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A. P. BLESING,
Minister of Agriculture.

AGRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Congress.

The forty-fourth Congress of the Agricultural Bureau will be opened by His Excellency the Governor at 8 pm. on Monday, September 11th, in the Way Hall, Franklin Street, Adelaide. Addresses will be delivered the same evening by the Minister of Agriculture (Hon. A. P. Blesing, M.L.C.) and the Chairman of the Advisory Board of Agriculture (Mr. A. J. Cooke). Delegates and other members of Branches are requested to be in attendance at 7.45 p.m.

Sessions for Women's and Men's Branches will be held on Tuesday morning, afternoon, and night, Wednesday morning (Free Parliament), and Wednesday night.

Agricultural Bureau Conferences.

Branches of the Agricultural Bureau have been advised that District Conferences will be held as follows:—

Pinnaroo Line, at Parilla, Tuesday, September 26th (Secretary, Mr. J. W. D. Carman) (altered).

Murray Lands (East), at Taplan, Thursday, September 28th. (Secretary, Mr. P. R. Hodge, Nangari) (altered).

Eyre's Peninsula (Southern), at Cummins, Wednesday, October 4th. (Secretary, Mr. H. M. Roberts.)

Eyre's Peninsula (Central), at Minnipa, Friday, October 6th. (Secretary, Mr. D. V. Kitto.)

Each Conference will commence at 10.30 a.m.

Butterfat Output Competition.

The United Dairy Cattle Breeders' Association of South Australia some six years ago inaugurated a Butterfat Output Competition, which has been known ever since to members of the association as the Gold Medal Competition. It is open to all members who have at least six cows under official test, and the results based on the official figures are computed and supplied annually by the Department of Agriculture.

In the main, the rules have not varied a great deal over the period of years, although one alteration made in the year just closed seemed to increase the tensify for some entrants and to reduce it for others. The rule in question was the one affecting the personnel of the herd, and requiring that at least one cow in every six or part thereof should be 5 years old or over. Such a rule had the effect of giving to the herd with the specified number of mature cows a decided advantage over the one which possessed too few, and in certain instances of relatively small herds in which the quota of mature cows lacked considerably, these herds were not eligible to compete. This anomaly, however, was removed in time for the sixth year, and the rules for that year, which ended on June 30th last, were as follows:—

1. At least six cows per herd had to be entered for the competition.
2. In herds of more than six cows, owners were permitted to withhold from competition 25 per cent. of their number, but not more than 25 per cent.
3. Handicaps were:—

For cows under 2 years at calving, 80lbs. butterfat.

Two years, but under 3 years at calving, 60lbs. butterfat.

Three years, but under 4 years at calving, 40lbs. butterfat.

Four years, but under 5 years at calving, 20lbs. butterfat.

Five years and over, nil.

The final results have brought to the fore a new winner in the person of Mr. C. E. Vereco, of Mount Compass; his herd, a comparatively small one, established a new record output for this particular competition.

The winners to date have been:—

- 1927-28 Mr. C. J. Morris, Monteith, 556.58lbs. butterfat.
- 1928-29 Mr. J. A. J. Pfitzner, Hampden, 456.81lbs. butterfat.
- 1929-30 Mr. C. J. Morris, Monteith, 496.69lbs. butterfat.
- 1930-31 Mr. C. J. Morris, Monteith, 465.21lbs. butterfat.
- 1931-32 Mr. C. J. Morris, Monteith, 560.94lbs. butterfat.
- 1932-33 Mr. C. E. Vereco, Mount Compass, 563.47lbs. butterfat.

The Late Professor Lowrie.

The recent death of Professor William Lowrie recalls to the minds of all farmers the valuable work which the late Professor achieved for South Australia. He was known personally to many as an able man of great personality, and the younger generation of farmers learnt to recognise him as a leader in agriculture and one whose work exercised a powerful influence on the agricultural practices of this State. As a tribute to the Professor the following remarks were made by the Minister of Agriculture (Hon. A. P. Blesing, M.L.C.) at the opening of the Winter School for Farmers at Roseworthy Agricultural College early this month:—"It is appropriate on this occasion to draw attention to the recent demise of Professor William Lowrie, who occupied the position of Principal of the Roseworthy Agricultural College with conspicuous success from 1887 to 1901. Concerning his College work, it can be said that during the course of those 14 years he laid down well and truly the foundations upon which the College work has since developed, and that he was responsible for the training of many students who have since risen to distinction in various walks of life. But he did far more than this. In Lowrie's time there was no Department of Agriculture; in fact, at that time the Roseworthy Agricultural College, meagrely equipped as it was, may be said to have been the Department of Agriculture. Lowrie was both a man of conspicuous ability and a practically minded farmer; he paid close attention to farm operations on the College farm; he sought to account for the relatively low wheat yields that were prevalent at the time. Eventually he came to attribute them to two main factors more or less related to our climatic conditions, namely:—(1) Efficient bare fallow, and (2) the systematic use of water soluble phosphates. As soon as he had convinced himself of the soundness of his facts, he stressed their importance to South Australia from platforms in every section of our agricultural areas. His advocacy was so successful in the matter that our mean wheat yields which for the 30 years ending in 1906 were below 6bush. to the acre rose to 9½bush. in the next decade and to 12½bush. in the decade that followed.

It can be said, of course, that land was being fallowed in South Australia before Lowrie's time, and that response of the College land to superphosphate had already been noted by his immediate predecessor, Professor Custance, and this no doubt is true. But farmers of the present day whose personal experience does not extend to the eighties can have no idea of the difference between 'fallow' as Lowrie conceived it—and as we accept it to-day—and 'fallow' currently practised by farmers of the eighties. Lowrie was the first to show how 'bare fallow' should be prepared and handled in South Australia; and to-day Lowrie's bare fallowing is the sheet anchor of South Australian farming. Further, more than any other man, Lowrie, by the effectiveness of his advocacy, was responsible for the rapid adoption of drills and superphosphate in South Australia. His name and fame should be an inspiration to all young South Australian farmers."

Worms in Horses.

At the recent Conference of Upper Northern Branches of the Agricultural Bureau a delegate from Morehard asked: "What is the cause and treatment of large white worms, very prevalent in young horses this year? Mr. R. H. F. Macindoe, B.V.Sc.,

M.B.C.V.S., to whom the question was submitted, says:—"Infestation of horses is the result of their swallowing the eggs of the worms contained in food or water. The eggs develop under favorable conditions of warmth and moisture such as would be supplied in moist earth at a temperature of 98deg. Fahr. They retain their fertility in unfavorable surroundings for a long time and develop under favorable conditions. The young worm in the egg can live in dry horse manure for six months. *Treatment for Horses with Large White Worms.*—Withhold all bulky food for 24 to 48 hours, but bran mash with a little crushed grain can be given. Then administer as a drench:—Raw linseed oil, 1½ pints; oil or turpentine, 4 to 6 table-spoonfuls. Shake thoroughly before administration. Withhold all food for two hours after drenching and then give a small feed, gradually increasing the amount until the animal's normal ration has been reached. Tartar emetic in one dram doses repeated at the end of 12 hours and given with a little linseed meal in a small bran mash, followed in 24 hours by an oil drench, is also effective, but do not give the oil drench if diarrhoea is present. *Preventive Measures.*—All worms expelled should be burnt. All drinking water should be protected from contamination with manure and as free from surface drainage as possible."

Oranges Setting Fruit out of Season.

Replying to a question, submitted by the Upper Northern Conference as to the cause of orange trees setting fruit out of season? Mr. G. Quinn (Chief Horticultural Instructor) says:—"Whilst the normal flowering period of the orange tree is in spring when the first burst of new growth occurs, it will, if stimulated to make further bursts of new growth, produce flowers and set scattered fruits at any time during the summer season. This characteristic may be explained by pointing out that orange trees do not develop flower buds on the previous summer's growth before the trees go to rest—as is seen in the case with the deciduous fruit trees such as apple, pear, peach, apricot, cherry, plum, &c., but the flowers are formed on the ends of new shoots and set into fruits without any delay or resting period.

The usual cause for a succession of fruits forming on the orange trees is that after the growth, which begun in the spring, has matured, the ground may become somewhat dried out and the roots cease growing. A soaking rain or an irrigation applied at this stage causes a renewal growth of young shoots which often blossom and set some fruits. In our dry summer climate such intermittent supplies of moisture may cause several bursts of new growths and flowers, and result in a tree carrying several lots of fruits, all of varying sizes and ripenesses. The best way to avoid these recurring settings of fruit is to maintain enough moisture in the soil until after midsummer to prevent these fits and starts of new growths. It is wiser to test the moisture in the soil about the trees by boring or digging a hole here and there, than to be guided by the curling of the leaves of the orange tree which is usually a sign that its roots are suffering from lack of soil moisture."

Publications Received.

Year Book of Agriculture, U.S.A., 1933.

* Domestic Preservation of Fruit and Vegetables, Bulletin, No. 21. Price, 1s. net.

* Narcissus Culture, Bulletin No. 44. Price, 9d. net.

* Published by Ministry of Agriculture, England.

AGRICULTURAL INQUIRIES.

[Replies supplied by Mr. W. J. SPAFFORD, Deputy Director of Agriculture.]

Weevil in Wheat.

Woolville Agricultural Bureau—"Will dry pickle kill wheat weevils?"

Reply.—It is a matter of common experience that where seed wheat is pickled with copper sulphate powder, and the work is done in a barn, the building is rid of weevils.

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The fine powder settling on walls and beams kills the insects and prevents re-infection from outside sources. The department has no knowledge of experiments carried out to show how little copper carbonate would be effective in killing weevil in grain, but in any case this method of eradicating the insects could only be practised with wheat that is to be used for seed, because copper carbonate in quantity is poison. Wheat that is to be used for feeding to animals can be kept free from weevils if stored in an airtight receptacle.

Ploughing in Stubble.

Palabie Agricultural Bureau—"Would ploughing in of 3bush. stubble be detrimental to fallow?"

Reply.—If the low yield of 3bush. per acre was due to the crop having been affected by "take-all," the ploughing in of the stubble would be harmful. In this case the land should have been cultivated instead of ploughed so as to leave the straw and other organic matter on the surface. On the other hand, if the low yield was due to lack of rain or poverty of the soil the ploughing in of the small amount of straw would not do much harm.

Working Red Land.

Palabie Agricultural Bureau—"The best method of working land, red sandy loam, ploughed August, 1932, worked back to depth of 2½ in. July, 1933, to be drilled in about May, 1934."

Reply.—If sheep are available they should have access to the fallow often enough to keep down all growth, then it will only be necessary to work the land when a crust has formed after fairly heavy rain. When the land is free from weeds a spring-tine cultivator with alternate tines removed will break the crust without smoothing the surface of the sandy soil to too great an extent, but if weeds are present the rigid-tine cultivator is the only implement to do the job properly without unduly encouraging drift. Under no circumstances whatever should the depth of cultivation given to this land exceed the 2½ in. of the working back.

Establishment of Artichokes.

Replying to an inquiry from Gulnare, Mr. Spafford states that there are two totally different plants known as artichoke which are used as vegetables. The globe artichoke is a thistle, the portion eaten by human beings being the base of the flower heads, whilst the other, generally known as the Jerusalem artichoke, produces tubers which are cooked like potatoes. The roadside weed known as wild artichoke is a thistle, very similar in appearance to the globe artichoke, but is very spiny, and except for the spines is a livestock foodstuff of fair feeding value. Stock do quite well on the wild artichoke if converted into ensilage, and readily eat the plants if they be cut and allowed to wilt before being placed before the animals. There is a form of the wild artichoke which is free from spines and is readily eaten by farm livestock.

Boiled versus Crushed Grain for Stock.

Weavers Agricultural Bureau—"Is it advisable to boil grain for stock, or is crushing best?"

Reply.—It is generally recognised that hardly any of the ordinary livestock foodstuffs are improved by boiling and that, with the exception of potatoes, it is not an economic practice. Best results are secured from grains by grinding to a fine meal; soaking gives slightly better results than feeding whole, dry grain. Cooking lowers digestibility, although it sometimes improves palatability. If grains are to be soaked, only sufficient water to be absorbed by the grain should be added, and there should never be a surplus of water. Soaked grain should be fed when fresh and not allowed to become sour.

Growing of a Wheat Crop on Irrigated Land.

Pompoota asks for information regarding the growing of a crop of wheat on irrigated land.

Reply.—It would be easy enough to grow a crop of wheat for hay with irrigation on swamp land, but it is doubtful whether one could be certain of a crop of grain. When growing wheat under such conditions there is very grave risk of red rust destroying the crop for all purposes, and if an attempt is made to grow a crop for grain it may have to be cut for hay at short notice. Without being at all confident that the crop will be successful, the following is suggested:—

Best Variety to Sow.—Of the prominent wheats of the State there are only two that are very rust-resistant—Ford and Sword. Although rust-resistant under ordinary field conditions, it could not be expected that they would retain this resistance on swamp land, but they should be better than other kinds; 60lbs. seed per acre should be ample. Although rank growth could be obtained without manure, the addition of 60lbs. to 90lbs. superphosphate per acre should be beneficial. If the crop does mature grain, it is certain to be so rank that it is very doubtful if a stripper could possibly handle it. A reaper-thresher would harvest the crop, otherwise it would be necessary to cut with binder and then thresh it in some way. For almost all conditions the best depth to sow seed wheat is about 1in. If planted by the middle of July and the crop matures normally, it should be ripe towards the end of December. If the land is at all damp at seeding time there will be no need to irrigate to promote germination, but if the land is dry it should be irrigated, and as soon as dry enough to take the team, it should be cultivated and sown. Where the watertable is so close to the surface, as it is in many parts of Pompoota, the greatest difficulty is likely to be keeping down excessively rank growth and to reduce moisture from around the plants, and it is doubtful if any irrigations will be required.

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Eradication of Soursobs.

Bowmans asks for information concerning the control of soursobs.

Reply.—The only successful method I have seen of controlling soursobs, which appear in quantity on cultivated stubble land, is to cut them off with a rigid-tined cultivator every time they appear, and delay seeding as long as possible and seed land with an early variety of wheat, such as Gluyas or Waratah. If they persist well into the winter, it may be necessary to keep at them until after the safe-seeding period for wheat has passed, then either Prior (2-rowed) or Roseworthy Oregon (6-rowed) barley could be sown. Barley tends to choke out soursobs much more effectively than any other of the cereals.

Soursobs, no matter how thick, do not interfere with the job of ploughing to any great extent, and as it is well to expose as many of the bulbs as possible the original stirring of the fallow should be given with a mouldboard plough. Very little can be done towards eradicating the weed during the spring and summer, unless pigs or turkeys are to be run on the land to help control the pest, when the more frequent the workings given the more bulbs will be exposed for the animals and birds to eat. As soon as the autumn rains arrive, a growth of soursobs appears, and to thin out the weeds it is necessary to cultivate every time the soil shows green. Seeding should be delayed and very early varieties of wheat used. The rigid-tined cultivator fitted with wide shares is the best implement to use to deal with soursobs.

Soursobs sometimes injuriously affect sheep when fed almost exclusively upon them for long periods of time, but provided the sheep are not hungry when first put on a luxuriant growth of soursobs little harm is usually experienced.

Soursobs are a nasty weed to have on a wheat-growing farm, and where present, farmers are almost compelled to delay seeding to enable them to frequently cut off the growth, and then to sow very early varieties of wheat.

VETERINARY INQUIRIES.

[Replies Supplied by Veterinary Officers of the Stock and Brands Department.]

Upper North Conference: "Has the Department any knowledge of a disease in the Flinders Range known as coast disease on Eyre's Peninsula?"

Reply.—The term "coast disease" has been applied in a wide sense by stockowners on Eyre's Peninsula, Kangaroo Island, and other coastal areas of the State to a variety of diseases seen principally in sheep, the symptoms of which are weakness and debility which may be accompanied by diarrhoea, in some cases associated with some inco-ordination of movement, and in other cases fragility of bones. These symptoms, however, may be brought about by a variety of causes, such as (1) internal parasites, (2) a mineral deficiency in the diet, (3) the ingestion of certain plants (which causes interference with nerve function), and on Eyre's Peninsula and Kangaroo Island there is a disease also included under the general term "coast disease," in which the sheep appear weak, possess no energy, and lose condition rapidly, but if transferred from the limestone country (where disease is always noticed to occur) on to ironstone country, recovery takes place. This means that the term "coast disease" as used by stockowners on Eyre's Peninsula and in other parts of the State does not define one specific disease, but is applied to at least four diseases which in many respects have some similarity in symptoms, e.g., weakness and debility. The Stock and Brands Department has no knowledge of a disease in the Flinders Range which resembles the diseases found on Eyre's Peninsula, but in heavy rainfall areas it is probable that internal parasites may be causing mortality and economic losses.

Upper North Conference: "How may corns be diagnosed on horses and what is the treatment?"

Reply.—The term "corn" is applied to a bruising of the sensitive sole situated between the bars and the hoof wall, which is always due to pressure brought about by the heel of the shoe pressing down on this part of the sole. The injury may

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cause a rupture of minute blood vessels in the sensitive sole and the blood escaping stains the fibres of the horny (insensitive) sole. If the injury to the part is severe or long continued and no attention is given to it, suppuration may supervene and then a festering corn is established. *Diagnosis*—The presence of corns will cause “nodding lameness,” but as other injuries below the region of the knee cause a similar symptom, it is always necessary to examine the foot of the affected leg to establish the diagnosis. *Treatment*—Remove the shoe or shoes, cut out the tissue lying between the bar and the wall, and apply a poultice. If pus (matter) is present, sufficient tissue should be removed to effect proper drainage (otherwise the pus will work upward and break out on top of the heels). The wound should then be syringed out or soaked in solution of lysol and water (2 tablespoonfuls of lysol to 1 pint of warm water) and then for three or four days placed in a bran poultice, removing and treating daily as outlined above. When lameness has disappeared, have the animal shod with shoes which do not apply weight on sole between bars and hoof wall. This can be done by either (1) a three-quarter shoe, which is a shoe without a heel, or (2) “seating” the shoe so that the weight is carried on the junction of the wall and sole only.

Upper North Conference: “Is it advisable to bandage the legs of a foal that has been born with weak joints and what class of a bandage would be suitable?”

Reply—It is difficult to reply to this question, as the treatment to be given depends largely on the symptoms exhibited. Often in blood stock foals which knuckle over badly are born, and in such cases the legs should be placed in splints which can be made from hoop iron encased in cotton wool, carried from below the knee down to the hoof, under it, and up to back of the knee and kept in place by bandages, but considerable ingenuity is required in fixing and keeping the splints in position.

Eastern Eyre’s Peninsula Conference: “What is the best remedy for a horse with worms, and to build up constitution?”

Reply—The treatment usually advised for parasitic infestation of the horse (farin type) is as follows:—(1) Starve the horse for 24 hours (no feed or water to be allowed). (2) At the end of that time give the following drench:—Raw linseed oil, 1½ pints; oil of turpentine, 2ozs. (3) Subsequently feed on good quality chaff, bran, and oats. Feed regularly. The feeding is very important. (4) Further, give 1 tablespoonful of Fowler’s solution of arsenic in a small damped feed night and morning for 14 days. Buy Fowler’s solution of arsenic in 1lb. bottles.

RED SCALE.

The Chief Horticultural Instructor (Mr. G. Quinn) has identified an insect sent to the Department of Agriculture by the Longwood Branch of the Agricultural Bureau as red or orange scale (*Aspidiotus aurantii*), and discussing methods for its control says the best remedy is to enclose the tree in a gas-tight fumigating sheet and fumigate it with hydrocyanic acid gas—prussic acid fumes—for 45 minutes. As this is a procedure fraught with some danger, it should only be done by experienced operators. The equipment also, as a rule, is only possessed by regular orchard fumigating contractors or association.

The next best remedy is to spray the affected trees with an oil emulsion, such as kerosene emulsion in soap, or one of the white summer spraying oils, or with resin wash. This work is best done during the summer months when the young scales are crawling about the trees, but in no case should a tree be sprayed unless there is abundance of moisture in the ground at the time, either from a recent rain or an irrigation.

If the trees are very dense, they should be first thinned out to permit the spray being applied to every part of the twigs and foliage. Two or more thorough sprayings are required each season to keep the scale thoroughly under control.



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ANIMAL BREEDING PAST AND PRESENT, WITH SPECIAL REFERENCE TO THE WORK OF ROBERT BAKEWELL.

*[Address by Dr. A. R. Callaghan (Principal of Roseworthy Agricultural College)
to the Annual Meeting of the S.A. Branch of the Australian Society of
Breeders of British Sheep.]*

Those of you who are familiar with the history of animal breeding, and the enormous theoretical developments in the subject within the present century, will feel truly sympathetic towards me, especially when you realise that I have to cover the story in the very short time allowance of about half an hour. Without wasting time, therefore, I wish to state at the outset that my main endeavor this evening will be to put your minds at ease on the subject of animal breeding as an applied science, for although by training I feel that I am more or less wedded to genetics, which is symbolised by Mendelism, I cannot see how I can help you as practical animal breeders beyond confirming your suspicions that certain old beliefs are false. If I had an hour and a half at my disposal I could guarantee to confuse you to such an extent that you would never open another text-book on the scientific principles of breeding for the rest of your lives. In fact there is no subject which lends itself so well to baffling one's listeners with science than that which has developed to explain the intricacies of heredity. Recently I received an inquiry from a sheep farmer interested in this subject; his letter indicated intense interest, combined however with a certain amount of hopelessness because he was unable to get anyone competent to give him a simple explanation of genetics. He pleaded and asked if I would put him on to the simplest and the best article on the subject. I referred him to the simplest and most up-to-date work I knew, stating in parenthesis that it was a book of approximately 500 pages.

I can divide my talk this evening into two main categories—the first deals with our knowledge of breeding before the opening of the present century, and includes the old theories, and the second deals with the development since 1900, and includes our modern conception of heredity.

The old theories can be traced back to thousands of years B.C., in fact they have their foundations in the first domestication of animals by man, which is well beyond the realms of ancient history. Skipping the dim ages I propose to commence our review with the days when Adam was a mere boy. Some of you will recall that Adam and Eve had two sons—one Cain, the other, Abel—and in the fourth Chapter of Genesis we read, "And in the process of time it came to pass that Cain brought of the fruit of the ground an offering unto the Lord, and Abel, he also brought of the firstlings of his flock and of the fat thereof. And the Lord had respect unto Abel and his offering, but to Cain and his offering he had not respect." My contention is, gentlemen, that Abel knew more about his job of animal breeding than Cain did about his job of agriculture.

This superiority of animal breeders over the agriculturists in the practice of their art continued through thousands of years, and I doubt very much whether the agriculturist has caught up even yet.

There is no doubt whatever that the knowledge of animal breeding is one of the greatest, if not the greatest, traditions of mankind; it has developed in snow-ball fashion through the ages, accumulating from one generation to another. It has developed because of man's close association with animals; this association probably began by sheer companionship, for we are told that the dog was one of the first to be domesticated. Soon man, the true egotist, conceived the idea of keeping animals for his use, and from that stage on there has been a steady increase

in the value and usefulness of the animals he domesticated, so much so that the original wild types are unknown to us in the majority of cases, and we are left to theorise on the probable type and conformation of their wild ancestors.

All this time a great art was developing, and we of the present day are practising that art as it has been handed down to us. Mistake me not, gentlemen, for I mean art, and not science, for I am certain that we in this generation will never be privileged to indulge in any exact science of animal breeding as applied to the major groups of our domestic animals, for our present artistry is greater than our present science as far as this aspect of breeding is concerned.

Naturally man put his reasoning powers into operation in connection with the breeding of his animals, and he began to theorise, and until comparatively recent years this is where he failed. He was following certain methods because he or his predecessors had had success with them, but the details of heredity baffled him.

The first great advances were when he first controlled parentage, and this goes back at least 2,000 years B.C. We know that Sheik Salaman of the Arabians owned five famous mares about 1635 B.C., from which the best Arabian horses have been descended. In passing it is of interest to note that it is known that the Arabs, even in these early days, practised artificial insemination. From these early periods the great theory, "like begets like" was handed down, and was the rule of thumb of all breeders. Practically no new developments ensued until Robert Bakewell, of Dishley Hall, walked on to the stage in 1760 to play his part, and all authorities agree that the development of modern breeding dates from 1760 when Robert Bakewell began his wonderful work, for it was he who actually laid the foundation upon which most of our modern breeds of livestock have been developed.

This leads me to one of the main objects of my talk to you this evening, that is to pay homage to Robert Bakewell, a distant relative of Messrs. H. K. and R. D. Bakewell, of the Yalkuri Pastoral Company, who are members of our S.A. Branch

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Authorized by the Advisory Committee for Improvement of Dairying.

of this society and are present with us this evening. Surely it is rather unique that this our S.A. Branch should have an almost direct connection such as this with the founder of modern breeding. I say almost direct connection for the simple and trustworthy reason that the famous Robert Bakewell was a bachelor.

I could well spend the rest of my allotted time this evening in discussing the character and ability of Robert Bakewell. I could tell you how he proceeded on his farm, introduced rare and original methods of agriculture, how he irrigated his pastures, and utilised the resources at his disposal to their fullest and best advantage, and to what lengths and pains he went to breed and nurture the best sheep, the best cattle, the best horses, and the best swine he could from the foundational material available to him. Interesting as all this might be it would not serve my purpose of portraying Bakewell as a master of the art of breeding, and placing his work before you in its maturest and truest perspective.

All the biographers of Bakewell give him an exemplary character; in fact only the one blemish to his character is recorded, a most excusable one at such a meeting as this, for he was accused of possessing a certain degree of acquired cunning which the biographer excuses on the basis that "it is the recognised vice of his profession." Like the breeders of to-day he had a store of anecdotes and stories, but differed from many in that his conversation was never disgraced with expletives. Further we learn that he was a man of unimpeachable morals, and a person of strong natural sagacity. My general impression of this man from what I have read is that he was a born experimentalist, attended to all his work with infinite pains and the greatest of detail, was willing to impart all he could to those in sympathy with him, yet had insufficient education to hand down his methods, ideas, and reasonings to posterity, by means of his own pen. I feel certain that had Robert Bakewell been a fully educated man, the world would have been the richer, for it would not have been left to others to record the story of his magnificent achievements.

Bakewell's most distinguished success was unquestionably the formation of the Dishley or New Leicester sheep, a work which will remain a classic in the annals of livestock breeding. This work with the Leicester, or English Leicester, as we know it in Australia, was a pioneering work of the greatest importance, and his efforts and extraordinary success paved the way to the improvement of all our breeds of sheep, and in fact all our breeds of livestock. Bakewell realised and convincingly demonstrated in this work that animals have the power of transmitting their good qualities to their progeny, and that if proper care and attention be paid to mating and selection the desired type can be obtained.

His initial step was to choose carefully and critically the animals for his foundation, those which satisfied him most from the point of view of the design and proportions which were in his own head. Having selected and purchased the best of all that could be found of the county sheep he then set about propagating his own without seeking further blood from outside, for trusting in his early judgment which guided his initial selections, he felt that there was no stock good enough to mate with his own again. As one author puts it, "There may have been an odd sire in some odd place as good, but Bakewell could not be running constantly to Westmorland for a bull, Lincoln for a ram, or Holland for a stallion. He therefore began to put his own stock to his own, and continued to do so until the end of his career." Such a practice of breeding within his own flock was greatly at variance with the belief of the times, in fact it shocked the populace to learn that he was even practising the closest of in-breeding with some of his sheep, mating sire and daughter, dam and son, brother and sister, and so on. It shocked their morals chiefly, and those writers of the time who attempted to describe his system had eventually to adopt defensive tactics. To my mind the method of close breeding which he adopted was the greatest single contribution Bakewell made to animal breeding.

Apart altogether from this, however, he paid particularly close attention to symmetry and utility of form, smallness of bone, early maturity, and good fattening qualities. These aspects of his ideal sheep he made his objective, and his greatness lies in the fact that he obtained his objective to his complete satisfaction. The Leicesters which he bred, although slightly smaller in frame than the original foundational sheep, were greatly improved in compactness and symmetry of form, were thicker and deeper, and possessed of great fattening qualities, as well as early maturity.

Summarising the outstanding features of Bakewell's work in this connection it can be said that he had an innate judgment of form and external appearance which enabled him to discern the qualities he desired in the material available for selection. He was able to discriminate between size and quality of carcass, and he perceived a relationship or correlation between outward form and the aptitude to fatten and develop quickly. In other words he defined type as we know it to-day, and realised the true basis of utility of form.

Unwittingly Bakewell followed the underlying biological principles which control all breeding, and if our present knowledge of heredity had been available at the time, no sounder principles could have been adopted for the establishment of a definite type of new breed.

Leaving Bakewell I desire to relate very briefly how our knowledge has developed since his time. Needless to say, Bakewell's methods gradually became known and adopted, and the names of many accomplished breeders since his time might be mentioned, but actually they were interpreters of the system laid down by him. Of these I might mention Culley Brothers, as founders of the Border Leicester, and Thomas Ellman, who laid the basis for the modern excellence of the Southdown, as perhaps the outstanding men. The art continued to develop, and its refinements became more and more generally adopted, and outstanding progress was made. Along with this progress, however, there evolved a keen sense of inquiry and desire to know just how the mechanism of heredity worked.

About 1800 Lamarck made the inheritance of acquired characters the basis of a theory of evolution. Briefly his theory was that a new environment created new desires, created more activity on the part of some organs than others, and generally gave stimulus to new characters to fit the new environment, until gradually, after a number of generations, certain characters changed form and were eventually inherited. Darwin supported this hypothesis, and attempted an explanation on the basis that the cells of the body influenced in some way the reproductive cells, so that body changes would be inherited in the progeny. He had no proof nor could he show how such could take place.

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Other men brought several theories to bear on the subject which played a big part in our present conception, but the most highly developed and convincing of all theories was that postulated by Weismann in 1892, and which is now known as the theory of the continuity of the germ plasm. He did not believe in the inheritance of acquired characters, and maintained that the germ plasm which gives rise to the sperms and egg cells of living organisms remains unchanged and is handed down by the body unchanged and intact to the germ cells. He attacked the theory of Lamarck and Darwin, and pointed out that the evidence they gave was inconclusive. You and I know, gentlemen, that certain body modifications acquired during life are most certainly not inherited, and, to put it bluntly, I usually point out that wooden legs are not inherited, but wooden heads are.

Weismann searched for a proof, but it was left to subsequent investigators to prove that he was correct and that a mechanism did exist whereby the germ plasm maintained its complete identity.

The next great advance was made by Hugo de Vries when he advanced his "Mutation theory." De Vries became so convinced of the general occurrence and significance of suddenly appearing heritable variations that he proposed a theory of evolution by mutation in which he applied Darwin's great principle of natural selection. Without some change in the germ plasm it was difficult to explain how new characters suddenly appeared, but de Vries theory now universally displaced the old theory of the inheritance of acquired characters.

The discovery of Mendel's laws, which were first interpreted and made known to the world in 1900, although Mendel's original paper was published in 1865, revolutionised all ideas which were current at the time on inheritance, and for the first time a clear and lucid picture of the inheritance of certain characters was given. Weismann's theory of the continuity of the germ plasm stood the test better than any other theory, and with slight modifications the inheritance of characters on the basis of the continuity of germ plasm is well established.

The discovery of chromosomes made possible by the development of the microscope actually proved that a mechanism for inheritance along the lines interpreted by Mendel did exist.

From Mendel's work an enormous and all absorbing science has developed, and its application to all known organisms, plants and animals, high and low, and even to man, has been definitely proved. We now realise that we depend upon our parents for our hereditary constitution just as much as the sheep that are bred by you depend upon their parents for their hereditary constitution.

And so during the last 30 years the new science of genetics has developed, phenomenal advances have been made in our knowledge of heredity and its physical mechanism, but as far as animal breeding is concerned genetics has so far only elucidated the "whys and wherefores" of animal breeding, it has not contributed greatly to the "how" of animal breeding, that is still the gift of the breeder. From our knowledge of genetics, however, we receive confidence, for the light that has come through our new knowledge has merely confirmed the best methods of the past and disproved the worst, and it bears witness to the soundness and genius of the most noted of our earlier animal breeders, amongst whom Robert Bakewell ranks supreme as the first great pioneer of the modern art.

Out of the successes and failures of the past the wonderful art that is known and practised by breeders of livestock has been fashioned. Even the most ardent geneticist must admit that animal breeding is more of an art or a craft than an applied science. The time will come, there is little doubt, when science will be applied to animal breeding with full and lasting consequences, but underlying every success will be the artfulness or the craftsmanship of the traditional animal breeder.

THE PRODUCTION OF FAT LAMBS FOR LOCAL AND EXPORT TRADE.

[Prepared for the South Australian Branch of the Australian Society of Breeders of British Sheep by Dr. A. R. Callaghan, Principal of Roseworthy Agricultural College, assisted by Mr. S. Whicker, Livestock Assistant, Roseworthy Agricultural College.]

For the man about to interest himself in the production of fat lambs there are two main considerations with which he is confronted at the outset; the first is the class of country at his disposal and the second is the class of sheep he should use.

The first of these leaves very little to choice as the country is usually a fixed factor as far as the producer is concerned and he is anxious to know how to proceed on the country already in his possession. Provided the holding is reasonably convenient to market, or facilities of transport to market are accessible, and

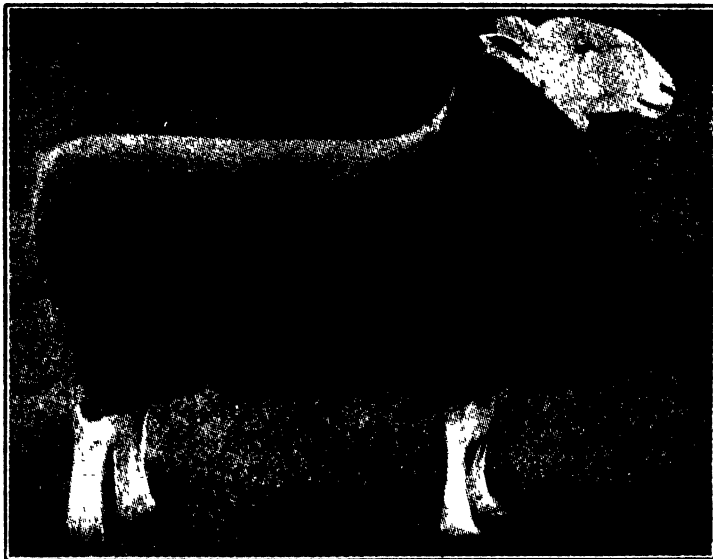


Fig. 1.—Border Leicester.

there is an assurance of winter feed, he can proceed with confidence. The very nature of our climate fits in with the idea of fat lamb production, for a period of feed shortage is followed by a period of excessive feed. The breeding of lambs to eat and fatten during the winter months when pasture is plentiful and selling them off the place again before the grass becomes scarce or dry and seedy, actually enables the grower to balance his carrying capacity, or utilise it to the fullest extent without having to run the risk of overstocking, or pursue an unsound policy of understocking. Under the environmental conditions prevailing in our main agricultural areas, therefore, fat lamb production has not only a definite place in our agriculture, but also a definite appeal to pastoralist and farmer alike.

CHOICE OF BREEDS.

The class of sheep at the disposal of the fat lamb producer is by no means limited in kind, but there are only three classes of sheep at his disposal.

Firstly, there is the Merino, renowned for its wool and kept principally for this reason. Secondly, there is the longwool class of British breeds, all of which may be described as dual purpose types, that is, they have valuable characters of carcase for mutton purposes as well as valuable wool. Thirdly, there are the shortwoolled, purely mutton breeds of British sheep.

For the successful pursuance of first class fat lamb production all three classes are utilised, but they are not essential, as will be shown later.

The longwool class when used is mated to Merino ewes primarily for the production of half-bred ewes, and the wether progeny can best be disposed of as fat lambs. In this mating there is an idea of *permanency*, for the half-bred



Fig. 2.—Romney Marsh.

ewes thus bred become valuable sheep from the point of view of their fleeces as well as for breeding of lambs.

The shortwoolled British breeds are purely mutton sheep, and when mated as sires to either Merino or half-bred ewes the sole object of the breeding is production of lambs for slaughter, the crossbreeding in this case is definitely of a *temporary* nature.

The choice of a foundation flock at the outset is therefore confined to Merino ewes, but where possible the breeding of a half-bred flock by mating at least some of the Merino ewes to rams of one of the longwool breeds is very desirable. The longwool British breeds at the growers' disposal are Border Leicester, Romney Marsh, English Leicester, and Lincoln (see Figs. 1 to 4), any one of which will cross very satisfactorily with the Merino and give a large framed, good breeding type carrying a profitable fleece (see Fig. 5). For the purpose the grower might find it more profitable to purchase the half-bred longwool Merino ewes rather than breed them himself, but much would depend upon local and personal circumstances. Any one particular breed cannot be advocated here,

even if it were desired, but the climatic conditions greatly influence choice, and it would be quite erroneous to be emphatic on the merits of one breed over all others. One type of half-bred will flourish under one environment, whereas better results with another will be obtained invariably in a different district, so that in point of fact it is impossible to stipulate which is the best half-bred to run unless the specific conditions are known.

It is generally recognised that, in the more favorable agricultural areas where fairly cold conditions prevail during the winter months, the half-bred longwool Merino ewe is an ideal type for fat lamb production, especially when mated with shortwool rams. There are many reasons for this, and briefly they may be summarised as follows:—

- (a) They are prolific, and capable of rearing twin lambs when twin lambs are born to them.
- (b) They are excellent mothers, foster their lambs well, and provide them with a plentiful supply of milk; this latter feature is important.



Fig. 3.—English Leicester.

- (c) They produce lambs of excellent conformation and capable of early maturity.
- (d) They carry fleeces of good weight and quality, and as they are a permanent feature of the work, this is a very important asset, which must be kept well in mind.
- (e) They can be mated to the rams as two-tooth, and with any of the short wool mutton breeds they nick well without any parturition complications.
- (f) They are ideal for more closely settled regions, being thrifty and good doers in small areas, not requiring the large, open runs that the Merino thrives best in, and, further, they have a natural aptitude to fatten even as broken-mouthed sheep, and, consequently, can be disposed of very profitably as mutton after their main period of breeding usefulness has finished.

Such a line of half-bred ewes is, however, not easily procured, but a flock can be easily bred up without seriously interfering with the immediate object of fat lamb production.

In the hotter and drier districts, where the sheep runs are larger, it is doubtful whether any breed is more suitable than the Merino as the basal flock. Provided the Merino is of the large-framed, plain-bodied, true South Australian type, excellent results can be obtained when these are mated to certain of the short woolled British breeds.

Where Corriedales are available they make an excellent foundation flock, giving excellent wool returns and fulfilling most of the desirable qualities of the half-bred longwool-Merino. When mated to the shortwool rams they produce splendid lambs.

The sires for fat lamb production for the best results must be drawn from the shortwoolled British breeds, and the following are available from which the grower must make his choice:- Southdown, Dorset Horn, Suffolk, Shropshire, Ryeland, and Hampshire (see Figs. 6-11). Undoubtedly certain breeds will give better results for export than others, and similarly other breeds will give better or at least as satisfactory results for the local market. It is possible here to be

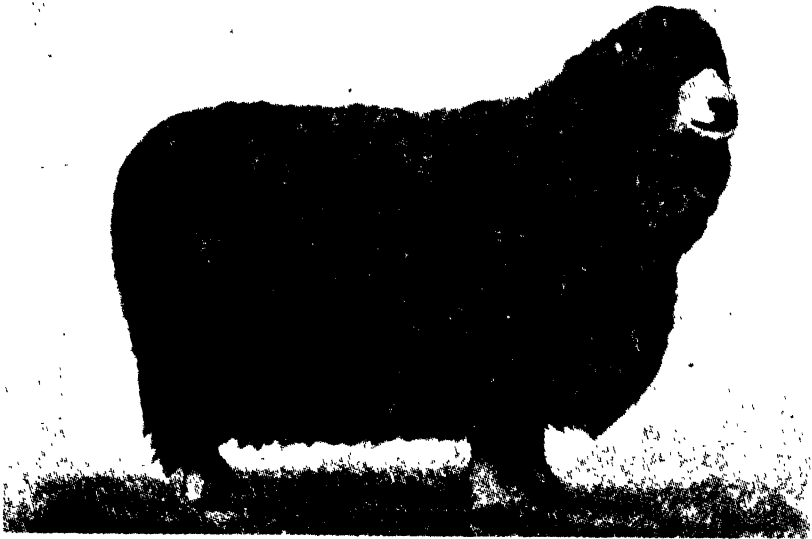


Fig. 4.—Lincoln.

more definite in making general recommendations, but it is more expedient to leave the choice of the sire to the particular fancy of the breeder and suitability to the district concerned. Much will depend upon whether Merinos are being used as dams, or what type of longwool-half-bred Merino is being used. Suffice it is to say that compactness and shapeliness of carcass is the objective, and provided any particular breed gives a satisfactory lambing percentage, is sufficiently prepotent to give shapeliness, and compactness to his progeny, as well as early maturity, excellent results will follow.

The shortwoolled breeds mentioned, generally speaking, fulfil these requirements. Obviously, the choice of the ram within the breed is very important, and due attention should be paid to shortness of leg, well filled breech, and low set carcass generally, with good heart and lung room.

Whatever the choice, it is preferable to use one breed of ram in the flock, as uniformity of type is one of the main features of successful marketing. (See Fig. 12).

MANAGEMENT.

Having decided the line of breeding to be followed is but the first step in successful lamb raising, and whatever the breeds intended to be mated proper and careful management is the keynote of success. It is this aspect of the industry that is apparently most neglected. Many growers go to no end of trouble to ascertain the right breeds to use, and having made the choice imagine that their chief work is done. Nothing could be further from the truth, as good lambs can only be produced with consistent results by paying great attention to all details of the management of the breeding flock and the ewes and lambs after parturition.

The following aspects of management which directly concern the fat lamb raiser must be given very careful consideration:—(a) Mating; (b) lambing; (c) lamb marking; (d) feeding; and (e) marketing.



Fig. 5.—A Long-wool Merino half-bred ewe.

(a) *Mating.*

The actual time of mating will depend upon anticipated feed supplies five months in advance; in other words, mating must be so arranged to ensure lambing when green feed is available in regular and increasing quantities. Generally speaking, green feed is available in our agricultural areas in May and even earlier, especially where stubble feed is available. On the assumption that fresh feed is usual about April 30th, then the ewes should be mated about November 30th, thus allowing for the five months' gestation period. Before this date it will be found difficult to mate longwool-Merino half-bred ewes, as they will not take the ram readily. This appears as a peculiarity of some breeds. Where early mating is required and considered reliable, the use of the Dorset Horn-Merino

half-bred will satisfy the requirements, as they mate readily at any time. The Dorset Horn is a breed more or less intermediate between the true shortwool British breeds and the longwool breeds, and when mated to the Merino they produce large-framed breeding ewes. As permanent flock 'sheep the half-bred Dorset Horn-Merinos yield a lower fleece return than the longwool-Merino half-breeds, but they are quite equal to them as mothers and for producing early-maturing lambs.

The rams of British breeds require to be young if satisfactory service is to be given, and they should be two, four, or six-tooth, but no older, for it can be taken as a general rule that British breed rams over three years of age are unreliable lamb getters. The rams should on no account be overfat, for in such condition they are lazy and prefer to sleep in spare moments when their activities are most required. They should, therefore, be in good, vigorous condition, and

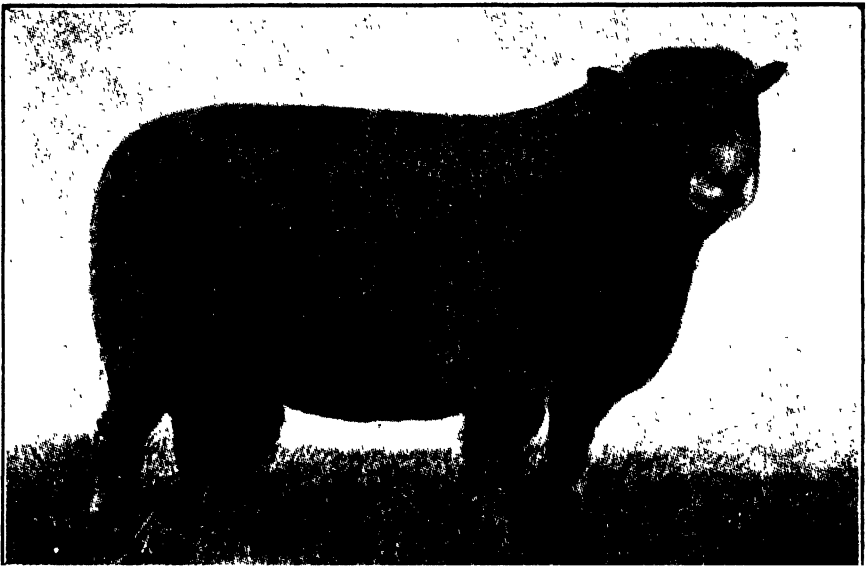


Fig. 6.—Southdown.

to encourage this it is a good practice to allow them $\frac{1}{2}$ lb. of oats per head per day for about a week or 10 days before mating.

The ewes should also be in active condition, preferably in forward-store condition, gaining weight, but not fat; overfatness in the ewes makes conception difficult, chiefly because the organs become rather congested with excess fat. The best results follow what is known as "flushing" the ewes just prior to and during mating; this requires that they be run during this period on the freshest and most nourishing feed available. Green pickings, which are normally prevalent on fallows at this time, serve the purpose of flushing well, as the fallow grazing assures a certain amount of exercise as well as providing the necessary fresh feed.

In joining the rams it is preferable to yard the ewes; in this way the rams and ewes become acquainted more readily than if the initial meeting is in an open paddock. Any benefits which may accrue from "love at first sight" are taken the fullest advantage of by this method. About once a week during the mating period the ewes should be yarded into a convenient yard or small enclosure and the rams removed and given a feed of $\frac{1}{2}$ lb. oats. Re-introduce the rams

after their feed before nightfall and allow the flock to remain in overnight. This night yarding certainly speeds up the work of the rams and encourages a far more even lambing. After mating has proceeded for a fortnight or three weeks, provided facilities are available, it is a good policy to introduce a reserve ram to the flock while one of the others is removed and spelled for a time, or better, use half the number of rams one week and replace them the next week with the other half. The rams being spelled should be fed well in the meantime. Often the ewes that do not take particularly to the rams already in the flock will take kindly to a fresh ram, and *vice versa*, a fresh ram will pay greater attention to ewes that have not received such intimate attention from the other rams.

The mating period should continue for seven to nine weeks, when all the rams should be removed.

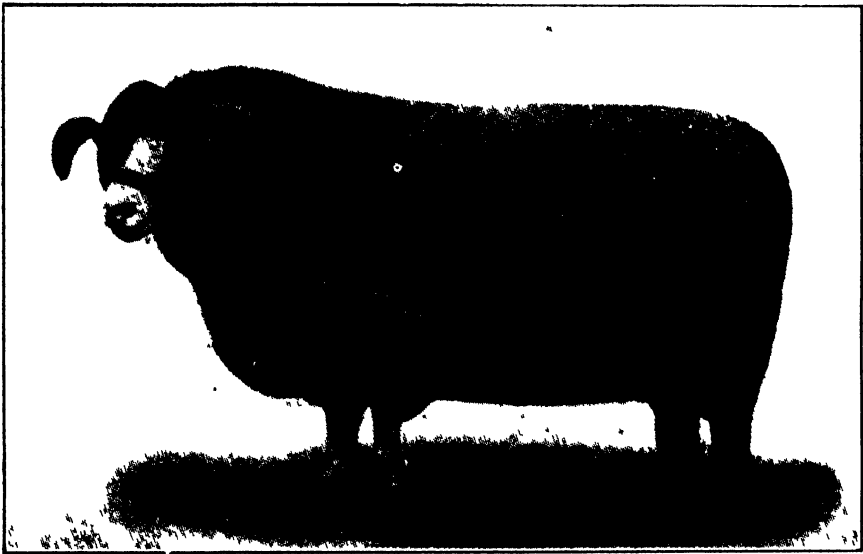


Fig. 7.—Dorset Horn

(b) *Lambing.*

About six weeks before the ewes are due to lamb they should be crutched. The crutching should extend from well above the tail down to the point of the hocks, as illustrated in Fig. 13; and in doing so the ewes should be handled with the strictest care, and on being released should be let go forward and on no account allowed to fall on one side.

When lambing time arrives it will be found that flocks of about 100 ewes, run in comparatively small paddocks, are most convenient and easily attended. The best feed paddocks available should be utilised at lambing time, and shelter of some description in the paddock is highly desirable. Open, exposed paddocks are most inhospitable to the lambing flock, especially as lambing is usual when cold, wet nights are not uncommon. Once lambing commences the flock should be quietly visited night and morning, care being taken not to disturb the ewes, and for this reason the attendant should not be accompanied by dogs. During these visits many troubles may be alleviated and many lambs saved as a result. In districts where foxes are troublesome poison baits will be found effective if used before any lambs are dropped. Where the paddocks are small sheep bells

round the necks of several of the ewes have a restraining influence on foxes, and an additional safeguard in cleared areas is to set two or three hurricane lanterns attached to stakes driven firmly into the ground in different parts of the paddocks.

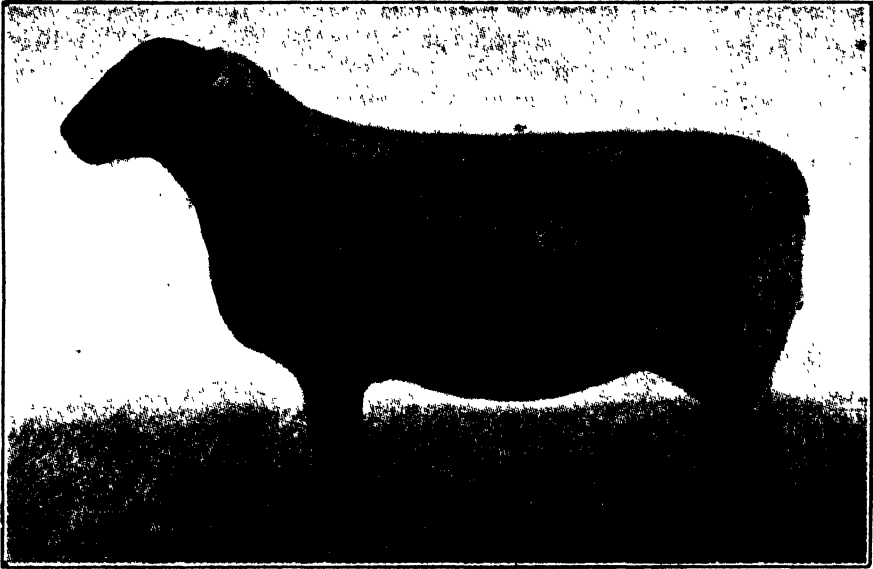


Fig. 8.—Suffolk.

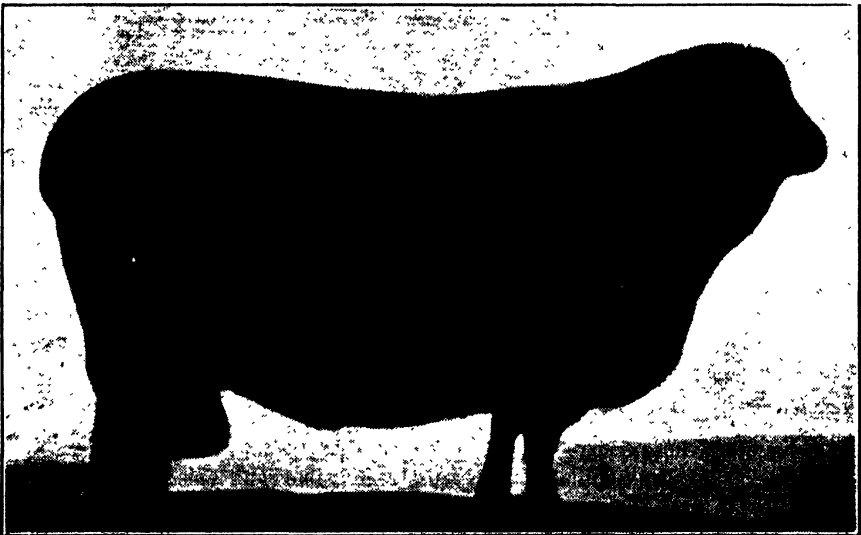


Fig. 9.—Shropshire.

Where it is possible it is an advantage to draft off the day or two-day old lambs with their mothers on to better and fresher feed.

Occasionally a ewe, especially with her first lamb, will leave it, and if the lamb is to be reared it must be mothered back to its mother preferably, or to a ewe whose lamb has died. Sometimes this process of mothering requires extreme

patience, but if the lamb is saved it means anything from 10s. or more extra return, so that the time occupied is well paid. Should a ewe lose her lamb it is advisable, if possible, to get her to mother a twin lamb from another ewe.

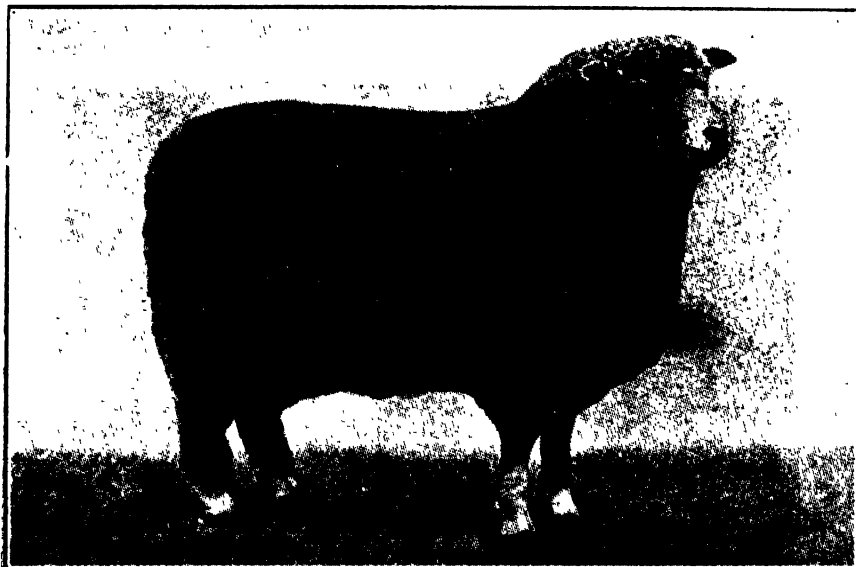


Fig. 10.—Ryeland.



Fig. 11.—Hampshire.

The most successful way of doing this is to skin the dead lamb and tie the skin so obtained around the less thrifty of the twin lambs and mother it to the mother of the dead lamb.

(c) *Lamb Marking.*

When the lambs are from 10 to 20 days old (and no older), they should be marked, and this is best done in one corner of a well grassed paddock. It is much better practice to mark early, and have two or three batches to mark, than to have some of the lambs too old when the operation is performed. A strip of

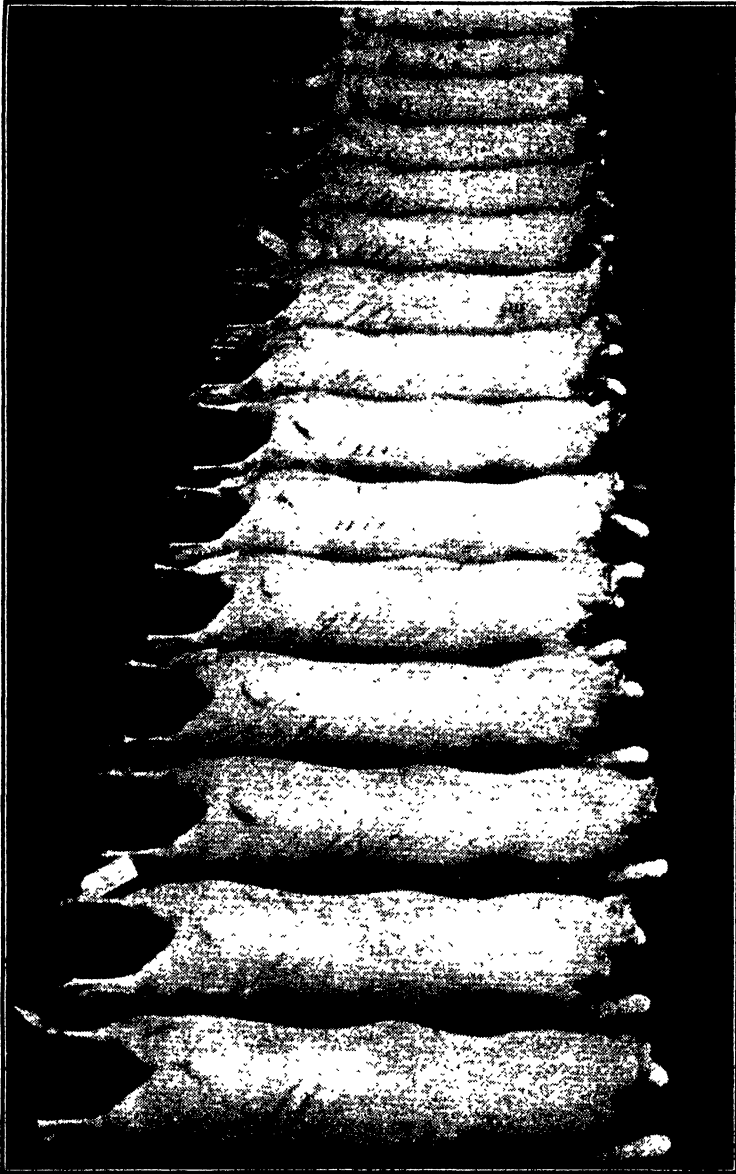


Fig. 12.—Carcasses of 15 lambs of even type (College entry for July Export Competition).

temporary fencing and a few stakes will enclose a corner of the paddock conveniently. By adopting a policy of marking on a fresh area of well grassed land, not only is the possibility of deaths from infection of wounds, such as may follow after marking in constantly used sheep yards lessened, but also the risk of lambs being rejected for export on account of caseous lymphadinitis.

The instruments used should be carefully sterilised before and during the operation by dipping them in liquid sheep dip or some other disinfectant such as lysol. A dressing may be applied, and preferably it should be something that will act as a blowfly deterrent; for this mixture one part of Stockholm tar to one part of kerosene is recommended. Actually, if the work is done cleanly no dressing is required on the cuts, but if applied to the wool just close to the cuts the kerosene in the mixture will help considerably to prevent blowfly strikes.

For marking, the flock should be assembled on a mild morning, and driven quietly, and not too far (this applies to after marking as well as before marking), otherwise the lambs get overheated and excessive bleeding will follow. During



Fig. 13.—A crutched ewe.

marking avoid overcrowding, especially of the lambs. The marking should be done early and never later than 4 p.m., as sufficient time must be allowed for the lambs to stop bleeding and mother up before nightfall.

In castrating it is best to cut a large piece off the top of the purse and not to slit it. In cutting off the tail remove at the first or second joint and force the skin back towards the lamb before cutting so that this loose skin will come down and cover up the end of the bone in the tail. If the knife is placed on the tail with the flat of the blade on the skin and the back of the blade towards the lamb the skin can be forced back towards the lamb this way. Then if the end of the tail held in the left hand is bent upwards towards the lamb and over the knife the joint will be easily located (at the bend) and the curve on the outside of the tail will allow of sufficient skin being left to cover the stump when the tail is cut off.

The lambs should always be watched carefully after marking to see that none has been fly blown in the open wounds.

(d) *Feeding.*

Between mating and lambing it is essential not to allow the ewes to become low in condition, and by changing the paddocks weekly, but at the same time



Fig. 14.—A dressed lamb of ideal weight and good conformation.

being careful to reserve a good paddock for lambing, the sheep will do better and the feed will be utilised more economically.

After the lambs have been dropped, if the season is normal, good feed is available. Here again it is better to give the flock weekly changes, never allowing

them to stay in a paddock until it is eaten down very low. It is extremely important that the lambs should continue their growth and at no time receive a check, and to avoid this the mothers must be kept in full milk and paddock feed maintained. This is best accomplished by careful management of the feed available, and regular changing of paddocks. This usually means a change to better feed as well as variation in diet.

Under no circumstances should the lambs be weaned from their mothers until the day they leave the farm for the market.

During the whole year a plentiful supply of clean water and salt lick should be available. A suitable lick is as follows:—Coarse salt 50 parts, superphosphate 25 parts, lime 15 parts, iron sulphate 3 parts, Epsom salts 7 parts. When fresh green feed is present the amount of Epsom salts should be reduced to 4 parts and iron sulphate increased to 6 parts.



Fig. 15.—Lamb and weighing sling.

To go about the production of early fat lambs with the greatest confidence it is essential that a supply of reserve feed be kept on hand for stock in the event of drought and consequent shortage of feed. If feed is present in a conserved form then the risk of the season opening late can be run without worry. Suitable feeds are ensilage and oats and both can be conserved on the farm conveniently. At first the sheep may not take kindly to ensilage, but after a time they will consume 4lbs. to 5lbs. per head daily. An allowance of 6ozs. of oats and 4lbs. to 5lbs. of ensilage per head per day will keep the sheep in healthy tone and condition.

(e) Marketing.

The lambs should be marketed straight from their mothers in as prime and finished condition as possible, showing sappiness and bloom and not a dry appearance.

For the export market the lambs should weigh from 60lbs. to 75lbs. live weight; these will then run from 30lbs. to 38lbs. dressed weight. The ideal lamb for export weighs 32lbs. dressed weight (see Fig. 14). For the local market extra weight receives the attention of the buyer, and with some breeds the lambs can be marketed in better condition and bloom at the heavier weights, so that for the local market lambs weighing 70lbs. to 80lbs. live weight will be found more profitable. Unfinished lambs invariably bring lower prices, and the aim should be to have the lambs well fleshed and rounded off with fat, or, in other words, in prime condition.

In handling the lambs prior to marketing the greatest care should be taken, as they are very liable to be bruised. Avoid poking with sticks, or using dogs which have a habit of biting, and to catch the lamb refrain from catching him by the legs or wool. The best method is to put one hand under and around the



Fig. 16.—Spring balance and lamb being weighed.

neck and to lift the lamb, put the other hand under the brisket just behind the forelegs.

To be sure of the weight of the lambs the most reliable guide is to weigh them, and for this purpose a lamb sling, constructed of a piece of board 19in. x 3in. x 1in. to fit along the belly, and two straps of leather each 48in. long attached about 3in. from the end of the board to form a loop on each side, will be found most convenient (see Fig. 15). The lamb is suspended in this sling and weighed on a clock-face spring balance, as illustrated in Fig. 15.

A daily gain in weight for a lamb varies according to the breed and feed, but $\frac{1}{2}$ lb per day is a general average. At this rate a lamb weighing about 9lbs. or 10lbs. at birth will be about 60lbs. live weight at 14 weeks. Some batches of lambs have reached a live weight of over 70lbs. in 13 weeks.

The loss in weight from the farm to the dressed weight on the hook is generally about 53 to 54 per cent., though in some cases it has been found to be less, according to the distance of travel and the breed.

Where lambs are to be sent by rail and the railway station is some 3 or 4 miles from the farm it is much better to put frames on a hay waggon and transport the lambs to the station rather than to drive them, as driving causes considerable wastage, and the lambs become dry in appearance and lose some of the sappiness and bloom so essential in a quality lamb.

Where lambs are required to travel any distance in a lorry old sheep skins tied around the rails of the frame, with the woolly sides close to the lambs, reduces the risk of bruising to a considerable extent. Some old straw scattered on the floor of the conveyance will usually prevent the lambs from becoming stained and dirty.

On the local market, where the lambs are sold on the hoof, it should be remembered that the more attractive the lambs the greater the attention from the buyers, consequently the greater the competition for them and the higher the price.

Whether sold in London or Adelaide, to be attractive, the lambs must be prime and sappy, evenly graded with regard to type and weight, and be free from bruises or blemishes when dressed.

It will always pay the seller to grade his lambs off into several pens so that each pen contains lambs of even weight and quality. If consigned to the Abattoirs they should be marked on the head with red or blue raddle, so that the agent will have no difficulty in drafting them into their most attractive grouping. Too often the grouping is left entirely to the discretion of the agent and he has to perform the job hurriedly and under the worst conditions, that is, if he has the time to do it at all. After all, the agent can hardly be expected to do this work; in many cases it is not done and a lot of the time and care of the grower is wasted by unattractive or careless marketing.

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PURE-BRED COWS COMPLETED OFFICIAL TEST

Herd Book No.	Name of Cow.	Owner and Address.	Breed.	Calved.
JUNIOR TWO-YEAR-OLDS—				
Not allotted	Lakeland Capture	H. B. Peters, Mount Compass	Jersey	16/8/32
"	Balaklava Griselda Inka	A. E. Middleton, Balaklava	Friesian	18/4/32
31136	Wooroora Lassie	A. B. Sieber, Eudunda	Jersey	5/6/32
34510	Tuela Waratah 4th	F. Coleman, Saddleworth	"	15/7/32
5423	Long Flat Lucy	W. J. Spackman, Long Flat	A.I.S.	14/8/32
34500	Tuela Gaillardia	F. Coleman, Saddleworth	Jersey	7/7/32
Not allotted	Crofton Sunny Morn.	H. & A. Bohme, Balhannah	"	14/9/32
31016	Crofton Mavourneen	H. & A. Bohme, Balhannah	"	14/6/32
34505	Tuela Shizanthus	F. Coleman, Saddleworth	"	6/7/32
34652	Cudlee Creek Fairy Queen 2nd ..	W. A. Pool, Cudlee Creek	"	8/7/32
Not allotted	Sweet Haven Mercedes Bloom 2nd ..	J. M. Bray, Langhorne's Creek.	"	13/9/32
5294	River Glen Clarabelle	S. N. Bott, Murray Bridge	A.I.S.	15/7/32
3326	Barina Bloom Beets	L. H. & P. C. Giles, Auburn	Friesian	28/6/32
34609	Roseworthy Princess 44th	Agricultural College, Roseworthy ..	Jersey	24/7/32
Not allotted	Kyby Blonde	Government Farm, Kybybolite	Ayrshire	5/4/32
34672	Roseworthy Scintial 3rd	Agricultural College, Roseworthy ..	Jersey	23/7/32
Not allotted	Balaklava Griselda Posch	A. E. Middleton, Balaklava	Friesian	17/6/32
5425	Long Flat Mayflower	W. J. Spackman, Long Flat	A.I.S.	26/9/32
34323	Hampden Madeira	J. A. J. Pfitzner, Hampden	Jersey	16/4/32
34508	Tuela Stephanotis	F. Coleman, Saddleworth	"	15/7/32
31137	Wooroora Princess Lotus	A. B. Sieber, Eudunda	"	25/5/32
Not allotted	Tuela Nemesis	F. Coleman, Saddleworth	"	18/9/32
Not allotted	Tuela Anchusa	F. Coleman, Saddleworth	"	22/7/32
31582	Alexandra Janet's Olive	A. Kelly, Milang	"	4/7/32
34651	Cudlee Creek Columbine's Pearl ..	G. D. Oster, Balaklava	"	2/7/32
Not allotted	Malwand Viola 2nd	A. P. Spehr, Mount Gambier	"	27/8/32
34322	Delma Sweet Lotus	E. W. Pfitzner, Eudunda	"	20/7/32
Not allotted	Kyby. Revel	Government Farm, Kybybolite	Ayrshire	5/6/32
34678	Fernden Lady Buttercup	E. O. Traeger, Eudunda	Jersey	1/8/32
34585	Alinda Mercedes Lass	A. Schulze, Paradise	"	15/6/32
Not allotted	Eudunda Fern	W. S. McAuliffe, Eudunda	"	11/5/32
34493	Pembroke Madge	Mrs. C. W. Ansell, Bletchley	Jersey	15/7/32
Not allotted	Tuela Daisy	F. Coleman, Saddleworth	"	4/7/32
34663	Para Wirra Sunrise 2nd	J. H. Dawkins, Gawler	"	30/8/32
Not allotted	Roseworthy Glimmer	Agricultural College, Roseworthy ..	"	19/7/32
34664	Eudunda Nancy	W. S. McAuliffe, Eudunda	"	11/5/32
Not allotted	Roseworthy Lady 4th	Agricultural College, Roseworthy ..	"	6/7/32
34604	Channel View Miss Grey	Mrs. A. M. Carruthers, Narrung ..	"	17/7/32
Not allotted	Eudunda Primrose	W. S. McAuliffe, Eudunda	"	8/6/32
34609	Oakhill Lady Lobelia	Mrs. M. I. Dittrich, Hampden	"	8/7/32
Not allotted	Tuela Snowflake	Mr. F. Coleman, Saddleworth	"	26/7/32
3419	Kyby Annie	Government Farm, Kybybolite ..	Ayrshire	21/5/32
"	Kyby Sheila	Government Farm, Kybybolite ..	"	3/4/32
"	Timbungalong Lady Carnation ..	Mrs. A. M. Carruthers, Narrung ..	Jersey	14/8/32
"	Kyby Wynette	Government Farm, Kybybolite ..	Ayrshire	9/5/32
"	Oakhill Pimpernel 5th	Mrs. M. I. Dittrich, Hampden	Jersey	5/4/32
"	Riverdale Buttermaid Posch	Glen Leggoe & Co., Binnun	Friesian	28/7/32
"	Talmont Pearl	A. J. Manoel, Birdwood	Ayrshire	30/5/32
5419	Northfield Royal's Pride	Insp.-General Hospitals, Northfield ..	A.I.S.	31/8/32
5354	The Bluff Viola	H. B. Kuchel, Murray Bridge	"	21/9/32
5422	Long Flat Cinderella	W. J. Spackman, Long Flat	"	25/8/32
Not allotted	Delma Duchess	E. W. Pfitzner, Eudunda	Jersey	31/7/32
3420	Kyby Snowqueen	Government Farm, Kybybolite ..	Ayrshire	20/5/32
Not allotted	Northfield Royal's Princess	Insp.-General Hospitals, Northfield ..	A.I.S.	8/7/32
34498	Riverdale Gem's Posch	Glen Leggoe & Co., Binnun	Friesian	18/7/32
Not allotted	Limelight's Sunflower of Northfield ..	Insp.-General Hospitals, Northfield ..	A.I.S.	21/8/32
34498	Tuela Fescue	F. Coleman, Saddleworth	Jersey	17/7/32
Not allotted	Riverdale Echo Ada	Glen Leggoe & Co., Binnun	Friesian	30/8/32

FROM 1ST JANUARY, 1933, TO 30TH JUNE, 1933.

Age at Calving.			Total Milk.	Aver- age Test.	Total Butter- fat.	Days Tested.	Sire.	Remarks.
Y.	M.	D.	Lbs.	—	Lbs.			
BUTTERFAT STANDARD. 230LBS.								
2	2	25	7,705½	5-09	392-54	273	Demetrius of Tuela	—
2	2	2	11,137½	3-46	385-74	273	Glenowie Beets Griselda	—
2	3	23	6,121½	6-16	377-10	273	Wollingurly Cavalier's Silver King	—
1	10	25	8,037	4-60	369-98	273	Brinkworth Chris.	—
2	1	15	8,100	4-53	366-61	273	Ruth's Limelight of Wangara	—
1	10	16	6,250½	5-80	362-58	273	Hampden Winsome King	—
1	7	1	6,487½	5-56	360-45	273	Butter King of Pella	—
2	2	4	5,844	6-06	354-04	273	Butter King of Pella	—
1	9	29	6,745½	5-24	353-46	273	Brinkworth Chris.	—
2	1	8	7,627½	4-61	351-94	273	Producer 3rd of Dalebank	—
2	0	2	6,259½	5-55	347-71	273	Dalebank Mercedes Duke	—
1	9	20	9,016½	3-84	346-23	273	Dorrie's Royal of Wangara	—
2	1	16	10,879½	3-12	339-04	273	Bolobek Topsail	—
1	11	9	6,568½	5-14	337-38	273	Mercedes Sweet Duke of Glen Iris	—
2	1	10	7,578	4-43	336-02	273	Gowrie Park Scottish Dandy	—
2	5	8	6,028½	5-56	335-28	273	Mercedes Sweet Duke of Glen Iris	—
2	2	12	9,810	3-37	330-60	273	Glenowie Beets Griselda	—
2	3	9	7,719	4-27	329-38	273	Liberton Gladiator 2nd	—
1	10	6	5,052	6-48	327-24	273	Hampden Olive's King	—
1	11	12	6,751½	4-84	327-08	273	Hampden Winsome King	—
2	3	11	4,846½	6-63	321-44	273	Wollingurly Cavalier's Silver King	—
2	0	9	6,304½	5-09	320-81	273	Brinkworth Chris	—
2	0	6	6,108	5-08	310-43	273	Hampden Winsome King	—
1	10	28	5,722½	5-38	308-14	273	Hampden Olive's King	—
2	2	8	5,761½	5-30	305-41	273	Producer 3rd of Dalebank	—
2	1	5	6,532½	4-67	305-32	273	Duke of Belgonja	—
2	5	27	6,043½	5-04	304-45	273	Beauty's King of Somerville	—
2	1	25	7,558½	3-94	298-15	273	Gowrie Park Scottish Dandy	—
1	10	15	5,374½	5-54	297-91	273	Werribee Combination	—
1	10	10	6,175½	4-82	297-47	273	Dalebank Mercedes Duke	—
1	8	2	5,860½	5-06	296-50	273	Stonyfell Rambler	—
1	11	26	5,353½	5-52	295-73	273	Twylfsh of Para Wirra	—
1	7	27	5,409	5-47	295-67	273	Brinkworth Chris	—
1	11	27	5,466	5-37	293-76	273	Banyule Pyton	—
1	10	1	4,422	6-56	289-97	273	Mercedes Sweet Duke of Glen Iris	—
1	8	14	4,324½	6-51	281-68	273	Stonyfell Rambler	—
1	11	28	5,691	4-89	278-30	273	Mercedes Sweet Duke of Glen Iris	—
1	8	27	5,457	5-04	275-22	273	Makarini of Dalebank	—
1	8	4	4,644	5-91	274-50	273	Stonyfell Rambler	—
1	9	4	4,765½	5-72	272-69	273	Oakhill Duke	—
1	10	22	5,289	5-15	272-20	273	Brinkworth Chris	—
2	2	13	6,004½	4-50	270-08	273	Gowrie Park Scottish Dandy	—
2	1	20	7,117½	3-79	269-55	273	Gowrie Park Scottish Dandy	—
2	5	1	5,068½	5-32	269-48	273	Timbungalung Butter King	—
1	9	6	6,693	4-00	267-50	273	Gowrie Park Scottish Dandy	—
1	10	3	4,360½	6-09	265-45	273	Carnation's Lad of Dalebank	—
1	6	1	8,647½	3-03	262-24	273	Cottesloe Prince Posch	—
2	3	23	6,276	4-16	261-22	273	Beleura Captain	—
1	11	12	6,552	3-95	258-55	273	Royal's Success of Arrawatta	—
2	1	3	6,877½	3-70	254-32	240	Swallow's Limelight of Wangara	—
1	9	12	6,505½	3-95	256-79	273	Ruth's Limelight of Wangara	—
1	10	14	5,029½	5-05	253-99	273	Beauty's King of Somerville	—
2	1	4	5,719½	4-39	251-09	273	Ida's Laird of Gowrie Park	—
2	1	4	6,622½	3-78	250-14	273	Janet's Royal of Northfield	—
1	5	24	5,790	4-21	243-71	273	Cottesloe Prince Posch	—
2	3	25	5,952	4-05	241-32	273	Melba's Limelight of Wangara	—
1	11	12	4,203	5-61	235-90	273	Brinkworth Chris	—
2	4	4	5,850	4-01	234-74	150	Echo Sylv. King Pontiac	Withdrawn

PURE-BRED COWS COMPLETED

Herd Book No.	Name of Cow.	Owner and Address.	Breed.	Calved.
JUNIOR TWO-YEAR-OLDS—BUTTERPAT				
31097	Delma Dorothy	E. W. Pfitzner, Eudunda	Jersey	15/5/32
Not allotted	Ninyeri Annette	E. L. Goode, Narrung	"	—/6/32
34319	Brinkworth Olive	C. C. T. Otteng, Brinkworth	"	11/5/32
Not allotted	Tuela Jasmine	F. Coleman, Saddleworth	"	23/7/32
"	Delma Twyllish	E. W. Pfitzner, Eudunda	"	8/7/32
"	Delma Bonny Countess	E. W. Pfitzner, Eudunda	"	23/8/32
"	Kyby Brunette	Government Farm, Kybybolite	Ayrshire	7/7/32
2352	Northfield Royal's Flirt	Insp.-General Hospitals, Northfield	A.I.S.	11/4/32
Not allotted	Delma Bright Lotus	E. W. Pfitzner, Eudunda	Jersey	22/7/32
"	Delma Twilight	E. W. Pfitzner, Eudunda	"	25/9/32
5421	Northfield Royal's Princess	Insp.-General Hospitals, Northfield	A.I.S.	9/8/32
Not allotted	Fembroke Dawn	Mrs. C. W. Ansell, Bletchley	Jersey	11/10/32
"	Woorora Rosebud	A. Kelly, Milang	"	10/11/32
"	Kyby Valerie	Government Farm, Kybybolite	Ayrshire	27/11/32
"	Hampden Aristocrat's Rosette	J. A. J. Pfitzner, Hampden	"	27/1/33
34641	Delma Jessamine's Beauty	E. W. Pfitzner, Eudunda	Jersey	11/3/33
SENIOR TWO-YEAR-OLDS.—BUTTERPAT				
34327	Melvin Viola 2nd	C. E. Verco, Mount Compass	Jersey	11/8/32
31104	Hampden Lady Olive	J. A. J. Pfitzner, Hampden	"	13/7/32
2291	River Glen Dianthus	S. N. Bott, Murray Bridge	A.I.S.	13/4/32
Not allotted	Kyby Ornate	Government Farm, Kybybolite	Ayrshire	25/8/32
"	Tuela Didsicus	F. Coleman, Saddleworth	Jersey	24/7/32
34494	Tuela Delphinium	F. Coleman, Saddleworth	"	1/7/32
Not allotted	Glenowie May Echo	H. Mountstephen, Monteith	Friesian	2/8/32
31018	Sweet Haven Flower	J. M. Bray, Langhorne's Creek	Jersey	16/9/32
Not allotted	Ontario Kitty	T. B. Brooks, Clarendon	"	18/7/32
31069	Eudunda Rhonda	W. S. McAuliffe, Eudunda	"	26/8/32
33169	Glenavon Princess	A. P. Spehr, Mount Gambler	"	18/9/32
34507	Tuela Spruce	F. Coleman, Saddleworth	"	12/7/32
33593	Brookfield Verbena 18th	A. P. Spehr, Mount Gambler	"	9/9/32
31149	Morella Princella 3rd	H. R. Walsh, Mount Barker	"	13/7/32
34604	Balaklava Collegian's Rosette	A. E. Middleton, Balaklava	"	23/9/32
34698	Fern Lady Bell	E. O. Traeger, Eudunda	"	28/6/32
Not allotted	Pembroke Patience	Mrs. C. W. Ansell, Bletchley	"	20/8/32
34605	Balaklava Patience	A. E. Middleton, Balaklava	"	21/6/32
34674	Roseworthy Sunset	Agricultural College, Roseworthy	"	14/8/32
Not allotted	Myrtle Bank Edith 2nd	W. A. Rodda, Salisbury	"	10/8/32
31005	Pembroke Fashion	Mrs. C. W. Ansell, Bletchley	"	19/7/32
Not allotted	Glenrobin Adsum	J. O. Robinson, Meadows	Ayrshire	15/6/32
"	Glenrobin Bliss	J. O. Robinson, Meadows	"	12/9/32
2350	Northfield Llimelight's Tot	Insp.-General Hospitals, Northfield	A.I.S.	31/3/32
31048	Cumberland Christine	Mrs. D. G. Steven, Kooringa	Jersey	22/9/32
JUNIOR THREE-YEAR-OLDS.—				
3646	Murray Glen Griselda Tulip	C. J. Morris Monteith	Friesian	21/8/32
18571	Pride 3rd of Elderslie	W. J. Spackman, Long Flat	A.I.S.	13/8/32
5371	Klama Robin 3rd	E. & A. Nicholls, Woodville	"	1/8/32
28058	Crofton Sunflower	H. & A. Bohme, Balhannah	Jersey	31/7/32
31074	Glen Ewin Morn's May 2nd	Jas. McEwin, Houghton	"	20/8/32
Not allotted	Glenowie Netherlands Pauline	H. Mountstephen, Monteith	Friesian	2/7/32
28158	Eudunda Rhonda's Glory	W. S. McAuliffe, Eudunda	Jersey	10/7/32
28057	Crofton Bonnie Kate	H. & A. Bohme, Balhannah	"	16/9/32
28096	Pella Solanum Sunshine	W. P. Eckermann, Eudunda	"	3/6/32
Not allotted	Road's End Coreyra	W. Hawker, Clare	Friesian	31/5/32
"	Para Wirra Iris Pansy	J. H. Dawkins, Gawler	Jersey	19/8/32
31147	Morella Belle 5th	H. R. Walsh, Mount Barker	"	5/7/32
31086	Oakhill Lobelia 3rd	Mrs. M. I. Dittrich, Hampden	"	18/7/32
Not allotted	Eudunda Lady Damsel	W. S. McAuliffe, Eudunda	"	17/7/32
31155	Scrub View Cherry	A. B. A. Weckert, Brinkworth	"	12/8/32
5365	Klama Mayflower 7th	E. A. Nicholls, Woodville	A.I.S.	4/5/32
34278	Bar Park Rose	A. P. Spehr, Mount Gambler	Jersey	11/9/33
31148	Morella Damsel 4th	Mrs. D. G. Steven, Kooringa	"	3/4/32
Not allotted	Kyby Gladys	Government Farm, Kybybolite	Ayrshire	18/9/32

OFFICIAL TEST—continued.

Age at Calving.	Total Milk.	Average Test.	Total Butter- fat.	Days Tested.	Sire.	Remarks.
Y. M. D.	Lbs.	—	Lbs.			
STANDARD, 230LBS.—continued..						
2 5 7	3,762	6-21	233-65	273	Beauty's King of Somerville	—
2 1 0	4,134	5-10	210-96	273	Morella Mercedes Sweet Duke	—
1 10 16	3,838½	5-29	203-00	273	Hampden Olive's King	—
1 10 21	3,369	5-83	196-52	273	Brinkworth Chris	—
1 10 2	3,270	5-95	194-59	273	Beauty's King of Somerville	—
1 6 17	3,390	5-51	186-64	240	Beauty's King of Somerville	Withdrawn
2 3 4	4,296	4-33	186-11	273	Gowrie Park Scottish Dandy	—
2 2 23	4,793½	3-84	184-20	273	Janet's Royal of Northfield	—
1 5 22	3,300	5-51	181-71	240	Beauty's King of Somerville	Dried off
1 6 0	3,525	5-09	179-35	240	Beauty's King of Somerville	Withdrawn
1 8 20	3,682½	3-91	144-11	273	Royal's Success of Arrawatta	—
2 1 16	2,025	5-02	113-84	150	Para Wirra Twylish	Withdrawn
1 8 25	1,950	5-38	104-85	120	Beauty's King of Somerville	Withdrawn
2 2 10	1,440	4-74	68-19	90	Gowrie Park Royal Prince	Exemption
2 1 10	1,080	5-70	61-59	60	Bellefaire Blonde's Aristocrat	Withdrawn
1 4 29	1,065	4-97	52-92	90	Beauty's King of Somerville	Withdrawn
—STANDARD, 250LBS.						
2 11 4	9,022½	5-99	540-29	273	Retford Julian	—
2 9 5	10,105½	5-25	530-84	273	Mayflower's Lad of Hampden	—
2 7 6	11,752½	3-75	440-75	273	Joffre of Brenda Park	—
2 11 1	10,035	4-18	419-04	273	Loyalty of Bridge View	—
2 11 3	7,863	5-16	405-45	273	Baron of Dalebank	—
2 10 0	7,092	5-60	396-81	273	Baron of Dalebank	—
2 9 26	9,751½	4-01	390-89	273	Murray Glen Prince Wooraki	—
2 10 22	6,826½	5-36	366-05	273	Sweet Haven Duke	—
2 11 28	6,379½	5-56	354-69	273	Para Wirra Cherry's Twylish	—
2 6 17	6,042	5-80	350-59	273	Ruby's Repulsive Hampden	—
2 9 24	6,399	5-39	344-95	273	Murta Lloyd	—
2 11 9	6,277½	5-35	335-57	273	Baron of Dalebank	—
2 10 16	5,451	5-87	319-99	273	Sweetbread's Duke of Glen Iris	—
2 11 1	5,361	5-91	316-67	273	Anemone's Chief of Morella	—
2 11 15	6,145½	4-99	306-61	273	Balaklava Skylee's Collegian	—
2 8 9	5,277	5-79	305-71	273	Werribee Combination	—
2 8 12	5,973	4-93	294-66	273	Twylish of Para Wirra	—
2 10 25	4,860	6-04	293-45	240	Oliver of Hampden	Dried off
2 7 29	5,344½	5-06	270-27	273	Mercedes Sweet Duke of Glen Iris	—
2 9 13	4,153½	6-00	249-40	273	Annette's Chief of Linden	—
2 10 16	4,305	4-92	211-92	240	Twylish of Para Wirra	Dried off
2 6 24	5,179½	4-09	211-74	273	Oakbank Nell	—
2 10 18	5,010	4-16	208-67	240	Angas Boy	Dried off
2 6 28	3,783	3-77	142-80	273	Melba's Limelight of Wangara	—
2 10 15	2,865	4-79	137-29	120	Silver Lad of Eudunda	Sold
BUTTERFAT STANDARD, 270LBS.						
3 0 17	11,017½	4-42	487-38	273	River Glen Lord Echo Griselda	—
3 2 13	11,506½	3-96	455-18	273	Marvellous of Hill View	—
3 5 29	11,649	3-78	439-93	273	Viscount of East View	—
3 5 7	8,902½	4-36	432-45	273	Butter King of Pella	—
3 0 16	7,852½	5-50	432-14	273	Brucevale Lord Fancy Starbright	—
3 5 28	11,431½	3-71	423-77	273	Longbeach Netherlands King 11	—
3 5 14	7,299	5-79	422-60	273	Myrtle Bank Kate's Chief	—
3 3 20	7,305	5-77	421-36	273	Butter King of Pella	—
3 3 20	7,569	5-19	392-99	273	Melford's Butter Lad of Pella	—
3 1 5	12,331½	3-11	383-08	273	Rosevale King Sylvia Posch	—
3 1 10	6,549	5-47	357-97	273	Para Wirra Millie's Twylish 2nd	—
3 2 14	7,633½	4-62	353-00	273	Anemone's Chief of Morella	—
3 3 14	6,043½	5-73	346-49	273	Carnation's Lad of Dalebank	—
3 4 11	6,648	5-20	345-81	273	Myrtle Bank Kate's Chief	—
3 0 26	5,748	5-79	332-56	273	Holly's King of Hampden	—
3 3 20	9,202	3-52	324-19	273	Viscount of East View	—
3 0 5	5,238	6-10	319-58	273	Alert of Farrington	—
3 1 0	6,244½	4-80	299-73	273	Morella Anemone's Chief 11	—
3 2 5	6,708	4-32	289-75	273	Loyalty of Bridge View	—

PURE-BRED COWS COMPLETED

Herd Book No.	Name of Cow.	Owner and Address.	Breed.	Calved.
JUNIOR THREE-YEAR-OLDS.—BUTTERFAT				
28142	Brinkworth Jewel	C. C. T. Ottens, Brinkworth	Jersey	8/8/32
Not allotted	Preston Silky	A. P. Spehr, Mount Gambler	"	11/8/32
2481	Glenlea Dixie 5th	E. T. Vinall, Brighton	Guernsey	27/6/32
2480	Glenlea Dixie 4th	E. T. Vinall, Brighton	"	29/8/32
18366	Muirhead's Princess of Northfield	Insp.-General Hospitals, Northfield	A.I.S.	24/6/32
21548	Glen Erin Wallflower	Ayrbrook Farm Ltd., Aldgate	Ayrshire	22/8/32
Not allotted	Kyby. Vanity	Government Farm, Kybybolite	"	8/9/32
32971	Staghorn Claribelle	Mrs. D. G. Steven, Kooringa	Jersey	1/9/32
31158	Scrub View Melba	A. B. A. Weckert, Brinkworth	"	18/6/32
Not allotted	Glenrobin Dena	J. O. Robinson, Meadows	"	2/10/32
"	Wattle Grove Peggy	A. P. Spehr, Mount Gambler	"	19/12/32
SENIOR THREE-YEAR-OLDS.—				
Not allotted	Glenowie Netherland Mary	H. Mountstephen, Monteith	Friesian	1/8/32
5364	Klama Bess 5th.	E. & A. Nicholls, Woodville	A.I.S.	15/8/32
Not allotted	Morella Princella 2nd	H. R. Walsh, Mount Barker	Jersey	17/7/32
28129	Eudunda Rhonda's Pride	W. S. McAuliffe, Eudunda	"	12/4/32
28076	Tuela Sparaxis	F. Coleman, Saddleworth	"	6/7/32
28130	Penrhyn Rhodesia 21st	W. S. McAuliffe, Eudunda	"	26/8/32
Not allotted	Penrhyn Flavia 18th	W. S. McAuliffe, Eudunda	"	12/9/32
28162	Anemone 3rd of Morella	E. L. Goode, Narrung	"	19/4/32
18371	Mermald 3rd of Elderslie	W. J. Spackman, Long Flat	A.I.S.	25/7/32
28116	Burnlea Wattle 2nd	J. M. Hudd, Bletchley	Jersey	15/5/32
28147	Hampden Janet	A. Kelly, Milang	"	14/7/32
31142	Fernden Lady Columbine	K. O. Traeger, Eudunda	"	11/8/32
Not allotted	Fernden Lady Madeira	E. O. Traeger, Eudunda	"	21/8/32
28068	Tuela Freesia 2nd	Mrs. D. G. Steven, Kooringa	"	15/7/32
Not allotted	Tuela Diascea	F. Coleman, Saddleworth	"	19/8/32
28165	Morella Damsel 3rd	E. L. Goode, Narrung	"	21/7/32
31044	Melvin Viola	H. Follett, Langhorne's Creek	"	10/7/32
Not allotted	Sunnybrook Flirt	J. J. Farrow, Gawler	A.I.S.	16/6/32
28112	Burnlea Glory 2nd	J. M. Hudd, Bletchley	Jersey	16/8/32
31116	Cudlee Creek Lucy	W. A. Pool, Cudlee Creek	"	27/4/32
Not allotted	Ontario Firefly	T. B. Brooks, Clarendon	"	5/4/32
2334	Blossom 2nd of Northfield	Insp.-General Hospitals, Northfield	A.I.S.	26/8/32
Not allotted	Liberton Honeycombe	E. & A. Nicholls, Woodville	"	6/6/32
2334	Myrtle Bank Edith	W. A. Rodda, Brooklyn Park	Jersey	27/7/32
Not allotted	Northfield Muirhead's Tot	Insp.-General Hospitals, Northfield	A.I.S.	8/9/32
18367	Alva Daphne	A. N. McArthur, Millicent	"	6/9/32
Not allotted	Myrtle Bank Rambler	W. A. Rodda, Brooklyn Park	Jersey	9/9/32
28059	Myrtle Bank Maglona 2nd.	H. A. Bohme, Balhannah	"	18/4/32
21598	Glenrobin Rumour	J. O. Robinson, Meadows	Ayrshire	6/9/32
21596	Glenrobin Nettle	J. O. Robinson, Meadows	"	24/9/32
5374	Klama Sultan's Beauty	E. & A. Nicholls, Woodville	A.I.S.	8/3/33
34602	Balaklava Collegian's Bud.	A. E. Middleton, Balaklava	Jersey	25/2/33
JUNIOR FOUR-YEAR-OLDS.—				
28066	Tuela Drosera	F. Coleman, Saddleworth	Jersey	11/7/32
17886	Spangle 2nd of Toora	S. N. Bott, Murray Bridge	A.I.S.	24/6/32
3657	Murray Glen Sylvia Topsy	C. J. Morris, Monteith	Friesian	23/6/32
Not allotted	Para Witra Sweet Iris	J. H. Dawkins, Gawler	Jersey	30/7/32
3477	Glenowie Plus Griselda 2nd.	A. E. Middleton, Balaklava	Friesian	18/6/32
24824	Sweet Haven Mercedes Bloom	J. M. Bray, Langhorne's Creek	Jersey	9/8/32
28052	Pembroke Duchess 2nd	Mrs. C. W. Ansell, Bletchley	"	9/8/32
2333	Mayflower 6th of Klama	E. & A. Nicholls, Woodville	A.I.S.	23/7/32
21831	Kyby. Barbara 2nd	Kyby. Farm	Ayrshire	4/6/32
Not allotted	Ontario Kate 2nd	T. B. Brooks, Clarendon	Jersey	11/8/32
18420	Kyby Bluebell	Government Farm, Kybybolite	Ayrshire	3/4/32
21843	Kyby Winsome	Government Farm, Kybybolite	"	15/9/32
28116	Burnlea Prudence	J. M. Hudd, Bletchley	Jersey	16/8/32
24994	Hampden Dorothy	A. E. Middleton, Balaklava	"	21/8/32
12007	Tulip 16th of Hill View	A. Snell, Bolivar	A.I.S.	23/4/32

OFFICIAL TEST—continued.

Age at Calving.	Total Milk.	Average Test.	Total Butter- fat.	Days Tested.	Sire.	Remarks.
Y. M. D.	Lbs.	—	Lbs.			
STANDARD, 270LBS.—continued.						
3 1 6	5,433	5-32	289-13	273	General Chris of Penrhyn	—
3 0 27	6,517½	4-58	282-29	273	Preston Pretty King	—
3 2 28	4,509½	6-12	276-17	273	Glenlea Hilda's Valour 2nd	—
3 5 11	5,346	4-76	254-57	273	Glenlea Hilda's Valour 2nd	—
3 5 23	5,580	4-39	245-15	240	Muirhead of Ben Lomond	Dried off
3 0 21	5,938½	4-62	233-71	273	Reality of Olive Dale	—
3 1 12	5,310	3-71	197-07	273	Loyalty of Bridge View	—
3 0 5	3,811½	5-38	205-00	273	Staghorn Northlark's Masterpiece	—
3 0 8	3,090	5-68	175-63	240	Scrub View Twyllish Lad	Withdrawn
3 2 29	3,420	4-02	137-61	150	Angas Boy	Dried off
3 2 10	795	4-52	35-90	60	Admiral of Fair View	Exemption
BUTTERFAT STANDARD, 290LBS.						
3 9 26	15,895½	3-68	585-47	273	Longbeach Netherland King 11	—
3 9 10	11,245½	4-12	462-95	273	Viscount of East View	—
3 9 19	6,931½	6-09	422-02	273	Anemone's Chief of Morella	—
3 6 25	6,705	6-29	421-52	273	Myrtle Bank Kate's Chief	—
3 10 24	8,412	4-98	418-96	273	Baron of Dalebank	—
3 6 21	7,662	5-42	415-25	273	Roderick of Penrhyn	—
3 11 3	8,152½	4-69	382-22	273	Makarini 2nd of Dalebank	—
3 8 15	7,590	4-99	378-92	273	Molly 5th's Audrey Twyllish of Banyule	—
	9,367½	5-18	485-22	365		
3 7 5	9,222½	4-08	375-96	273	Marvellous of Hill View	—
3 8 24	6,048	5-80	351-06	273	Mack of Glenford	—
3 11 3	5,940	5-67	336-97	273	Beauty's King of Somerville	—
3 9 13	5,521½	6-00	331-45	273	Kate's Chief of Myrtle Bank	—
3 10 0	6,622½	4-98	329-79	273	Werribee Combination	—
3 11 3	6,400½	5-02	321-43	273	Tuela Eric	—
3 6 18	5,890½	5-43	320-07	273	Baron of Dalebank	—
3 10 8	6,835½	4-63	316-85	273	Anemone's Chief of Morella	—
3 11 4	6,193½	5-04	312-26	273	Repulse of Somerville	—
3 11 10	6,799½	4-43	300-88	273	Illawarra Jellicoe's Belmont	—
3 11 18	5,494½	5-41	297-00	273	Mack of Glenford	—
3 8 7	6,492	4-53	293-99	273	Producer 3rd of Dalebank	—
3 9 2	5,175	5-64	292-03	273	Mercedes Sweet Duke of Glen Iris ...	—
3 10 1	6,342½	4-39	278-59	273	Muirhead of Ben Lomond	—
3 6 13	7,288½	3-61	263-30	273	Lilmit of East View	—
3 9 28	4,680	5-12	239-80	273	Annette's Chief of Linden	—
3 10 14	5,935	3-93	233-52	273	Muirhead of Ben Lomond	—
3 11 13	7,042½	3-27	230-02	273	Illawarra Daphne's Jellicoe	—
3 9 2	3,720	5-80	215-75	240	Fawn Chief of Carrickalinga	Ceased testing
3 7 17	3,391½	5-98	202-97	273	Annette's Chief of Linden	—
3 8 20	4,455	3-85	171-60	180	Oakbank Spotlight	Dried off
3 11 20	41,55	4-04	168-02	150	Angas Boy	Dried off
3 6 13	3,120	3-56	111-10	90	Sultan of East View	Withdrawn
3 6 8	945	4-66	44-01	30	Balaklava Skylee's Collegian	Withdrawn
BUTTERFAT STANDARD, 310LBS.						
4 2 26	8,811	6-01	529-52	273	Maid's Success of Linden	—
4 5 2	12,141	4-31	522-93	273	Iris 5th's Superb of Toora	—
4 1 1	15,222	3-27	497-84	273	Riverglen Lord Echo Griselda	—
4 0 29	8,046	5-90	474-68	273	Mercedes Sweet Duke of Glen Iris ...	—
4 1 19	14,026½	3-22	452-03	273	Riverglen Sir Pietje Griselda	—
4 2 15	8,529	5-27	44-925	273	Mercedes Sweet Duke of Glen Iris ...	—
4 3 1	8,268	5-25	433-67	273	Twyllish of Para Wirra	—
4 3 15	10,123½	4-03	408-08	273	Viscount of East View	—
4 3 7	9,945	4-04	402-02	273	Ida's Laird of Gowrie Park	—
4 0 3	7,431	5-27	391-28	273	Cherry's Twyllish of Para Wirra	—
4 5 7	8,862	4-30	381-13	273	Loyalty of Bridge View	—
4 5 11	9,750	3-82	372-66	273	Loyalty of Bridge View	—
4 0 4	6,478½	5-51	357-10	273	Mack of Glenford	—
4 6 0	6,424½	5-25	337-47	273	Beauty's King of Somerville	—
4 6 0	8,566½	3-39	383-33	273	Lilmitlight of Hill View	—

PURE-BRED COWS COMPLETED

Herd Book No.	Name of Cow.	Owner and Address.	Breed.	Calved.
JUNIOR FOUR-YEAR-OLD.—				
28164	Morella Belle 4th.....	H. R. Walsh, Mount Barker	Jersey	2/8/32
2997	Barina Konigen Gem	L. H. & P. C. Giles, Auburn	Friesian	21/8/32
24991	Brinkworth Ruby	C. C. T. Ottens, Brinkworth	Jersey	18/6/32
38597	Willis Vale Briar Rose	A. P. Spehr, Mount Gambler	"	9/9/32
21886	Kyby Madge 2nd	Government Farm, Kybybolite	Ayrshire	16/8/32
21889	Kyby Rose 4th	Government Farm, Kybybolite	"	21/9/32
28051	Pembroke Daisy	Mrs. C. W. Ansell, Bletchley	Jersey	12/10/32
18369	Royal's Sunflower of Northfield	Insp.-General Hospitals, Northfield	A.I.S.	27/7/32
Not allotted	Morella Lily	Mrs. D. G. Steven, Koorlinga	Jersey	14/3/32
3309	Anama Pontiac Pride	W. Hawker, Clare	Friesian	26/1/33
20997	Angle Farm Petunia	Ayrbrook Farm Ltd., Aldgate	Ayrshire	19/12/32
SENIOR FOUR-YEAR-OLD.—				
3655	Murray Glen Princess Maggie	C. J. Morris, Monteith	Friesian	11/8/32
34326	Melvin Duchess	C. E. Verco, Mount Compass	Jersey	17/9/32
3347	Bloomfield Alcatra Joan	W. Hawker, Clare	Friesian	8/9/32
24962	Pella Rose Marie	C. E. Verco, Mount Compass	Jersey	30/7/32
24862	Fernden Lady Twyllish	E. O. Tracer, Eudunda	"	19/7/32
8001	Barina Woodcrest Maid	L. H. & P. C. Giles, Auburn	Friesian	20/8/32
24866	Scrubview Daffodil	A. B. A. Weckert, Brinkworth	Jersey	12/7/32
18353	Gem 22nd of Greyleigh	A. Snell, Bolivar	A.I.S.	23/7/32
18368	Princess of Northfield	Insp.-General Hospitals, Northfield	"	10/4/32
28062	Ontario Kate's Twyllish	T. B. Brooks, Clarendon	Jersey	9/4/32
18327	Mayflower 5th of Klama	E. & A. Nicholls, Woodville	A.I.S.	17/8/32
24858	Woorora Starbright's Doris	A. B. Sieber, Eudunda	Jersey	30/4/32
6721	Alva Pansy	A. N. McArthur, Millicent	A.I.S.	11/9/32
18780	Oakbank Rosalind	J. O. Robinson, Meadows	Ayrshire	5/10/32
28169	Morella Starbright	E. L. Goode, Narrung	Jersey	19/12/32
MATURE COWS.—BUTTERFAT				
1919	Murray Glen Sylvia Patch	C. J. Morris, Monteith	Friesian	7/9/32
20738	Lupin of Tuela	E. W. Pfitzner, Eudunda	Jersey	22/7/32
2508	Murray Glen Segis Inka	C. J. Morris, Monteith	Friesian	17/9/32
28161	Pella Solanum Micaelo	C. E. Verco, Mount Compass	Jersey	19/8/32
20830	Winnie of Hampden	J. A. J. Pfitzner, Hampden	"	26/5/32
23670	Pella Reva Kelly	C. E. Verco, Mount Compass	"	17/8/32
2500	Murray Glen Echo Topay	C. J. Morris, Monteith	Friesian	9/7/32
17875	Flower of Toora	S. N. Bott, Murray Bridge	A.I.S.	18/4/32
23591	Woodside Morn	Jas. McEwin, Houghton	Jersey	22/9/32
2194	Glenowie Griselda Fosch	H. Mountstephen, Monteith	Friesian	2/6/32
17885	Ruby of Toora	S. N. Bott, Murray Bridge	A.I.S.	5/4/32
1917	Murray Glen Inka Tulip	C. J. Morris, Monteith	Friesian	20/9/32
17895	Countess Lotus of Pella	W. P. Eckermann, Eudunda	Jersey	23/5/32
20827	Carnation of Hampden	J. A. J. Pfitzner, Hampden	"	21/7/32
28554	Myrtle Bank Kate	T. B. Brooks, Clarendon	"	8/5/32
10920	Buttercup Jellicoe 2nd of Illawarra	A. Snell, Bolivar	A.I.S.	21/7/32
14983	Searchlight's Shiela of Wangara	S. N. Bott, Murray Bridge	"	22/4/32
24853	Hampden Maybee	J. A. J. Pfitzner, Hampden	Jersey	16/5/32
14970	Clarabelle 5th of Wangara	S. N. Bott, Murray Bridge	A.I.S.	12/9/32
17922	Roseworthy Erudite	Agricultural College, Roseworthy	Jersey	25/7/32
17896	Dora of Pella	A. Kelly, Milang	"	1/9/32
20740	Sweetbriar of Tuela	F. Coleman, Saddleworth	"	10/9/32
19075	Pearl of Hampden	J. A. J. Pfitzner, Hampden	"	25/7/32
2656	Barina Rosemary Posch	L. H. & P. C. Giles, Auburn	Friesian	16/8/32
19069	Countess of Hampden	E. W. Pfitzner, Eudunda	Jersey	3/7/32
1918	Murray Glen Princess Hauraki	C. J. Morris, Monteith	Friesian	15/8/32
20777	Lady Floretta of Gum Hill	W. P. Eckermann, Eudunda	Jersey	7/7/32
19049	Para Wirra Iris	J. H. Dawkins, Gawler	"	30/5/32
28071	Tuela Heather	F. Coleman, Saddleworth	"	1/8/32
23629	Roseworthy Sunbeam	Agricultural College, Roseworthy	"	3/5/32
23565	Dulcie of Para Wirra	J. H. Dawkins, Gawler	"	11/6/32
3479	Glenowie Princess Patch	H. Mountstephen, Monteith	Friesian	2/8/32
23632	Pella Lady Lotus	A. Kelly, Milang	Jersey	2/7/32
23553	Dalebank Carnation 4th	J. M. Bray, Langhorne's Creek	"	27/8/32
14622	Azalea of Tuela	F. Coleman, Saddleworth	"	16/8/32
28065	Tuela Daffodil 2nd	F. Coleman, Saddleworth	"	21/8/32
11658	Carnation of Oakhill	Mrs. M. I. Dittich, Hampden	"	19/8/32
3160	Murray Glen Princess Royal	C. J. Morris, Monteith	Friesian	18/9/32
3481	Glenowie Sylvia Patch	H. Mountstephen, Monteith	"	17/5/32
24695	Para Wirra Cherry	J. H. Dawkins, Gawler	Jersey	11/8/32
14625	Syringa of Tuela	F. Coleman, Saddleworth	"	19/7/32
Not allotted	Glenowie Echo Patch	H. Mountstephen, Monteith	Friesian	1/7/32
25609	Wompini Gaiety Girl	W. A. Pool, Cudlee Creek	Jersey	26/9/32
2461	Glenowie Pauline Griselda	H. Mountstephen, Monteith	Friesian	17/5/32

OFFICIAL TEST—continued.

Age at Calving.	Total Milk.	Average Test.	Total Butter-fat.	Days Tested.	Sire.	Remarks.
Y. M. D.	Lbs.	—	Lbs.			
BUTTERFAT STANDARD, 310LBS.—continued.						
4 0 2	6,792	4.73	321.39	273	Mercedes Sweet Duke of Glen Iris ...	—
4 0 13	10,222½	3.12	318.59	273	River Glen Pietje Posch	—
4 1 2	6,323½	4.96	314.09	273	Beauty's King of Somerville	—
4 0 10	5,797½	5.13	297.42	273	Cammellia's King of Willis Vale	—
4 1 22	7,231½	4.31	284.19	273	Loyalty of Bridge View	—
4 4 18	7,110	3.83	272.44	273	Loyalty of Bridge View	—
4 1 11	4,507½	5.93	267.28	210	Twylsh of Para Wirra	Dry
4 3 11	6,387½	3.92	250.25	273	Royal's Success of Arrawatta	—
4 0 12	4,894½	4.99	244.12	273	Springmead's General	—
4 3 3	3,885	3.04	118.00	120	Inavale Lady's Pride	Dry
4 3 15	2,880	3.73	107.40	120	Angle Farm Progress	Dry
BUTTERFAT STANDARD, 330LBS.						
4 9 14	15,181½	4.62	701.02	273	Glenburn Segis Griselda	—
4 11 8	11,193	5.75	644.00	273	Retford Julian	—
4 10 8	13,756½	3.25	447.20	273	Bloomfield Alcartra Clothilde	—
4 6 11	7,812	5.60	437.10	273	Melford's Butter Lad of Pella	—
4 8 9	7,639	5.68	436.62	273	Werribee Combination	—
4 7 12	10,587½	4.12	435.63	273	Riverglen Pietje Posch	—
4 10 17	7,267½	5.25	381.69	273	Holly's King of Hampden	—
4 10 13	9,603½	3.91	375.32	273	Alma's Jelliooe of Hillcrest	—
4 7 6	8,495½	4.39	372.97	273	Conjurer of Darbalara	—
4 8 8	6,783	5.49	372.27	273	Cherry's Twylsh of Para Wirra	—
4 8 28	9,904½	3.65	361.55	273	Viscount of East View	—
4 9 27	6,121½	5.77	352.94	273	Werribee Starbright's Fancy	—
4 11 15	7,161	3.79	271.10	273	Majestic of East View	—
4 11 18	4,275	3.93	168.05	150	Oakbank Spotlight	Dry
4 7 8	1,905	4.05	77.13	90	Anemone's Chief of Morella	Sold
STANDARD, 350LBS.						
8 3 21	16,510½	4.13	682.33	273	Burnbank Sylvia Patch	—
8 0 0	10,369½	6.44	668.07	273	Maid's Success of Linden	—
8 3 28	14,907	4.39	653.75	273	Glenburn Segis Griselda	—
6 4 13	9,910½	6.37	630.95	273	Werribee Starbright's Fancy	—
6 2 27	9,735	6.29	612.20	273	Beauty's King of Somerville	—
5 5 27	11,059½	5.38	594.47	273	Werribee Starbright's Fancy	—
6 0 5	15,915	3.58	569.94	273	River Glen Lord Echo Griselda	—
5 4 2	13,761	4.02	553.71	273	Lester of Darbalara	—
7 0 1	10,764	5.14	552.94	273	Montrose Sultan (Imp.)	—
7 6 21	17,274	3.15	544.41	273	Riverglen Sir Pietje Griselda	—
	19,525	3.20	624.50	365		
5 1 6	11,908½	4.48	535.68	273	Lester of Darbalara	—
8 2 6	12,261	4.35	533.55	273	Riverglen Lord Echo Griselda	—
8 0 5	8,829	5.95	525.05	273	Werribee Starbright's Fancy	—
6 3 9	9,555	5.43	519.33	273	Carnation's Lad of Dalebank	—
6 7 20	9,196½	5.64	518.86	273	Cheverell of Banyule	—
7 4 7	10,853½	4.75	515.73	273	Fussy's Jelliooe of Hill View	—
5 8 6	12,691½	4.05	514.12	273	Searchlight of Darbalara	—
5 11 1	8,791½	5.83	512.22	273	Carnation's Lad of Dalebank	—
5 10 20	12,396	4.08	505.86	273	Searchlight of Darbalara	—
7 11 29	7,413	6.72	498.47	273	King Solomon of Dalebank	—
8 3 28	9,009	5.61	496.13	273	Werribee Starbright's Fancy	—
7 5 12	10,156½	4.84	491.65	273	Maid's Success of Linden	—
7 0 14	9,175½	5.33	489.04	273	Carnation's Lad of Dalebank	—
5 2 23	13,989	3.49	488.86	273	Riverglen Pietje Posch	—
6 10 4	9,166½	5.33	488.71	273	Carnation's Lad of Dalebank	—
8 10 12	13,501½	3.53	477.01	273	Woorak of Henley	—
8 9 14	10,135½	4.70	476.72	273	Werribee Starbright's Fancy	—
7 0 19	10,404	4.51	469.45	273	Molly 5th's Audrey Twylsh of Banyule	—
5 0 7	8,784	5.29	465.00	273	Maid's Success of Linden	—
5 8 19	9,318	4.98	464.47	273	Courtier of Dalebank	—
6 7 24	8,295	5.50	456.00	240	Empire Day of Melrose	Dead
5 2 22	12,912	3.52	454.07	273	Murray Glen Echo Griselda	—
5 3 21	6,901½	6.55	452.13	273	Werribee Starbright's Fancy	—
5 7 2	8,628	5.22	450.48	273	Twylsh of Dalebank	—
9 11 17	8,749½	5.08	444.35	273	Admiral 2nd of Dalebank	—
5 0 25	6,907½	6.41	443.01	273	Maid's Success of Linden	—
10 11 28	7,852½	5.62	441.67	273	Janet's Laddie of Grantala	—
5 11 20	11,371½	3.85	437.27	273	River Glen Lord Echo Griselda	—
5 6 28	10,686	4.05	433.20	273	River Glen Sir Pietje Griselda	—
5 11 29	7,995	5.41	432.60	273	Twylsh of Para Wirra	—
9 11 12	9,169½	4.70	431.27	273	Admiral 2nd of Dalebank	—
5 8 18	12,083½	3.51	424.15	273	River Glen Sir Pietje Griselda	—
5 11 27	7,467	5.68	423.82	273	Werribee Masterman	—
6 2 14	9,622½	4.31	414.37	273	Riverglen Sir Pietje Griselda	—

PURE-BRED COWS COMPLETED

Herd Book No.	Name of Cow.	Owner and Address.	Breed.	Calved.
MATURE COWS—BUTTERFAT STANDARD				
19054	Burnlea Glory	J. M. Hudd, Bletchley	Jersey	6/8/32
18905	Kate Kelly of Pella	W. P. Eckermann, Eudunda	"	2/7/32
23567	Willow Farm Millie 31st	A. J. Marrett, Saddleworth	"	22/5/32
20760	Doreen of Pella	A. B. Sieber, Eudunda	"	11/7/32
24861	Fernden Lady Beth	E. O. Traeger, Eudunda	"	10/8/32
23604	Rhodesia 2nd of Hampden	A. E. Middleton, Balaklava	"	19/8/32
19079	Roseworthy Princess 18th	Agricultural College, Roseworthy	"	17/8/32
24692	Pembroke Duchess	Mrs. C. W. Ansell, Bletchley	"	17/8/32
20755	Millie 30th of Willow Farm	T. B. Brooks, Clarendon	"	19/8/32
20772	Burnlea Bloom	J. M. Hudd, Bletchley	"	4/6/32
3350	Bloomfield Piebe Gwen	W. Hawker, Clare	Friesian	22/8/32
16387	Kyby Ina	Government Farm, Kybybolite	Ayrshire	21/8/32
2652	Barina Pietje's Gem	L. H. & P. C. Giles, Auburn	Friesian	21/6/32
18373	Mayflower Jellicoe 2nd of Illawarra	W. J. Spackman, Long Flat	A.I.S.	17/6/32
23621	Roseworthy Princess 25th	Agricultural College, Roseworthy	Jersey	17/6/32
23617	Roseworthy Dawn	Agricultural College, Roseworthy	"	6/9/32
2991	Anama Gem's Diamond	W. Hawker, Clare	Friesian	6/9/32
17889	Jean 3rd of Dalebank	Mrs. C. W. Ansell, Bletchley	Jersey	5/6/32
18326	Mayflower 4th of Klamia	E. & A. Nicholls, Woodville	A.I.S.	5/9/32
19042	Flower of Dalebank	J. M. Bray, Langhorne's Creek	Jersey	25/8/32
16845	Roseworthy Lady	Agricultural College, Roseworthy	"	22/8/32
17883	Pembroke Viola	Mrs. C. W. Ansell, Bletchley	"	16/8/32
23605	Hampden Rhonda	C. C. T. Ottens, Brinkworth	"	6/7/32
20729	Kate 4th of Stonyfell	H. & A. Bohme, Balhannah	"	31/8/32
24989	Oakhill Carnation 4th	Mrs. M. I. Dittich, Hampden	A.I.S.	8/9/32
11653	Gayboy's Sunflower of Wangara	Insp.-General Hospitals, Northfield	Jersey	3/5/32
16806	Solanum's Blossom of Pella	W. P. Eckermann, Eudunda	Friesian	29/4/32
2350	Barina Coolangatta Buttercup	L. H. and P. C. Giles, Auburn	"	10/7/32
20825	Judith of Talunga	C. C. T. Ottens, Brinkworth	A.I.S.	14/8/32
18362	Ruby 5th of Hill View	A. Snell, Bollivar	Jersey	1/6/32
15074	Lotus of Oakhill	Mrs. M. I. Dittich, Hampden	A.I.S.	2/9/32
18199	Bluebell of Lossie	A. N. McArthur, Millicent	Ayrshire	28/8/32
13415	Kyby Rose 2nd	Government Farm, Kybybolite	Jersey	10/8/32
19052	Burnlea Blandina	J. M. Hudd, Bletchley	Ayrshire	27/7/32
17929	Lady Alice of Fernden	E. O. Traeger, Eudunda	Jersey	11/8/32
14704	Kyby Barbara	Government Farm, Kybybolite	"	5/9/32
23638	Kelvinside Tribly's Olive	H. R. Walsh, Mount Barker	Ayrshire	2/9/32
31020	Ontario Millie	T. B. Brooks, Clarendon	Jersey	29/7/32
18422	Kyby Heather	Government Farm, Kybybolite	A.I.S.	21/7/32
13851	Viola 2nd of Dalebank	Mrs. C. W. Ansell, Bletchley	Guernsey	1/5/32
24693	Pembroke Lotus	Mrs. C. W. Ansell, Bletchley	Jersey	24/7/32
18356	Hero's Handsome 2nd of Illawarra	A. Snell, Bollivar	A.I.S.	14/4/32
1543	Glenlea Dixie	E. T. Vinall, Brighton	"	2/5/32
15056	Rockness Goldfinch	H. B. Peters, Mount Compass	"	7/9/32
15033	Janet of Ben Lomond	Insp.-General Hospitals, Northfield	Ayrshire	20/11/32
14965	Searchlight's Primrose of Wangara	J. J. Farrow, Gawler	"	22/10/32
18202	Lady Galway of Alva	A. N. McArthur, Millicent	A.I.S.	10/1/33
15665	Angle Farm Poppy	Ayrbrook Farm Ltd., Aldgate	Jersey	8/12/32
22714	El Rimal Rhoda	Ayrbrook Farm Ltd., Aldgate	Ayrshire	16/12/32
14873	Waratah 2nd of Loch Willow Farm	H. B. Kuchel, Murray Bridge	"	17/2/33
29481	Womplini First Clementine	Jas. McEwin, Houghton	"	15/4/33
19411	Angle Farm Elsie	Ayrbrook Farm Ltd., Aldgate	"	11/3/33
18693	Oakbank Alm	Government Farm, Kybybolite	"	
20791	Lady McEwin 19th of Penrhyn	A. J. Marrett, Saddleworth	"	
23557	Dalebank Fairy Queen 3rd	A. J. Marrett, Saddleworth	"	
18245	Damsel of Brinkley	H. R. Walsh, Mount Barker	"	

The following cow has now completed 365 days' test. Her figures for 278

34602 | Balaklava Collegian's Bud..... | A. E. Middleton, Balaklava | Jersey | 30/12/31

CORRE

Woorora King's Rosalind's figures were published previously as a Junior two, whereas she was actually

23158 | Woorora King's Rosalind | A. B. Sieber, Eudunda | Jersey | 21/1/32

BUTTERFAT TESTS (OFFICIAL) FOR YEAR ENDED JUNE 30TH, 1933, OF FOUNDATION REGISTERED IN

Particulars of Registration.	Name of Cow.	Owner and Address.	Breed.
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JUNIOR FOUR-YEAR-OLDS.—

C.B. only | Glenowie Echo Segis..... | A. E. Middleton, Balaklava | Friesian

MATURE COWS.—BUTTERFAT

App.	Anama Topsy 3rd	C. J. Morris, Monteith	Friesian
Foundation Cow .	Gem of Toora	S. N. Bott, Murray Bridge	A.I.S.
Foundation Cow .	Lucy of Toora	W. J. Spackman, Long Flat	A.I.S.

OFFICIAL TEST—continued.

Age at Calving.			Total Milk.	Average Test.	Total Butterfat.	Days Tested.	Sire.	Remarks.
Y.	M.	D.	Lbs.	%	Lbs.			
— 350LBS.—continued.								
73	21		7,350	5.52	405.98	273	Triumph 2nd of Dalebank	—
8	5	22	6,996	5.78	404.67	273	Werribee Starbright's Fancy	—
5	10	13	7,569	5.33	403.72	273	Molly 5th's Audrey Tyllish of Banyule	—
6	0	17	8,221	4.89	401.81	273	Governor Grey of Pella	—
5	5	14	7,834	5.01	392.15	273	Werribee Combination	—
5	4	26	7,215	5.36	386.38	240	Carnation's Lad of Dalebank	Dried off
7	4	15	6,558	5.89	386.27	273	Trick of Linden	—
6	1	8	6,912	5.55	383.35	273	Triumph 2nd of Dalebank	—
6	10	19	7,314	5.23	382.89	273	Molly 5th's Audrey Tyllish of Banyule	—
5	10	29	6,753	5.67	382.85	273	Mack of Glenford	—
5	0	21	11,389	3.34	380.97	273	Mutual Pearl Piebe	—
5	5	21	8,515	4.45	378.72	273	Loyalty of Bridge View	—
5	1	15	13,086	2.75	376.04	273	River Glen Pietje Posch	—
7	3	2	8,715	4.31	375.31	273	Fussy's Jellicoe of Hill View	—
5	7	24	7,650	4.90	374.99	273	King Solomon of Dalebank	—
5	5	29	6,843	5.44	372.38	273	Lad of Linden	—
5	6	2	11,247	3.29	369.60	273	Inavale Lady's Pride	—
7	6	11	7,807	4.71	367.78	273	Baxter of Banyule	—
5	11	4	10,582	3.44	364.43	273	Pembroke of Greyleigh	—
7	6	27	7,434	4.90	363.91	273	Baxter of Banyule	—
8	3	21	7,719	4.69	362.00	273	King Solomon of Dalebank	—
7	9	12	6,315	5.69	359.13	273	Tyllish of Dalebank	—
5	11	29	6,768	5.28	357.17	273	Carnation's Lad of Dalebank	—
6	2	1	6,562	5.43	356.68	273	Bonnie Chief of Inglewood	—
5	4	28	6,532	5.44	355.31	273	Milkad 2nd of Dalebank	—
12	8	6	10,483	3.36	351.76	273	Gayboy of Arrawatta	—
8	1	23	6,510	5.39	350.75	273	Werribee Starbright's Fancy	—
6	8	10	10,534	3.32	349.60	273	Pride's King Rock of Brundee	—
7	8	21	7,171	4.82	345.48	273	Molar Chief of Banyule	—
5	6	23	8,652	4.14	344.52	273	Gay Lad of Burradale	—
11	3	10	5,985	5.73	343.14	210	Lord Douglas of Penrhyn	Exemption
7	11	10	10,054	3.40	341.82	273	Majestic of East View	—
8	1	25	8,476	4.01	339.55	273	Royalty of Bridge View	—
7	9	16	6,396	5.22	334.14	273	Triumph 2nd of Dalebank	—
7	10	1	6,745	4.93	332.90	273	Milkad 5th of Dalebank	—
6	9	2	7,860	4.21	330.68	240	Royalty of Bridge View	Dried off
6	7	4	6,348	5.19	329.46	273	Noble of Yaralla	—
5	1	17	5,547	5.77	320.01	273	Molly 5th's Audrey Tyllish of Banyule	—
5	1	29	8,550	3.72	318.05	240	Royalty of Bridge View	Dried off
9	7	9	5,566	5.64	313.76	273	You'll Do of Dalebank	—
5	10	14	6,058	5.15	312.12	273	Triumph 2nd of Dalebank	—
5	10	19	7,152	4.35	310.96	273	Fussy's Hero of Hill View	—
5	9	26	6,589	4.67	307.69	273	Minamurra Laddie	—
9	8	14	5,394	5.47	295.11	273	Bonnie Chief of Inglewood	—
6	8	18	6,795	3.94	267.71	273	Conjurer of Darbalaria	—
7	2	7	6,813	3.74	254.66	273	Searchlight of Darbalaria	—
5	4	14	6,049	3.70	223.80	273	Majestic of East View	—
7	2	7	5,385	3.98	214.10	180	Angle Farm Liberty	Dried off
5	9	4	5,265	3.88	204.13	180	El Rimal Prince Charlie	Dried off
11	6	19	5,355	3.76	201.42	120	Conundrum of Loch Willow Farm	Withdrawn
5	1	8	2,565	5.39	138.29	90	Werribee Masterman	Sold
5	4	26	3,780	3.52	133.17	150	Angle Farm Liberty	Dried off
7	2	27	3,075	3.80	116.87	150	Summit of Lady Bank	Dried off
7	9	10	1,950	4.08	79.53	90	Bramble's Lord of Linden	Sold
6	9	2	885	5.30	46.94	30	Baxter of Banyule	Sold
12	5	18	870	5.20	45.24	430	Molar Chief of Banyule	Withdrawn

days' test were published in the previous half-yearly list.

2	4	15	9,370	5.39	505.06	365	Balaklava Skylee's Collegian	—
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CTION.

a Senior two-year-old, as amended below :—

2	11	5	4,050	6.01	243.30	210	Wollingury Cavalier's Silver King	Withdrawn
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APPENDIX COWS, AND OF PURE BREDS, WHICH ON JUNE 30TH, 1933, WERE CALE ROLL ONLY.

Calved.	Age at Calving.			Total Milk.	Average Test.	Total Butterfat.	Days Tested.	Sire.
BUTTERFAT STANDARD, 310LBS.								
18/11/31	4	0	20	10,072½	3.26	328.44	273	Glenowie Beets Griselda
STANDARD, 350LBS.								
19/6/32	10	5	9	{ 18,067½ 20,280	{ 2.88 2.91	{ 520.52 589.75	{ 273 365	King Reuben of Monavale
21/4/32	—			{ 12,580½	3.96	498.17	273	
26/6/32	—			9,499	3.99	378.75	273	

STOCK AILMENTS.

(An Address to the Ceduna Conference by W. G. Bennett, B.V.Sc., Lecturer on Veterinary Science, &c., Roseworthy College.)

This is a very wide subject, and one can only deal with those conditions commonly met with, and which are capable of simple treatment. Ailments of stock can be roughly divided into three classes, viz., those due to *injury and accident*, the results of which are usually quite obvious and the treatment largely a matter of common sense. The principal points to be observed in all such cases are first of all the removal of any foreign matter which may be present, the cleaning up and keeping clean of any wounds, the application of hot or cold packs to bruises and sprains, and the resting of any animal injured.

The second class, and that with which we are principally concerned, might be called *simple diseases*, which may or may not be associated with germs, but are never contagious. The third class are the *contagious diseases*, such as tuberculosis and strangles.

Dealing with the simple ailments, it can be confidently stated that 85 per cent. of cases met with are directly or indirectly traceable to the bowels, but in every case a proper diagnosis of the condition and its cause should be made before any treatment is adopted. This applies with particular force to the well-known condition of *colic*. All horse owners at some time or another have to deal with cases of this type. Colic is not a disease in itself, but really a symptom which may be due to many quite unrelated causes; actually all it really means is a pain in the abdomen, and may be traceable to an excessive amount of wind in the bowels, an impaction of food there, or, again the actual pain may be in the chest. It is therefore necessary to make a careful examination of each individual case to determine the cause before starting treatment.

To deal with each type separately let us take *flatulent or windy colic* first. This is caused by the fermentation of food in the bowels, with their consequent distention with gas. It is often traceable to succulent foods, particularly when these are damp; but also follows overfeeding with grain, such as wheat, or mouldy fodders. In this form the pain is continuous, and only rarely does the animal throw itself about. It appears afraid to lie down, and is very uneasy with constant pawing of the ground, looking round at the flank, and occasionally squatting like a dog or kneeling on the fore legs to relieve the pressure. This pressure of gas may interfere with the breathing.

Treatment necessarily requires the use of a medicine to relieve the gas, and for this purpose a drench consisting of 1oz. each of turpentine and aromatic spirits of ammonia in 1½ pints of linseed oil will be found most effective. In absence of any other drugs, two tablespoonfuls of baking soda in a pint of water every two hours will be found beneficial. When the pain is severe, and this applies to all forms of colic, a dose of 1oz. of chloral hydrate in half a pint of liquid paraffin (medicinal) is the best drug to use. Do not use laudanum, as it has a depressing effect on bowel action, leading to further constipation. Enemas of warm water and soap should be given at frequent intervals.

The next type is *spasmodic colic*, always traceable to the food, but bad teeth may be a contributing cause. Mouldy food, sudden changes of food, boiled foods fed to animals not used to them are all possible causes.

As a rule the condition develops suddenly; the pain severe; the animal throws itself about, rolls, stretches as if to urinate; kicks at the belly, and looks round at the flank. Owing to the stretching, many people get the erroneous idea that the trouble is located in the bladder (commonly known as "wrong in the water").

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This is a very rare condition in the horse, and will probably not occur once in a lifetime. Any distention of the bladder is entirely due to a temporary paralysis of that organ, due to the pain, and can frequently be relieved by massage of it through the rectum, or last part of the gut.

For treatment, chloral, as mentioned, will give relief. In its absence $\frac{1}{2}$ pint of whisky or brandy will help. Since it is frequently associated with impaction of the large bowel, soap and water enemas should again be applied, and a drench of 1 ounce of turpentine in $1\frac{1}{2}$ pints of linseed oil will complete the treatment. The horse should be put on a laxative diet for several days after.

A third type of colic, more or less restricted to certain types of country and dry seasons, is *Sand Colic*. Here, although the symptoms are similar to the last in many respects, sand is usually seen in the droppings, and special treatment is required, as well as the general treatment mentioned above. After 12 to 16 hours starvation, give 1lb. of honey in 1 quart of whole milk, followed by the usual purgative. Relief can sometimes be obtained by throwing the horse, rolling it over on its back, and massaging the abdomen. To tone up the bowels, give 1 level teaspoonful of powdered Nux Vomica night and morning, mixed in 1 tablespoonful of treacle. A laxative ration should be fed for a week following, or green feed, if available.

Engorgement with wheat is another fairly common occurrence in horses, and should be treated by giving $\frac{1}{2}$ lb. of baking soda in 1 pint of water every two hours, followed by a drench of 1lb. of Epsom salts and 2 tablespoonfuls of ginger. Watch for founder, and treat accordingly.

Three diseases, due in large measure to feeding, will now be dealt with. The first of these is known as *Lymphangitis*, *Monday Morning Disease*, or *Big Leg*. Certain animals are more prone to it than others, particularly those of a slow lymphatic temperament. It always follows the feeding of a full ration during an extended period of rest, such as the week end; hence the name. Usually both hind legs swell to an enormous size, and are hot and tender to the touch. It may be confined to only one leg, or, in some cases, may also affect the front legs. The animal is off his food, and obviously uncomfortable. The first thing required is a complete clearing of the bowels by the standard drench, and the feeding of a laxative ration. The local condition in the legs is best treated by the application of cold water from a hose or bucket for about 10 minutes twice or three times a day, and gentle massage. The condition may become chronic.

The second is known as *Azoturia*, which is characterised by a sudden paralysis of the hind legs and a coffee-colored urine. It usually follows similar feeding conditions to the last. The symptoms arise suddenly, usually as a stiffness of the limbs, and if the animal is forced to move it falls and cannot rise. Treatment is not very successful, but should take the form mainly of nursing, i.e., plenty of bedding and warm clothing. Turn the animal over at frequent intervals to prevent bedsores. Put on a diet of mash and green feed, give enemas and plenty of cold water. Keep the bowels open with Epsom salts, preferably in the feed.

The third is the well-known condition of *founder*, which usually affects both front feet, occasionally all four. The commonest causes are over-driving, too much hard feed to a stallion, engorgement with cereal grain, too long grazing on growing wheat, and sometimes after foaling in the mare. A characteristic symptom of this ailment is for the horse to stand with both hind legs well under the body, and both fore pushed well out in front, with the weight on the heels. The feet are hot to the touch, and show pain when struck. It is almost always followed by dropped soles. The most effective treatment is to stand the animal in a mud puddle or pool of water for several hours a day, and placing it in a well-bedded stall at night. Water should be run down the legs for several minutes at intervals during the day. Give a 6 dram aloes ball or a dose of oil to hasten the evacuation of the bowels, and place on a laxative diet.

Passing to the dairy cow, the first point which requires stressing is the absolute necessity of supplying a mineral supplement to the feed, irrespective of the ration or pasture to which the animal has access. Owing to the enormous drain on the body minerals by the supplying of milk, many obscure conditions develop in the cow, such as *blindness*, *staggers*, and others which are directly traceable to a lowering of these essentials. This deficiency must be made good, and is better done before the troubles arise. The simplest method of doing this is to add minerals to the ration, and as lime and phosphorus are the two most commonly lacking, a handful of superphosphate added to the feed twice daily will meet most requirements. It is better, however, when possible to feed a complex such as dicalcic phosphate or bonemeal 3 parts, plus salt 2 parts. (Super can be used in place of either of the former, but is not so digestible).

Passing to actual disease conditions, the two of most general occurrence are *mammitis* and *milk fever*. The former is an inflammation of the udder, usually caused by a germ, sometimes contagious, which gives rise to heat in one or more quarters, pain, redness, and the presence of a hard lump. The milk, if any, is watery, containing clots and strings, and will not keep. Treatment consists of the application of hot water fomentals as hot as the hands will stand for 10 minutes, followed by massage of the affected quarters with some liniment, such as camphorated oil. The udder should be stripped out several times a day, and the above treatment applied each time.

Passing to *Milk Fever*, this usually occurs in cows in good condition after an easy calving, and in good producers. After being milked out the animal becomes restless and excited, then lies down in a semi-conscious condition, with the head turned to the flank. The simplest treatment on the farm is to inflate the udder with air by means of a pump, and the animal will usually rise inside a couple of hours. If not, pump her up again. Never drench her while on the ground, but after she gets up a drench of 1oz. each of calcium chloride and ammonium chloride will help to prevent a relapse. Do not strip the cow out for several days after an attack, but just take away sufficient milk to relieve the udder. Always see that the teat tube is well boiled before pumping up the udder. If the teats are tied always use wide tapes.

Bloat is a common ailment of cattle, particularly after eating wet succulent fodder grasses, and can be easily diagnosed by the swelling of the left flank. The administration of $\frac{1}{2}$ lb. of baking soda, or 2ozs. of turpentine in oil, will sometimes relieve the condition, or the passage of a narrow piece of hose into the paunch. When other remedies fail, the flank should be punctured at a point midway between the last rib and the point of the hip, and at the highest point of the swelling. A special instrument, known as a trocar and canula, can be used, but in its absence the gas can be let out by driving in a broad-bladed knife and turning it sideways. The skin should be pulled to one side before making the hole. Turpentine or soda solution can be poured straight into the paunch through the opening.

Bowel conditions similar to those occurring in the horse, and accompanied by pain or "colic," are quite common in dairy cows, traceable to sluggishness of those organs and an impaction of the food mass therein. One condition of almost everyday occurrence is that of a cow losing her appetite and a drop in milk yield from no apparent cause. All such cases respond quite readily to a standard drench of $1\frac{1}{2}$ lbs. of Epsom salts, $\frac{1}{2}$ lb. of treacle, and 2 level tablespoonfuls of ginger in 1 pint of lukewarm water. In fact, it may be said that in all cases of simple ailments in cows the administration of this drench will be attended by excellent results. The treatment should be followed by a course of *nux vomica*, at the rate of 1 level teaspoonful mixed with treacle, and wiped on the tongue twice daily, as a general stimulant.

THE HILLS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR JUNE, 1933.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during June.	Per Cow during June.	Per Cow July to June.	Per Herd during June.	Per Cow during June.	Per Cow July to June.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
7/E . .	26-17	19-73	11,267	430-53	6,609-42	472-57	18-06	268-28	4-19
7/H . .	9	8	5,295	588-33	7,028-74	260-17	28-91	350-89	4-91
7/K . .	14-73	12-87	9,149	621-11	8,476-36	368-36	25-01	347-08	4-03
7/L . .	33-06	23-27	15,725½	489-42	6,781-27	720-57	22-45	320-07	4-58
7/T . .	15	11-90	4,593½	306-23	5,302-56	249-05	16-60	247-65	5-42
7/W . .	19	12-90	6,223½	327-55	7,065-02	263-63	13-88	296-75	4-24
7/Y . .	27-37	16-17	9,885	361-16	6,216-25	479-84	17-53	292-28	4-85
7/AA . .	14	9-23	4,321	308-64	5,232-85	203-63	14-55	257-31	4-71
7/HH . .	18	14	7,335	407-50	5,774-48	328-89	18-27	252-94	4-48
7/KK . .	19-97	11-97	9,588½	480-15	7,222-30	432-15	21-64	308-84	4-51
7/MM . .	37-80	31-87	20,544	543-62	7,631-42	805-95	21-33	299-60	3-94
7/NN . .	24	15-77	7,651	318-70	6,655-99	314-22	13-09	262-55	4-11
7/OO . .	16	12-77	8,017½	501-09	7,455-95	373-04	23-32	354-46	4-65
7/PP . .	19	14-63	8,870½	466-87	7,206-70	481-70	25-35	389-00	5-43
7/QQ . .	16-17	13-40	7,941	491-09	5,958-69	469-67	29-05	338-63	5-91
7/TT . .	20-80	15-33	9,872	476-54	7,427-91	447-50	21-59	334-84	4-53
7/VV . .	23-90	10-70	5,041	210-92	5,515-57	242-26	10-14	253-58	4-81
7/YY . .	13-27	10-37	7,601	572-79	7,470-76	379-42	28-59	308-84	4-99
7/XX . .	22-73	16-97	11,324	498-19	8,058-50	612-73	26-96	440-23	5-41
7/YY . .	22-60	19-73	9,569	423-41	5,619-33	435-91	19-29	253-28	4-56
7/P . .	23-60	20-73	18,419½	780-48	1,739-14	892-96	37-51	Apr.-June 83-85	4-85
Means	20-77	15-35	9,439-69	454-48	6,704-57	439-72	21-17	306-17	4-66

NARRUNG HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR JUNE, 1933.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during June.	Per Cow during June.	Per Cow October to June.	Per Herd during June.	Per Cow during June.	Per Cow October to June.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
5 O . .	35	25-93	15,285	436-71	[4,684-59	800-04	22-86	241-96	5-23
5/D . .	33-17	22-77	17,327½	522-38	4,602-11	901-71	27-18	249-17	5-20
5/E . .	42	30-40	24,477½	517-71	4,059-80	1,236-02	26-07	214-98	5-24
5/P . .	32	27-67	19,603½	612-61	5,224-89	1,038-84	32-46	265-40	5-30
5/R . .	68-10	32-57	11,513½	169-07	2,604-85	466-28	7-14	109-43	4-22
5/S . .	18	14-10	7,989	443-83	3,367-20	364-30	20-24	163-52	4-56
5/Y . .	26	20-63	11,897½	457-60	4,709-73	674-76	25-95	252-53	5-71
5/Z . .	37	32	24,810	670-54	5,979-73	1,239-93	33-51	291-80	5-00
5/EE . .	17-93	5-27	2,816½	157-22	4,943-27	146-11	8-16	250-82	5-19
5/GG . .	22-90	18-33	7,233	315-85	3,060-74	359-27	15-69	148-50	4-97
5/II . .	30-53	20-30	12,331	403-89	4,751-64	617-61	20-23	238-26	4-99
5/JJ . .	24	15-57	12,370½	540-44	4,732-21	550-16	22-92	206-55	4-24
5/KK . .	20	14-17	6,536	328-80	3,996-38	323-59	16-18	184-39	4-95
5/NN . .	26-93	9-43	4,092½	151-97	4,420-25	190-27	7-07	208-08	4-65
5/OO . .	20	11-97	6,206½	310-33	4,283-00	275-13	13-76	195-26	4-43
5/QQ . .	21	15-60	9,507½	452-74	4,159-99	557-35	26-54	231-28	5-56
5/RR . .	22	21	9,900	450-00	3,011-81	526-04	23-91	167-07	5-31
5/SS . .	21	13-80	5,642	268-66	3,831-56	266-44	18-64	179-66	5-08
5/TT . .	11	7-87	4,487	407-91	4,802-35	220-85	20-08	248-71	4-92
5/UU . .	23	21-70	12,556	545-91	3,859-45	553-01	24-04	174-27	4-40
5/VV . .	28	27	21,510	768-21	5,522-56	904-30	32-30	239-29	4-20
Means	27-60	19-43	11,842-48	429-11	4,241-12	583-43	21-14	208-12	4-93

LAKE ALBERT HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR JUNE, 1933.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during June.	Per Cow during June.	Per Cow December to June.	Per Herd during June.	Per Cow during June.	Per Cow December to June.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
6/B .	19	12-20	9,356	492-42	2,421-30	408-50	21-50	112-61	4-37
6/C .	20	13-07	10,240½	512-03	3,757-22	398-61	19-93	165-19	3-89
6/F .	22-30	18-63	18,847½	845-18	4,007-97	931-87	41-78	201-45	4-94
6/H .	26-47	22-67	19,177	724-48	3,583-76	842-86	31-84	171-60	4-40
6/Y .	11	7-30	2,656	239-86	2,638-13	126-68	11-43	118-79	4-75
6/I .	24	21-43	15,386	634-50	4,460-04	678-93	28-03	191-00	4-43
6/LL	25	19-67	10,903½	436-14	3,866-73	409-15	16-37	148-92	3-75
6/Oo.	21	18-80	11,418	543-71	5,614-29	511-22	24-34	251-72	4-48
6/Pp	15	15	8,925	595-00	3,735-40	478-57	31-90	190-68	5-36
6/Qq.	25-70	13-77	9,062	352-61	4,984-78	376-45	14-65	214-46	4-15
6/Rr	27	18-43	12,918½	478-46	4,604-40	548-40	20-31	198-31	4-24
6/Tt	22	17-37	10,188½	463-11	4,244-62	448-22	20-37	188-90	4-40
6/Vv	22	13-70	11,788½	535-84	4,658-87	551-55	25-07	220-20	4-68
6/Xx	25	19-50	11,378	455-12	4,482-15	486-71	19-47	191-15	4-28
7/Yy.	29	20-97	8,636½	297-81	2,985-96	451-60	15-57	153-70	5-23
6/Zz .	27	20-03	10,545	390-56	4,391-77	467-26	17-31	198-11	4-43
6/AAA	21	7-60	4,415	210-24	1,355-09	230-39	10-97	74-25	5-22
6/BBB	27-57	19-30	12,865½	466-65	4,687-89	558-89	20-27	191-63	4-84
6/CCC	22	14-87	7,869½	357-70	4,044-63	299-66	13-62	169-26	3-81
6/DDD	23-77	20-47	10,892½	458-24	4,436-73	499-13	21-00	194-87	4-58
6/EEE	27	22-87	18,587½	684-74	5,425-22	734-40	27-04	227-60	3-95
6/FFF	27	21-90	15,405	570-56	4,993-33	662-84	24-55	212-97	4-30
6/GGG	22-07	22-03	15,349	695-46	5,748-57	593-75	26-90	229-19	3-87
Means	23-13	17-50	11,600-46	501-64	4,182-55	508-50	21-99	184-98	4-39

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

1933 PRUNING COMPETITIONS.

McLAREN FLAT.

The Annual Pruning Competitions, conducted under the auspices of the McLaren Flat Branch of the Agricultural Bureau, were held in Mr. J. Ingoldby's vineyard on June 24th.

RESULTS.

FRUIT TREE SECTION.

Judge—R. Fowler.

Competitor.	Apricot.	Prune.	Total.	Competitor.	Apricot.	Prune.	Total.
F. M. Elliott ...	89	83	172	A. Trembath ...	76	84	160
J. B. Helbig	90	80	170	W. C. Ledgerd .	78	81	159
R. E. Elliott ...	85	83	168	H. Eatts	—	67	67
D. Nicolle	86	77	163	C. Bruce	66	—	66
L. Ward	77	86	163				

TREE SECTION.

Competitor.	Apple.	Pear.	Peach.	Apricot.	Total.
H. Linton	91	90	88	87	356
J. B. Helbig	89	89	81	92	351
H. D. Bain	88	88	85	89	350
O. Burford	91	83	81	94	349
F. W. Boehm	85	80	89	89	343
V. Duke	87	84	83	88	342
H. E. Wilksch	86	82	84	88	340
G. Boehm	85	81	85	89	340
A. J. Chapman	85	85	88	79	337
A. Smith	86	84	78	88	336
E. G. Helbig	83	87	74	91	335
S. Turnbull	82	81	85	85	333
B. Fromm	79	84	81	85	329
A. Andriske	82	77	84	83	326
A. T. Leske	84	83	74	82	323
M. Duke	80	77	75	84	316
W. H. Penna	66	73	80	83	302

VINE SECTION.

Judges—Messrs. G. Cox, E. Leishman, J. Williams, and J. B. Harris.

Competitor.	Spur.	Rod.	Total.	Competitor.	Spur.	Rod.	Total.
H. O. Helbig	93	90	183	C. Sigston	87	77	164
T. E. Teusner	91	90	181	J. Piercey	89	75	164
E. Strout	88	92	178	E. Roberts	81	82	163
P. Wapper	83	95	178	L. Ward	87	76	163
F. Price	87	89	176	D. Hunt	82	81	163
J. B. Helbig	85	89	174	F. Turner	82	80	162
Reg. Elliott	87	87	174	R. Low	80	82	162
F. H. Schurgott ..	84	90	174	W. Sigston	77	85	162
H. J. Cox	87	87	174	A. Cooper	79	83	162
O. Wright	84	89	173	H. Alexander	92	70	162
W. Harris	84	87	171	E. Waye	81	80	161
J. Sigston	86	84	170	J. Keane	83	77	160
A. G. Air	82	88	170	A. Tickle	80	80	160
Rex Ward	90	80	170	E. Baldock	80	80	160
T. Burgan	80	90	170	H. Easton	82	78	160
L. G. Osmond	84	85	169	H. Storer	76	84	160
S. Bennett	85	84	169	O. Manser	80	80	160
C. E. Air	86	82	168	G. Baldock	84	75	159
R. Townsend	88	78	166	J. Ordish	80	79	159
A. Osmond	84	82	166	A. E. Helbig	80	79	159
F. M. Elliott	90	76	166	F. Grohs	83	76	159
C. R. Helbig	84	81	165	W. C. Ledgard ...	78	80	158
E. R. Grohs	82	83	165	R. Forrest	79	79	158
W. Stillwell	83	82	165	C. Penney	78	79	157
H. Sparrow	82	83	165	H. Eatts	75	82	157
H. Baxter	82	83	165	H. Hobbs	83	72	155
J. Mitchell	85	80	165	E. G. Helbig	84	66	150
G. Clayton	82	83	165	L. Dyer	79	70	149
R. Gunn	81	83	164	Ron Ward	—	78	78
L. V. Turner	83	81	164	C. Ward	—	76	76
P. Penney	84	80	164	R. Rayner	—	70	70
B. Powell	81	83	164	R. Hobbs	—	70	70

. RIVER MURRAY PRUNING CHAMPIONSHIP.

Held at Waikerie on July 6th on Mr. L. W. Andrew's Block.

Judges—E. Leishman, F. Arndt, and F. J. Elliott.

VINE SECTION.

TREE SECTION.

Name.	Gordo 100	Current 100	Sultana 120	Total 320	Name.	Apricot 100	Peach 100	Pear 100	Total 300
1. Isaacson, R.	87	90	105	282	1. Isaacson, R.	89	88	85	262
2. Pethick, N.	86	89	105	280	2. Keast, S.	82	90	87	259
3. Elliott, G.	91	87	100	278	3. { Wedd, A.	86	90	80	256
4. Perkins, H. M. ...	86	87	102	275	{ Rout, W. E.	84	89	83	256
5. Boehm, C.	85	85	102	272	5. { Curtis, C.	88	81	86	255
6. Liddicoat, E. A. .	88	87	96	271	{ Vogt, W.	86	86	83	255
7. Peitch, A.	88	86	96	270	7. Keast, R.	81	85	87	253
8. { Rout, W. E.	86	81	99	266	8. Vercoc, G.	85	80	86	251
{ Loxton, S.	84	85	97	266	9. { Liddicoat, E. A. .	82	85	83	250
10. Vogt, W.	82	82	101	265	{ Beckwith, J. G. .	80	80	90	250
11. Wedd, A.	83	85	96	264	11. Heart, F.	81	83	85	249
12. Keast, S.	81	87	95	263	12. Pethick, N.	79	81	88	248
13. Hoffmann, M. ...	81	84	97	262	13. Perkins, H. M. ...	78	84	82	244
14. Keast, R.	80	85	96	261	14. Kuchel, S.	81	81	80	242
15. { Prosser, A. E. .	78	80	100	258	15. Hoffmann, M.	80	77	82	239
{ Loxton, R.	76	84	98	258					
17. Robertson, J. T. .	80	80	96	256					

LOWER NORTH PRUNING CHAMPIONSHIP.

WATERVALE, JULY 13th.

Judges—Messrs. C. Pollitt, J. Williams, E. Leishman, and J. B. Harris.

VINE SECTION.

Competition.	Spur.	Rod.	Total.	Competitor.	Spur.	Rod.	Total.
Schiller, E.	92½	93	185½	Sparrow, A.	84½	85½	170
Burgess, A. S.	90	92	182	Linton, A.	86	83½	169½
Filsell, E. P. J. ...	92½	89	181½	Andriske, A.	84½	85	169½
Schulz, F. H.	89½	91	180½	Staehr, P. E.	81½	87	168½
Linton, H.	90½	89	179½	Kurtz, O.	83½	84½	168
Boehm, F. W.	88	91	179	Grosskopf, G.	81½	84½	166
Gallasch, R.	86	91½	177½	Hale, A.	80½	82½	163
Obst, P.	90½	85½	176½	Merrett, G.	85	77½	162½
Parbs, H.	88	87½	175½	Helbig, A. E.	72½	88	160½
Obst, A.	88½	86	174½	Nayda, F.	80	80	160
Leske, A. T.	82	92	174	Fromm, B.	80	78	158
Lehmann, H.	81½	92	173½	Smith, E. C.	73	—*	—*
Burford, O.	80½	91½	172				

* Disqualified (4 vines only pruned).

TREE SECTION.

Competitor.	Peach.	Apricot.	Apple.	Pear.	Total.
H. Linton	88	87	91	90	356
J. B. Helbig	81	92	89	89	351
H. D. Bain	85	89	88	88	350
O. Burford	81	94	91	83	349
F. W. Boehm	89	89	85	80	343
V. Duke	83	88	87	84	342
H. E. Wilksch	84	88	86	82	340
G. Boehm	85	89	85	81	340
A. J. Chapman	88	79	85	85	337
A. Smith	78	88	86	84	336
E. G. Helbig	74	91	83	87	335
S. Turnbull	85	85	82	81	333
B. Fromm	81	85	79	84	329
A. Andriske	84	83	82	77	326
A. T. Leske	74	82	84	83	323
M. Duke	75	84	80	77	316
W. H. Penna	80	83	66	73	302

LANGDON PARSONS' TROPHY.

To the Light's Pass Branch this year belongs the credit—in the person of F. W. Boehm—of winning the coveted trophy presented by Mr. W. Langdon Parsons to the competitor securing the highest number of points over the three years 1931-1932-1933 in the local pruning competition in both the fruit tree and vine sections. The following table sets out the points obtained to each competitor :—

Name.	Branch.	1931.	1932.	1933.	Grand Aggregate.
F. W. Boehm	Light's Pass	544	556½	548	1,648½
H. Linton	Angaston	544	554	549	1,647
A. Andriske	Lone Pine	536½	554	553	1,643½
B. Fromm	Lone Pine	556	543	538	1,637
J. B. Helbig	Greenock	547	542½	540½	1,630
G. Boehm	Light's Pass	547	543	536½	1,626½
A. J. Chapman	Light's Pass	545½	535	543	1,623½
C. A. Hoffmann	Lone Pine	544½	546½	523	1,614
A. S. Burgess	Watervale	544	546	520	1,610
H. E. Wilksch	Greenock	545	522	536	1,603
F. H. Schulz	Light's Pass	554	516	527	1,597
S. Turnbull	Lone Pine	522	531	533	1,586
H. Kappler	Lone Pine	549	517½	517	1,583½
O. Burford	Watervale	518	522	529	1,569
V. Duke	Penwortham	504	542	522	1,568
W. B. Koop	Light's Pass	524½	513½	530	1,568
W. G. Ahrens	Light's Pass	522	515½	523	1,560½
L. Koop	Light's Pass	532	523½	502	1,557½
A. Smith	Watervale	531	505	517	1,553
E. W. Burgess	Watervale	523	516	513	1,552
A. Milway	Light's Pass	529½	509½	507	1,546
J. Brysky	Watervale	530	511	493	1,534
C. S. Wyman	Penwortham	518	527	482	1,527
G. Burgess	Watervale	515	519	492	1,526
A. Hage	Lone Pine	500	524½	496	1,520½
F. Nayda	Penwortham	503	495	518	1,516
F. L. Burgess	Penwortham	520	507	476	1,503

LICENCES FOR BULLS.

There seems to be a little uncertainty in some quarters about the question of bull licences, chiefly as regards which bulls should be licensed; when, where, and by whom the licence is to be applied for, and how much it will cost.

It might be advisable, in the circumstances, to try to answer these queries now and thus clear up some of the doubts which are in the minds of people who have neither had an opportunity of reading the Dairy Cattle Improvement Act for themselves, nor of having it explained to them.

In the first place it should be noted that bulls located outside of the hundreds of the State need not be licensed at all; the Act applying only to those *within* the hundreds.

Next, it is not necessary to license a bull until after it is six months old, and actually, in some instances, it need not be licensed until it is nearly 12 months old. Nevertheless, owners are advised to give serious thought to the question of licensing immediately the bull reaches the six months' mark.

Here is a simple guide by which one might know when it is time to take out the licence:—

A bull which is over six months old on July 1st (even one day over) should be licensed during July. The licence will cost 10s., and will remain in force until the following June 30th. A fresh licence is required every year in the month of July.

A bull which is not more than six months old on July 1st, but which reaches that age on or before the following January 1st, should be licensed during January. The licence will cost 5s., and will remain in force until the 30th June. Thereafter licences should be applied for every July, and the fee will be 10s. per annum.

Licences are obtainable from local police stations, and from district dairy instructors.

And finally, concerning the question of who it is that should license the bull, the Act states that the responsibility rests with the owner, the part-owner, or lessee, or any person in possession of the bull. This being so, it is always advisable for the owner to see to it that either he or the person having possession of the bull takes out a licence, otherwise one of them, or even both of them, render themselves liable to prosecution.

LIFE — A BUSINESS

It is a paradox, perhaps, that while Home Life is a refuge from business, it is itself a business.

Money enters so largely into everything that it must be planned for in every phase of life.

It is in business that money is earned, in the Home, chiefly, that it is spent, and there is no sound reason why the spending should not be regarded as being just as important as earning. In fact, it is far more important, for earning is difficult and must employ wisdom, forethought, and energy, while spending is easy, so easy that there is temptation to spend unwisely.

Every Home, then, is a business, and needs an economic system, of which the Savings Bank Pass Book can be the valuable basis.

Commonwealth Savings Bank of Australia

GUARANTEED BY THE COMMONWEALTH GOVERNMENT.

SUMMARY OF LIVESTOCK STATISTICS, YEAR 1932.

[W. L. JOHNSTON, Government Statist.]

I. SHEEP AND WOOL.

1. *Number of Sheep*.—The sheep flocks on December 31st, 1932, numbered 7,713,236, constituting a record; the previous highest being 7,646,239 in 1891, and the next highest 7,542,345 in 1927; compared with 1931, 6,608,981, there was an increase of 1,104,255. The flocks were classified as follows:—Ewes, 3,815,513 (3,287,194); wethers, 1,788,094 (1,513,377); rams, 97,858 (86,061); under one year old, 2,011,771 (1,722,349).

2. *Breeds of Sheep*.—86·7 (86·4) per cent. of the flock were returned as pure-bred Merino, and 5·3 (6·3) per cent. Merino Comebacks, 1·0 (1·0) per cent. other pure breeds (Corriedale, Shropshire, Dorset Horn, Lincoln, Romney Marsh, Southdown, Suffolk, &c.), and 7·0 (6·3) per cent. Crossbreds.

3. *Lambing, 1932*.—During the year 1932, 3,127,432 (2,717,101) ewes were mated and 2,270,081 (1,983,667) lambs marked, exceeding the previous year's record. The percentage was 72·59 (73·01).

4. *Winter Lambing, 1933*.—3,264,000 ewes were reported as either mated or intended to be mated for the winter lambing of 1933. In addition, 144,000 ewes were expected to be reserved for spring lambing.

5. *Wool Clip*.—7,573,237 (6,404,046) sheep and lambs were shorn, the total clip including locks, bellies, pieces, &c., being 65,154,632 (56,960,732) lbs., increase 8,193,900lbs. The average weight of fleece for sheep and lambs combined was 8·60 (8·89) and for sheep only 10·42 (10·75) pounds.

6. *Total Wool Production*.—Subject to slight revision, it is estimated that the grand total wool production, including the clip and wool fellmongered and wool on local skins exported, was 75,500,000 (67,021,312) lbs., increase 8,478,688lbs., value £2,302,750 (£1,921,278), increase, £381,472, the average value per lb. greasy being 7·32d. (6·88d.)

II. CATTLE.

1. *Numbers*.—All kinds 312,932 (265,324), increase 47,608. Dairying cattle 149,172 (127,756), increase 21,416, classified as follows:—In milk 101,974 (90,767), dry 29,508 (23,171), and heifers springing 17,690 (13,818). In addition, there were 18,129 (14,896) other heifers one year and over which are possible additions to the dairying herds.

2. *Butter and Cheese*. Provisional for 1932-33. Butter, 21,000,000lbs., and cheese, 6,000,000lbs., both exceeded the previous year's record production of 17,663,029lbs. and 5,096,731lbs., and record quantities were exported—Butter, 9,500,027 (7,400,628) lbs.; cheese, 1,578,780 (908,847) lbs.

III. HORSES.

190,222 (185,222), increase of 5,000.

IV. PIGS.

113,831 (109,780) being the highest since 1917.

V. GOYDER'S LINE OF RAINFALL AND LIVESTOCK.

During the year 1932 the percentage to the total of sheep outside Goyder's line of rainfall increased from 36·12 to 37·72, cattle decreased 28·58 to 28·51, and horses 27·21 to 26·81. The numbers within and without the line for 1932 were—Sheep, 4,803,728 and 2,909,508; cattle, 223,716 and 89,216; horses, 139,231 and 50,991.

VI. INTERSTATE MOVEMENT OF STOCK.

The State gained 46,252 head of cattle, 563,648 sheep, and 2,391 horses by transit of stock between States. The total interstate imports were—Sheep, 629,562; cattle, 52,231; horses, 3,772; and exports sheep, 65,914; cattle, 5,979; and horses, 1,381. Net exports of horses to overseas countries 347.

VII. SLAUGHTERING.

Sheep and lambs, 1,279,245 (1,378,931), including for export 53,355 (135,386); cattle, 88,350 (81,285); pigs, 150,318 (135,822).

VIII. VALUE OF PASTORAL AND DAIRYING INDUSTRIES.

Provisional for 1932-33, £4,800,000 (£4,295,906), increase £504,094.

LIVESTOCK AS AT DECEMBER 31ST, 1932, IN COMPARISON WITH DECEMBER 31ST, 1931.

Division.	Sheep.		Cattle.		Horses, 1932.	Pigs, 1931.
	1932.	1931.	1932.	1931.		
	No.	No.	No.	No.	No.	No.
Central	1,501,929	1,332,449	119,807	101,533	57,051	51,442
Lower North	1,232,763	954,230	37,830	30,808	39,628	20,507
Upper North	1,005,608	720,407	21,029	17,306	13,928	6,260
South-Eastern	1,306,586	1,276,646	43,193	36,810	12,937	6,925
Western	935,778	817,661	14,170	11,686	25,190	9,635
Murray Mallee	558,074	444,077	30,803	25,884	31,734	18,915
Total Counties	6,540,738	5,545,470	266,832	224,027	180,468	113,684
Outside Counties	1,172,498	1,063,511	46,100	41,297	9,754	147
Total State	7,713,236	6,608,981	312,932	265,324	190,222	113,831
Increase	1,104,255	628,022	47,608	46,339	5,000	4,051

LIVESTOCK WITHIN AND WITHOUT GOYDER'S LINE OF RAINFALL, 1930 TO 1932.

Year.	Sheep.		Cattle.		Horses.	
	Total.	Percentage.	Total.	Percentage.	Total.	Percentage.

Within Goyder's Line of Rainfall.

1930	4,194,587	70.13	164,206	74.99	135,786	73.99
1931	4,221,994	63.88	189,488	71.42	134,825	72.79
1932	4,803,728	62.28	223,716	71.49	139,231	73.19

Without Goyder's Line of Rainfall.

1930	1,786,372	29.87	54,779	25.01	47,743	26.01
1931	2,386,987	36.12	75,836	28.58	50,397	27.21
1932	2,909,508	37.72	89,216	28.51	50,991	26.81

WOOL PRODUCTION.

Division.	Wool Clip.			Average Weight Fleeces.		
	1932-33.	1931-32.	Increase.	1932-33.	1931-32.	Increase.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Central	12,105,410	11,163,914	941,496	8.21	8.32	-0.11
Lower North	10,940,916	8,498,807	2,442,109	9.46	9.50	-0.04
Upper North	8,548,250	6,386,752	2,161,498	9.07	9.88	-0.81
South-Eastern	10,175,592	10,022,208	153,384	8.07	7.94	-0.13
Western	7,415,792	6,570,909	844,883	8.02	8.26	-0.24
Murray Mallee	4,478,916	3,932,659	546,257	8.66	9.18	-0.52
Total Counties	53,664,876	46,575,249	7,089,627	8.55	8.68	-0.13
Outside Counties	11,489,756	10,385,483	1,104,273	8.87	10.03	-1.16
Total State	65,154,632	56,960,732	8,193,900	8.60	8.89	-0.29

Grand Total Wool Production (clip, fellmongered and on skins exported), subject to slight revision, 1931-32, 67,021,312lbs.; 1932, 75,500,000lbs.; increase, 8,478,688lbs.

Minus sign denotes decrease.

ENSILAGE COMPETITION—HILLS DISTRICT.

[Judged by Mr. R. HILL, Agricultural Instructor.]

There were 12 entries in the Hills District Ensilage Competition conducted this year under the auspices of the South Australian Advisory Dairy Board. These entries were scattered from Jervois Swamps to Two Wells and were not all ready to judge at the one time, which spread the time of judging over several months. The efforts of competitors in an undertaking, which is quite new to the majority of them, have been very pleasing and satisfactory, demonstrating to many of them the medicinal value of such fodder and many other advantages.

Outside of the ensilage entered for competition, some very half-hearted attempts have been made to cure ensilage, and the resulting failure in many cases has unfortunately caused the practice to be condemned by some, but as a matter of fact the making of ensilage is much more simple than the curing of hay. Weather conditions do not interfere to the same extent with the making of ensilage, and it is an advantage if the material is stacked while wet.

Time of Cutting.—The outstanding fault has been cutting the material too far advanced in growth, or, in other words, after the flowering stage has been reached. The more fibrous a plant is the more difficult it is to exclude air quickly and prevent overheating, which causes charring and an inferior fodder. In the early stages of growth plants contain a higher percentage of mineral matter than the matured plant and have higher laxative qualities so necessary in a suitable fodder for dairy cows, especially in our drier areas. The ease with which young succulent plants can be consolidated and air excluded minimises the anxiety of those who fear overheating, hence the importance of cutting not later than the flowering time of the bulk of the plants included in a mixture should not be overlooked. Young succulent material does not heat very rapidly and the stacking need not be done so hurriedly as is necessary when the material is in an advanced stage of growth. By no means the least important advantage of early cutting is that good growth as a second crop follows, as in the case where the winner of this competition was able to obtain a second cut for hay. During last year Mr. Sparrow, of Sandy Creek, cut wheat for silage as soon as the heads appeared, and the result was that he harvested quite a payable yield of grain for the second growth.

The Economic Point of View.—One continually hears dairy farmers complaining of the costs of concentrates necessary to keep their herds up to a high standard of production, but it is certain that such costs can be, and have been, considerably reduced if their attention is directed to using well cured ensilage in conjunction with hay. At some time of the year excessive growth is found on all localities where dairying is practised, and a lean period follows, but how often is it that full use is made of the material provided in the time of plenty? It is only necessary to pass through the country in the summer months and see the waving fields of dry feed to realise that opportunities to conserve valuable fodder have been lost. Economic grazing necessitates keeping plants growing by delaying their seeding and making full use of the young and more nutritious growth, but the total area on a farm cannot always be handled in this way unless additional livestock is made available during the spring months. The practice on small holdings of buying additional livestock when feed is plentiful and selling when there is a shortage is not sound, and maximum returns can only be had by conserving fodder in its most valuable form as ensilage, hay, &c., and feeding when it is most profitable and not when the farmer is compelled to feed. Some of the inferior annual grasses take control of fields at times if not judiciously

handled, and the cutting of such fields for ensilage before these plants can produce seed minimises the possibility of these plants crowding out the more valuable pasture plants.

Labor Costs.—The labor required to handle bulky, heavy, green material is raised as an objection to the making of ensilage, but this work can be considerably simplified by the use of a tumbler-sweep hoist, which anyone deciding to make ensilage each year cannot afford to be without. This applies, of course, where loose material is to be handled.

Methods of Conserving Ensilage.—In the wet districts, such as the Adelaide hills, where temperatures are low and there is an abundance of tender growth, the stack method is quite satisfactory and the most economical one to adopt, but when it comes to the plain country and northern districts, where cereals are usually the bulk of the material used and hot drying winds play on the open stacks, the trench system is undoubtedly the best. Ensilage has been successfully made in a stack out of cereals at Roseworthy Agricultural College this season, but it necessitated a framework of poles to form a skeleton silo so that sheaves of cereals could be placed parallel to the sides instead of building with butts out as in stacking hay.

The Nutritive Value of Ensilage.—As will be seen from analyses of the various entries in this competition, the starch equivalent is fairly regular, although the mixture of material varies considerably. The starch equivalent averages out at a little under 11 for all entries, and taking standard wheaten hay, which has a starch equivalent of 30.9 as a comparison, it will be understood that one ton of hay has approximately the same feeding value as three tons of ensilage. It must be remembered, however, that a crop which will produce a ton of hay will provide material for approximately three tons of ensilage. The advantage in favor of ensilage is that it is more succulent, has certain laxative qualities, and can be reserved as a fodder almost indefinitely without fear of loss by fire or from vermin. Another point in its favor is that numerous plants which cannot be made into palatable hay can be made of some use in the form of ensilage, although to make first quality silage only the best material should be used.

Moisture.—There was a considerable difference in the percentage of moisture in samples collected, but all have been standardised to 75 per cent. moisture in order to make a comparison.

Results of Competition.

Competitor.	Address.	Position.	Suitability of Plants.	Succulency.	Palatability.	Nutritive Value.	Percentage of Waste.	Total.
			15	20	15	35	15	100
D. F. Sheppard ..	Prospect Hill	1	14	19	14	27	12	86
A. E. Francis	Bugle Ranges.....	2	13	18	13	26	12	82
W. J. Dawkins ...	Gawler River	3	10	15	14	29	13	81
R. Enniss	Echunga	3	12	15	12	31	11	81
Mrs. A. D. Liebelt	Littlehampton ...	3	13	16	12	29	11	81
A. Sparrow	Sandy Creek.....	6	10	13	15	27	14	79
W. A. Woolley ...	Mt. Barker Junctn.	7	13	12	13	29	11	78
W. S. Martin	Sandy Creek.....	7	11	16	12	28	11	78
R. J. Baker	Two Wells	9	10	12	14	27	14	77
E. Wise	Jervois	10	13	15	12	25	11	76
V. Lehmann	Callington	11	10	13	12	27	10	72
F. O. Ball	Bugle Ranges.....	12	12	12	10	29	9	72

Analyses of Ensilage Samples.

Competitor.	Posi- tion.	Actual Analyses.						Total	Standardised to 75% Moisture.						Starch Equiva- lent.	
		Mois- ture.	Ash.	Pro- tein.	Fat.	Fibre	Carbo- hydrates.		Mois- ture.	Ash.	Pro- tein.	Fat.	Fibre.	Carbo- hydrates.		Total
D. F. Sheppard ...	1	% 82.4	% 1.6	% 2.9	% 0.4	% 5.5	% 7.2	% 100	% 75.0	% 2.275	% 4.125	% 0.575	% 7.80	% 10.225	% 100	% 10.60
A. E. Francis	2	% 80.2	% 2.9	% 2.4	% 0.8	% 5.8	% 7.9	% 100	% 75.0	% 3.675	% 3.025	% 1.00	% 7.325	% 9.975	% 100	% 10.32
W. J. Dawkins ...	3	% 74.1	% 1.8	% 1.9	% 0.6	% 7.9	% 13.7	% 100	% 75.0	% 1.750	% 1.850	% 0.550	% 7.575	% 13.275	% 100	% 11.04
R. Ennis	3	% 75.5	% 1.3	% 4.0	% 0.9	% 7.4	% 10.9	% 100	% 75.0	% 1.325	% 4.075	% 0.925	% 7.55	% 11.125	% 100	% 11.52
Mrs. A. D. Liebelt .	3	% 76.4	% 2.0	% 3.0	% 1.0	% 7.6	% 10.0	% 100	% 75.0	% 2.125	% 3.175	% 1.05	% 8.05	% 10.60	% 100	% 11.00
A. Sparrow	6	% 71.2	% 2.4	% 1.8	% 0.65	% 9.75	% 14.2	% 100	% 75.0	% 2.10	% 1.55	% 0.575	% 8.475	% 12.30	% 100	% 10.54
W. A. Woolley ...	7	% 68.8	% 2.9	% 4.0	% 1.0	% 9.2	% 14.1	% 100	% 75.0	% 2.325	% 3.20	% 0.80	% 7.375	% 11.30	% 100	% 10.94
W. S. Martin	7	% 76.8	% 2.3	% 2.9	% 0.5	% 6.8	% 10.7	% 100	% 75.0	% 2.475	% 3.125	% 0.55	% 7.325	% 11.525	% 100	% 10.66
R. J. Baker	9	% 69.7	% 2.8	% 2.7	% 0.8	% 9.8	% 14.2	% 100	% 75.0	% 2.275	% 2.1875	% 0.6625	% 8.10	% 11.775	% 100	% 10.62
E. Wise	10	% 74.3	% 3.0	% 4.6	% 0.86	% 8.7	% 8.54	% 100	% 75.0	% 2.925	% 4.475	% 0.825	% 8.475	% 8.30	% 100	% 10.13
V. Lehmann	11	% 71.4	% 3.7	% 3.4	% 1.0	% 8.9	% 11.6	% 100	% 75.0	% 3.225	% 2.975	% 0.875	% 7.775	% 10.15	% 100	% 10.47
F. O. Ball	12	% 69.9	% 2.1	% 3.2	% 0.8	% 9.6	% 14.4	% 100	% 75.0	% 1.750	% 2.650	% 0.675	% 7.975	% 11.95	% 100	% 10.98

JUDGE'S COMMENTS ON THE ENTRIES.

1. *D. F. Sheppard*.—Mr. Sheppard's entry was a square stack 12ft. by 12ft., which was 7ft. high when consolidated. Well weighted with stones on completion of stacking. A mixture of subterranean clover, cocksfoot, perennial rye grass, prairie grass, soft brome grass, sterile brome grass, and cape weed cut while quite wet. Cut during the third week in September for ensilage, and the same field was again cut for hay during the third week of November. Very succulent, palatable, and nutritious feed with about 2in. of waste only on the outside. It was the second year that this competitor has made ensilage and he was pleased with the result. He assured me that his cows have shown him the highest returns he has ever had for the time of the year while he was feeding this ensilage.

2. *A. E. Francis*.—The entry submitted was a stack 15ft. by 15ft. covered with 12in. to 15in. of earth. A mixture of subterranean clover, silver grass, soft brome grass, sterile brome grass, perennial rye grass, cape weed, and geranium. Good color, palatable, and quite good nutritive value. Cut when the majority of the cape weed was in flower, which meant that the grasses were young and tender. Feeding to dairy cows commenced on December 29th, and although the feeding of concentrates was discontinued, the supply of milk was maintained, and live-stock was in good healthy condition.

3. *W. J. Dawkins*.—Ensilage was made in an overhead reinforced concrete silo with a capacity of about 100 tons. The sample was taken 8ft. from the top of the silo. A mixture of chaffed malting barley, cape barley, and a few prickly jacks. Very little waste, palatability quite good, but color rather dark. Analysis showed quite good feeding value, and this probably improves further down in the silo where peas come into the mixture. Dairy cows and ewes were being fed from this silo.

3. *R. Enniss*.—The ensilage entered by Mr. Enniss was a square stack 18ft. by 18ft., which settled down to 10ft. when well weighted with logs, but there was about 9in. of waste all around the outside due to the weighting not extending right to the edges. A mixture of subterranean clover, a considerable amount of silver grass, some soft brome grass, sterile brome grass, barley grass, and geranium was collected with a sweep and placed on the stack with a pulley and a grab worked by a horse. Grasses were all a little too much matured, but have cured remarkably well under the circumstances. Readily eaten by livestock and analysis showed really good nutritive value. This was the first attempt by the competitor to make ensilage.

3. *Mrs. A. D. Liebelt*.—The ensilage stack was 18ft. by 12ft. and weighted with stones 1ft. thick. The mixture consisted of clovers, which were principally subterranean, sterile brome grass, soft brome grass, geranium, silver grass, and perennial rye grass. The bottom 3ft. of silage was really good, but the top 3ft., although not waste, was inferior owing to insufficient weight to exclude the air. A fair amount of waste on the western side; the material was a little too mature, which could be overcome in future by cutting at least a fortnight earlier. This is the competitor's second attempt at making ensilage, and it has proved to be satisfactory. The cows receiving it were hanging on to their milk yield well, although they had not had any bran from Christmas time up to the middle of March.

6. *A. Sparrow*.—The ensilage was made in a trench 60ft. long, 12ft. wide at the top and 10ft. at the bottom, and 6ft. deep; covered with about 15in. of soil. A mixture of algerian oats, cape barley, odd plants of Salvation Jane, some barley grass, and sterile brome grass. Cut when the oats were flowering, but the barley was a little too far advanced. Oats predominated throughout and all ensilage was a splendid color, very palatable, and readily taken by the milking cows and other cattle. The percentage of waste was exceptionally small, there being none whatever on the sides and bottom.

7. *W. A. Woolley*.—The stack was 15ft. by 15ft., well weighted with logs, but it had been built too high in the centre, not allowing full pressure of the logs to come on to the outside. A mixture of perennial rye grass, silver grass, subterranean clover, barley grass, and dandelions, all rather too mature by at least a fortnight. There was too much waste on the outside, principally due to the manner in which the stack was built. Quite palatable to livestock, and analysis showed good nutritive value.

7. *W. S. Martin*.—Mr. Martin's stack was built in a trench 60ft. long and 12ft. wide and about 4ft. deep, and above this soil was banked up against the portion built above ground. A mixture of cape barley in sheaves cut at the flowering stage with a considerable amount of barrel clover and burr clover as an undergrowth. After carting was completed, the material was covered with 15in. of soil. There was some waste on top and sides, but the bottom ensilage in the trench was exceptionally good. A deeper trench would be more satisfactory.

9. *R. J. Baker*.—Early Burt oats cut with a binder at the milky stage of the grain comprised the ensilage entered by Mr. Baker; made in a trench 42ft. long with an average width of 10ft. 6in. and 6ft. deep. Bands of the sheaves were cut, but the straws packed in straight, parallel to the sides of the trench. Before covering, the material was built about 4ft. above ground level, and this portion did not have the bands cut. Covered with 18in. of earth it settled down to ground level. Very palatable, a splendid color, and practically no waste. This was the first attempt to make ensilage by this competitor, who was naturally very pleased with his success. Feeding to livestock commenced on January 3rd, and 21 cows and seven poddies were fed until February 21st, and the cows, which were in excellent condition, had kept up their milk supply better than in previous years for that time of the year.

10. *E. Wise*.—The ensilage was made in a stack 25ft. by 15ft., weighted with meadow hay about 6ft. in depth. This was interesting from the point of view that there was practically no waste on the top of the ensilage other than the silage, which was a little inferior, and the bottom portion of the hay had actually become very palatable brown hay. Waste on the outside was about 6in. in thickness with a tendency for the ensilage to be a little inferior inwards for another 6in. A mixture of barley grass, perennial rye grass, subterranean clover, white clover, cocksfoot, prairie grass, cape barley, and lucerne. Although rather dark in color towards the top of the stack, due to insufficient weighting, all the material was quite palatable to livestock and a very valuable reserve of fodder.

11. *V. Lehmann*.—Mr. Lehmann's entry was a round stack 15ft. in diameter, which was weighted with 200 fencing posts. Well consolidated in the centre, but about 15in. of the outside material was inferior silage, probably due to weight not extending far enough out to the edges. Slightly charred, but readily eaten by livestock. This was a very interesting entry, because of the mixture which included barley grass, wheat, poppies, a little lucerne, and a considerable amount of fumitory (pink weed), and prickly jacks. For grazing, some of these inferior plants are never eaten by livestock, but included in this stack as a mixture were readily eaten and helped to make a feed which on analysis showed quite good nutritive value. Another point is that cutting annual weeds at this stage prevents reseeding, which materially helps in cleaning infested fields.

12. *F. O. Ball*.—The ensilage was made in a stack 20ft. by 20ft. square, rather unevenly and lightly weighted with logs. A mixture, principally of grasses, consisting of soft brome grass, sterile brome grass, prairie grass, barley grass, and subterranean clover. The stack was commenced on a base too large for the

quantity of material, and the grasses were all rather too matured, particularly when grasses predominated in the mixture. Although analysis showed the nutritive value to be good, the silage was not very palatable, and there was far too much waste, due to irregular and insufficient weighting for material cut on the late side. Waste does not necessarily mean absolutely useless material, but includes inferior silage that will be eaten by livestock, and has been charred by excessive heat, developed because the air has not been excluded quickly enough.

NAMES OF PLANTS INCLUDED IN THIS REPORT.

Salvation Jane (*Echium Plantagineum*); prickly jacks (*Emex australis*); barley grass (*Hordeum murinum*); sterile brome grass (*Bromus villosus*); soft brome grass (*Bromus hordeaceus*); subterranean clover (*Trifolium subterraneum*); cape weed (*Cryptostemma calendulaceum*); perennial rye grass (*Lolium perenne*); prairie grass (*Bromus unioloides*); silver grass (*Festuca myuros*); geranium (*Erodium botrys*); barrel clover (*Medicago tribuloides*); burr clover (*Medicago denticulata*); fumitory (*Fumaria muralis*); white clover (*Trifolium repens*); cocksfoot (*Dactylis glomerata*).

STINKWORT POISONING.

Reply supplied by Mr. R. H. F. Macindoe, B.Sc., M.R.C.V.S., to a question, "Treatment for sheep suffering from stinkwort poisoning," submitted at the Upper North Conference.

So far as has been determined by feeding tests, stinkwort itself contains no poisonous principle, but stinkwort eaten at the flowering stage, especially if damp, has been associated with heavy mortalities in sheep, due to the flower specules (awns) damaging the lining of the bowels and allowing the toxins of a germ to penetrate.

The germ responsible, *Bacillus oritoxicus*, is found in soils, &c., and is taken in with the food eaten. If animals are constipated, the action of the poison is increased.

Treatment.—As affected sheep are usually found dead, or if seen alive, live only for a few hours, no medicinal treatment is effective, but steps should be taken to prevent the appearance of the disease by—

1. Keeping sheep off stinkwort when in the flowering stage and when damp.
2. Preventing constipation by giving licks containing Epsom salts or by placing Epsom salts in the drinking water.

A suitable lick would be:—

Superphosphate	50lbs.
Slaked lime	124lbs.
Common salt	40lbs.
Epsom salts	10lbs.
Molasses	5lbs.

To Make.—Mix the super and lime thoroughly, breaking down all lumps. Then mix in the common salt and Epsom salts and moisten with the molasses (mixed with water). As the disease is a bacterial one, experiments in preventing the disease have been successfully carried out by using a vaccine for the purpose, but this is only indicated for use on those properties where the disease occurs regularly every year, as the disease may frequently make its appearance on a property only once or twice, after which no further cases occur, and the expense of vaccine treatment may not be justified.

RED COMB EGG ASSOCIATION.

OFFICIAL SINGLE TEST.

EGG-LAYING COMPETITION, 1933-34.

SECTION 1.—WHITE LEGHORNS.

Competitor.	Address.	WINTER TEST. April 1st-July 31st, 1933.			
		Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Totals
E. F. Ashmeade	398, Magill Road, Kensington Park	(1) 19	(2) 18	(3) 49	86
L. R. Badcock	77, Findon Rd., Woodville	(4) 18	(5) 49	(6) 39	106
C. J. C. Burton	Mallala	(7) 22	(8) 22	(9) 34	78
C. J. C. Burton	Mallala	(10) 21	(11) 17	(12) 35	73
W. A. Carter	2, Grosvenor St., Glandore	(13) 21	(14) 44	(15) 2	67
W. A. Carter	2, Grosvenor St., Glandore	(16) 43	(17) 46	(18) 4	93
B. Cooke	Kanmantoo	(19) 57	(20) 42	(21) 23	122
H. F. Cox	Samson Road, Glanville Blocks	(22) 14	(23) 35	(24) 15	64
H. F. Cox	Samson Road, Glanville Blocks	(25) 31	(26) 36	(27) 45	112
L. H. Crawford	Military Road, Grange ..	(28) 20	(29) 36	(30) 32	88
L. H. Crawford	Military Road, Grange ..	(31) 34	(32) 3	(33) 27	64
R. C. Crittenden	William Street, Kilkenny North	(34) 53	(35) 46	(36) 27	126
Chas. H. Day	Box 28, Salisbury	(37) 26	(38) 11	(39) 32	69
J. H. Dowling	Glossop	(40) 41	(41) 34	(42) 25	100
T. Duhring	Mallala	(43) 39	(44) 40	(45) 16	95
T. Duhring	Mallala	(46) 17	(47) 4	(48) 13	34
H. Fidge	313, Cross Roads, Clarence Park	(49) 20	(50) 14	(51) 15	49
V. F. Gameau	Findon Road, Woodville .	(52) 2	(53) 28	(54) 29	59
W. Chas. Slape	Magill Road, Magill	(55) 26	(56) 55	(57) 36	117
G. C. Gavin	Salisbury	(58) 19	(59) 15	(60) 25	59
G. C. Gavin	Salisbury	(61) 41	(62) 28	(63) 30	99
H. H. Hefford	McHenry Street, Murray Bridge	(64) 31	(65) 15	(66) 8	54
H. H. Hefford	McHenry Street, Murray Bridge	(67) 61	(68) 31	(69) 8	100
W. H. A. Hodgson ..	Commercial Rd., Salisbury	(70) 31	(71) 26	(72) 13	70
W. H. A. Hodgson ..	Commercial Rd., Salisbury	(73) 17	(74) 26	(75) 20	63
E. A. Lamerton	Cross Roads, Edwardstown	(76) 7	(77) 23	(78) 51	81
C. H. Lines, jun. ...	Box 75, Gladstone	(79) 43	(80) 51	(81) 6	100
C. H. Lines, jun. ...	Box 75, Gladstone	(82) 39	(83) 17	(84) 34	90
V. F. Gameau	Findon Road, Woodville .	(85) 27	(86) 25	(87) 19	71
L. A. G. Pitt	24, John Street, Payneham	(88) 33	(89) 19	(90) 19	71
L. A. G. Pitt	24, John Street, Payneham	(91) 47	(92) 37	(93) 33	117
H. A. Rasmussen ...	Swan Terrace, Ethelton .	(94) 18	(95) 43	(96) 50	111
H. A. Rasmussen ...	Swan Terrace, Ethelton .	(97) 37	(98) 34	(99) 32	103
S. E. Reedman	51, Gilbert Street, Gilberton	(100) 34	(101) 57	(102) 28	119
Bruce Rowe	"St. Kevern," Two Wells	(103) 30	(104) 12	(105) 58	100
Bruce Rowe	"St. Kevern," Two Wells	(106) 28	(107) 33	(108) 22	83
H. J. Stacey	Uraidla	(109) 24	(110) 18	(111) 28	70
H. J. Stacey	Uraidla	(112) 40	(113) 40	(114) 3	83
Thomas & Elson ...	53, Clifton Street, Hawthorn	(115) 18	(116) 12	(117) 39	69
Thomas & Elson ...	53, Clifton Street, Hawthorn	(118) 15	(119) 15	(120) 24	54
H. L. Twartz	Gawler	(121) 30	(122) 39	(123) 47	116
H. L. Twartz	Gawler	(124) 28	(125) 12	(126) 36	76
F. F. Welford	1, Ludgate Circus, Colonel Light Gardens	(127) 29	(128) 62	(129) 31	122
F. F. Welford	1, Ludgate Circus, Colonel Light Gardens	(130) 58	(131) 36	(132) 10	104

EGG-LAYING COMPETITION—SECTION 1—WHITE LEGHOENS—*continued.*

Competitor.	Address.	WINTER TEST. April 1st-July 31st, 1933.			
		Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Totals
A. P. Urlwin	Box 80, Balaklava	(133) 6	(134) 47	(135) 32	85
A. G. Dawes	230, Portrush Road, Glenunga Gardens	(136) 59	(137) 37	(138) 32	128
Total—Section 1		—	—	—	4,000

SECTION 2—ANY OTHER LIGHT BREEDS.

V. F. Gameau	Findon Road, Woodville (Minorcas)	(139) 31	(140) 18	(141) 13	62
M. O. and C. A. Roberts	Torrens Road, Kilkenny (Minorcas)	(142) 7	(143) 26	(144) 1	34
Total—Section 2		—	—	—	96

SECTION 3—BLACK ORPINGTONS.

Arthur Cook ..	187, Goodwood Road, Colonel Light Gardens	(145) 54	(146) 63	(147) 20	137
B. Cooke	Kanmantoo	(148) 32	(149) 9	(150) 34	75
L. H. Crawford	Military Road, Grange ..	(151) 8	(152) 8	(153) 30	46
L. H. Crawford	Military Road, Grange ..	(154) 40	(155) 41	(156) 65	146
Les. Darcy	Mypolonga	(157) 51	(158) 44	(159) 31	126
Les. Darcy	Mypolonga	(160) 15	(161) 43	(162) 25	83
J. H. Dowling	Glossop	(163) 9	(164) 14	(165) —	23
H. Fidge	313, Cross Rds., Clarence Pk.	(166) 31	(167) 39	(168) 4	74
H. H. Hefford	McHenry Street, Murray Bridge	(169) 19	(170) 11	(171) 50	80
F. J. Hudson	54, Willcox Av., Prospect	(172) 34	(173) 57	(174) 20	111
A. G. Dawes	230, Portrush Road, Glenunga Gardens	(175) 21	(176) 69	(177) 27	117
C. H. Lines, jun.	Box 75, Gladstone	(178) 39	(179) 4	(180) 15	58
C. H. Lines, jun.	Box 75, Gladstone	(181) 26	(182) 15	(183) 41	82
H. J. Mills	Edward St., Edwardstown	(184) 44	(185) 62	(186) 49	155
H. J. Mills	Edward St., Edwardstown	(187) 57	(188) 40	(189) 32	129
J. Rowe	Honeyton St., Seaton Pk.	(190) 51	(191) 24	(192) —	75
S. E. Reedman	51, Gilbert St., Gilberton.	(193) 36	(194) 23	(195) 66	125
S. E. Reedman	51, Gilbert St., Gilberton.	(196) 3	(197) 46	(198) 49	98
H. L. Twartz	Gawler	(199) 32	(200) 50	(201) 37	119
A. G. Dawes	230, Portrush Road, Glenunga Gardens	(202) 60	(203) 65	(204)*	125
N. F. Richardson ...	60, Beaufort St., Wood- ville Park, Kilkenny	(205) 58	(206) 41	(207) 49	148
W. H. L. Wittenberg	3, Rushton St., Goodwood	(208) 67	(209) 17	(210) 15	99
W. H. L. Wittenberg	3, Rushton St., Goodwood	(211) 11	(212) 53	(213) 60	124
W. Woodley	Tailem Bend	(214) 22	(215) 11	(216) 7	40
W. Woodley	Tailem Bend	(217) 25	(218) —	(219) 16	41
Total—Section 3		—	—	—	2,436

SECTION 4—ANY OTHER HEAVY BREED.

H. Fidge	313, Cross Roads, Clarence Park (Rhode Is. Reds)	(220) 14	(221) 19	(222) —	33
V. F. Gameau	Findon Road, Woodville (Rhode Island Reds)	(223) 28	(224) 21	(225) 27	76
V. F. Gameau	Findon Road, Woodville (Rhode Island Reds)	(226) 5	(227) 25	(228) 45	75
H. J. Mills	Edward St., Edwardstown (Rhode Island Reds)	(229) 55	(230) 48	(231) 25	128
W. R. Williams	28, Avenue Rd., Frewville (Rhode Island Reds)	(232) 48	(233) 45	(234) 30	123
W. R. Williams	28, Avenue Rd., Frewville (Rhode Island Reds)	(235) 37	(236) 19	(237) 47	103
Bruce Rowe	"St. Kevern," Two Wells (Barnevelders)	(238) 22	(239) 5	(240) —	27
Bruce Rowe	"St. Kevern," Two Wells (Welsumers)	(241) 3	(242) 17	(243) —	20
Total—Section 4		—	—	—	585

* Dead.

NOTE.—Only first grade eggs are shown above.

ORCHARD NOTES FOR SOUTHERN DISTRICTS FOR AUGUST.

[By CHAS. H. BEAUMONT, District Horticultural Instructor, &c.]

Pruning will have been completed, all cuttings burned, and big cuttings protected with a coat of white lead paint.

Winter washings or sprayings for prevention of fungous pests should be carried out this month; there is no doubt of its usefulness in preventing curl leaf and shothole, and it helps materially in controlling scab in apples and pears. Anthracnose in vines is controlled by swabbing with a 10 per cent. solution of sulphuric acid, or with the sulphate of iron mixture; vines should be scraped clean before swabbing to get best results.

Brown rot in citrus is dealt with by spraying with Bordeaux mixture and by destroying diseased fruits. The use of the copper solution may also stop the skin disease known as *Xanthema* by adding a small proportion of copper to the soil. Peach aphid is controlled to a great extent by early spraying with red oil or black leaf 40.

The most important work is to get the soil into good working order. Trees cannot function properly in sodden soil; it must be in such condition that the air can circulate freely, and thus keep bacterial activity continuous. Soil in good condition is warmer than a sodden soil and trees can do better.

Strawberry beds need clean cultivation and good drainage.

Do not keep any sickly plants in tomato houses; it is much safer to lift them out and burn them and replace with a strong plant.

If it is intended to use fertilisers, do it now and dig them in deep.

Currants may safely be said to be out of hand now, after another prolonged drying season, which has clearly demonstrated the usefulness of dehydrators. See that every scrap of waste fruit is disposed of and not allowed to be a harbor for fruit moth.

These notes will be the final from my pen. The monthly notes have necessarily been short, but they have brought me many letters of inquiry, and many words of appreciation, for which I am very thankful.

I have always urged thoroughness in orchard and vineyard work. I know how much there is to do, and how few hands to do it, but there is reason in advocating thoroughness because it decreases work.

When planting new trees get good ones from a reliable nursery and plant early, because early planting has been proved to be the best.

However well you may spray to control codling moth, you are not going to get good results if shelters are left for the larvae.

You can spray to prevent fungous diseases, but unless you clean up diseased fruits early and often, you are simply making the work continuous.

Mixing several spray materials together may seem to save work, but it is a dangerous practice and not reliable.

Good cultivation (with drainage) takes time and needs good implements, but it results in healthy trees, and only healthy trees can give good quality fruit.

I have advocated co-operation as the best means of getting a good pack and good prices, and feel sure that this will come in the near future.

The new season has opened well from a production point of view, and I trust that growers may have many successful years before them.

“WATTLE” Binder Twine

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“Good Twine Saves Time.”

Farmers who insist upon a **QUALITY Twine** (keeping one eye on economy) should order “Wattle” brand this season.

“Wattle” brand has established a reputation for quality. Its unusual strength ensures freedom from breakages, it runs freely and evenly, thereby saving time and money.

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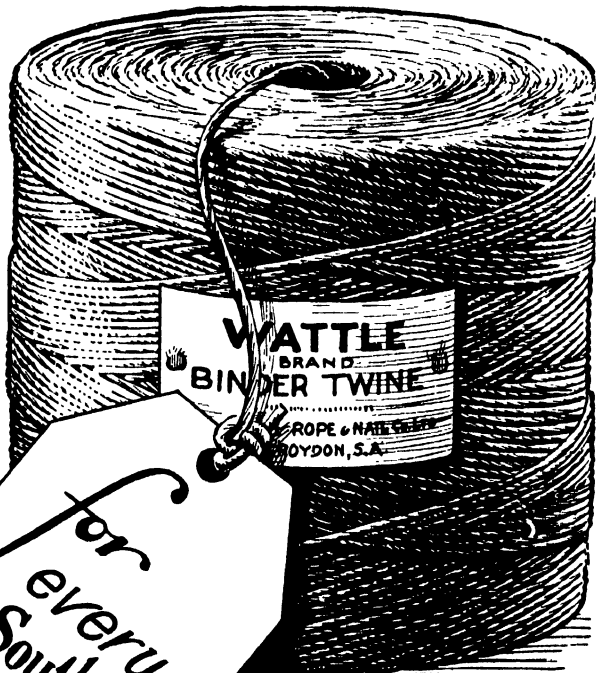
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PAPERS READ AT CONFERENCES.

UPPER NORTHERN BRANCHES, MORCHARD, JULY 19th, 1933.

EFFICIENCY ON THE FARM.

[By A. McCALLUM, Morchard.]

Farm efficiency is applied methodical common sense in the running and management of the farm.

It is, no doubt, a very easy matter to find the faulty or inefficient methods of neighbors, but to put the finger on our own is the thing that we must try to do, and this is one of the objects of the Agricultural Bureau.

Firstly dealing with machinery, many farmers are too busy or hard pushed for time ever to read the instruction book. Careful study of the instruction book will pay very big dividends in the life of a machine.

With internal combustion engines, use only the best oil and greases, for when a farmer has to pay several hundreds of pounds for a machine, it is worth while to put that little difference in price between poor and good lubrication into that machine, for in all cases good lubrication pays.

See that the fuel—whether for car, engine, or tractor—is strained. This, in the long run, will prove a time saver. One may go perhaps for months without trouble through not straining the fuel, and then perhaps, miss an important engagement, or lose several hours with blocked fuel pipes.

Always clean gauze strainers at certain periods, for even with the best strainers sediments get through.

When emptying oil tins or drums, be careful of the last drop, for it is usually in this that the water and rubbish collects, and unless strained may ruin expensive bearings.

Keep your eyes and ears open, and if you see or hear something wrong, stop and remedy it unless it is trivial, even then it pays, for “a stitch in time saves nine,” and nothing is surer than that adage when applied to fast moving machinery.

When feeding cows, pigs, horses, &c., always have the feeding utensils in a convenient place.

Do not leave implements in a far corner of the farm; they may be needed later, and time will be lost in getting any parts or tools that are required.

Take care of any borrowed article and do not forget to return it in the stipulated time or when finished with. It is easier done then than when in the middle of an important job.

Efficiency can be practised in many other ways on the farm, and these are only a few which I have noted. There are many others, and they will all prove time and labor saving.

THE FARM ORCHARD.

[By P. J. CURNOW, Wirrabara.]

Every farm where locality and soil conditions will permit, should possess a small orchard. The annual production of even a moderate quantity of clean, fresh fruit means a saving, and the satisfaction of growing the home requirements is an added incentive. A farm home, surrounded by even a small number of fruit, shelter, and other trees, is more attractive than the usually bare farm buildings to be found in country districts.

[Papers Read at Conferences.]

In the dry northern areas, too often the conditions are such that the planting of fruit and other trees has proved unprofitable and a waste of time and effort. The principal factors against success, are long dry summers, unsuitability of soil, the absence of any irrigation system, and too often failure on the part of the owner to give his trees reasonable care and attention.

THE SITE.

Many homesteads are situated on high ground. Generally there is a hard, marly subsoil beneath the surface of the surrounding soil. To attempt to plant such land with fruit trees—particularly if the situation faces the hot north—is to court failure. If then a suitable site for a farm orchard is to be selected, the prospective planter should try to select a piece of good, sandy loam over a red clay that is not too retentive. The site if possible should face south or east, and sloping land is best. These conditions, the writer is aware, are often difficult to obtain, but, he affirms, are ideal for the purpose.

CULTIVATION AND PLANTING.

Having selected the orchard site, proceed to break up the soil to the greatest possible depth, with a big team. An old, heavy single furrow plough makes the best job. If this work is carried out before the fence is erected, the whole area can be broken up. If the soil is left in a state of fallow from one winter to the next before planting is carried out, fruit trees will thrive better than if put into the fresh, rough soil. After securely fencing against stock and vermin, proceed to lay out the rows. The first row should be not less than 20ft. from the fence. This distance permits of the easy turning of the team when cultivating.

Trees should be planted not less than 20ft. apart. At this spacing 100 trees to the acre can be planted. After marking out the places for the trees—either on the square or diagonal system—proceed to dig the holes. Each should be 3ft. to 4ft. square. Throw on one side the loamy surface soil. Clean out the hole to the depth of a long digging fork. Proceed to break up the bottom soil to the greatest possible depth, care being taken to keep the subsoil in the bottom.

As the surface soil is being replaced, break the sides of the hole down, thus preventing the formation of a tank-like hole, which would prevent the natural spread of the roots. Before planting each tree, roots that are too long, and others that are broken, should be cut back.

The roots should be spread out in the prepared hole in a natural manner. Care must be taken to plant the tree a little lower than it stood in the nursery row; when the soil settles, the height will be right. Tread around the tree carefully, firming the soil. If the weather is dry at planting time, give a can of water.

The best time to plant fruit trees in the north is June. Late July and August planting, particularly in the drier districts, too often means either failure, or poor success. It must be remembered that fruit trees, in common with most other trees, start into growth in their root systems some weeks before any top growth becomes apparent.

The above conditions constitute a somewhat ideal state of affairs in laying out a farm orchard, where a choice of selection of a site can be made. Too often a farmer tries to surround his home with fruit and other trees under less favorable circumstances. An exposed site, a hard retentive clay, or worse still, either marl or limestone, have to be dealt with. If the site is too exposed to hot winds in summer and cold driving rain storms in winter, any attempt at fruit growing under such conditions should be abandoned. On the other hand, if a comparatively sheltered site can be selected—even where the subsoil is as above described, something can be done, that will help win success.

The use of explosives in the Wirrabara district in the preparation of land for planting out commercial orchards has been adopted with considerable success. Much limestone country has been planted to stone fruits where the holes have been blown

[Papers Read at Conferences.]

out with agricultural dynamite and the subsoil broken up to 3ft. in depth. Fruit trees so planted have stood up to the past five years of drought in a remarkable manner. If land of a similar type found around some farm homesteads were treated in like manner—even using two plugs of explosives to each hole—success would attend the planting of fruit trees of a suitable type, and the expense would not be prohibitive.

VARIETIES.

The selection of the right varieties of trees is important. Unless the locality selected as an orchard site is well sheltered and the soil of a good loamy character, with a deep clay subsoil, the planting of apple trees is not recommended. A 20-inch rainfall is essential. Where conditions are right, the Jonathan is the best summer apple, followed by the Cleopatra for winter eating. Where the locality suits, Rome Beauty may be tried. A selection from these keeping culinary varieties may be made:—Stone Pippin, Dunn's Favorite, and Granny Smith. For late keeping, Rokewood and Tasma are recommended.

Stone fruits are more suited to poorer soils and drier conditions. For early peaches Brigg's and Wiggins are best; to be followed by Peregrine. For preserving, Elberta and Goodman's Choice may be selected.

Japanese plums are more suited to moister conditions. Climax, Santa Rosa, Rubeo (a blood variety), and Wickson are best.

In apricots, Oullin's Early is the first early; Newcastle Early is not recommended. It produces too many small fruits. Tilton and Moorpark are preserving and drying varieties. European plums are harder than the Jap. varieties. These could be tried. For early kinds:—Early New Orleans, Angelina Burdett. Medium season:—Coe's Golden Drop, Greengage, and Kirks. In late varieties:—Monarch, Grand Duke, and President.

In nectarines only one variety is recommended—Goldmine.

The pear tree is hardier than any other pip fruit, and will thrive under comparatively harsh conditions. A good subsoil, though, is essential. A tree or two of Duchess will be sufficient to supply a home. While an excellent dessert and preserving variety, it is a poor keeper. Packham's Triumph is a good dessert kind, and is specially recommended. Other good varieties are Josephine, Glou Morceau, Vicar of Winkfield, and Kieffer's Hybrid. The latter is a hardy variety. Cherries are not recommended for the north, except in sheltered and hilly districts, where there is a good rainfall.

Where irrigation, even on a moderate scale, is available in summer orange trees may be successfully grown, even on plain country, where the soil is suitable and heavy winter frosts are not experienced. It is surprising to note the excellent growth such trees make in many small northern gardens, and the crops of really good fruit that are gathered. The orange tree, well planted and given a good soaking every four to six weeks, will often thrive where other fruits either fail, or are a poor success. These kinds are particularly recommended:—The Navel, St. Michael, Parramatta, Valencia Late, and Joppa.

A few fig trees in a small orchard give a crop of fruit annually, even when other varieties fail. The white kinds are best.

Half a dozen kinds of grapes are not too many. Early varieties are Crystal and Sweetwater. Later kinds are Grand Turk, Lady's Finger, Malaga Red, Muscatel, and (for jam making) Wortley Hall. A few trellised Zante currants will provide a home in currants for a whole year. Cincturing or ringing is necessary, or the crop will not set.

The above varieties of fruit trees can be recommended, and will give good returns where conditions are reasonably suitable. In long periods of drought fruit trees, in common with all vegetation, must suffer severely in even comparatively good districts. With the idea of keeping those who may wish to replant old areas or lay out new orchards, there points are submitted.

[Papers Read at Conferences.]

THE USE OF PRODUCER GAS FOR FARM TRACTORS AND MOTOR TRUCKS.

[By L. M. W. JUDELL, Jamestown.]

Although producer gas has been used for heating, power generation, and other industrial purposes for the past hundred years, first in Europe and later in almost every country in the world, its use as a fuel for farm tractors has naturally been quite a modern development. In South Australia, as well as in the other States of the Commonwealth, the fall in price of wheat and other products of the soil during the past four years—with the consequent necessity for farmers to lower their costs of production—has led to some interest being taken in this cheap fuel for power purposes on wheat farms.

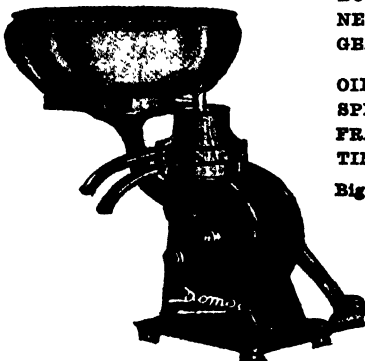
In a paper given by the writer at a Conference of the Upper North Branches of the Bureau at Black Rock last year, the nature and methods of generation and the requirements for power purposes of producer gas were dealt with in some detail. In order to avoid going over the same ground, in this paper it is proposed to give a short resumé of the use of producer gas for farm tractors and motor transport, and to summarise the advantages and disadvantages inherent in its utilisation.

It is obvious that the cost of the fuel for farm tractors is only one item in the schedule of costs, but it is a large item and offers an opportunity to the farmer of saving a substantial amount each year on the purchase of petrol, kerosene, and oil. At the present time many farmers in various parts of this State owe, in some cases, hundreds of pounds for liquid fuel which has been used in their tractors, a state of affairs to be deplored. The advantages from a national point of view of using charcoal made from wood grown in our own country as compared with the importation of expensive liquid fuel from overseas is very apparent.

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[Papers Read at Conferences.]

In the report of the Advisory Council of Science and Industry of South Australia, 1930, it is stated:—

The Committee has no hesitation in saying that it can see no practical difficulty in the adoption of the charcoal gas producer lorry for a substantial proportion of our country road haulage. The producer is of such simple construction that there is no reason to anticipate any greater cost for repairs and depreciation than with a petrol-driven lorry, and there should be no difficulty in training a driver of an internal combustion engine to successfully drive a producer gas lorry.

The investigations of this Committee were confined to the use of this gas with motor lorries up to the time at which this report was issued, but it will be seen that the members found no reason to alter their opinions when they extended their researches into the problem of using producer gas with farm tractors. The same report is thus concluded:—

The economic benefits which South Australia would derive from expending money in labor in preparing wood and charcoal for use in such lorries and tractors, instead of sending the money out of Australia for liquid fuels must be obvious."

In 1928 the Federal Commission of Development and Migration deputed a sub-committee to investigate the possibilities of the use of producer gas for motor transport purposes. This Committee, after collecting and studying the results and experience of French and Belgian engineers and users of this gas for the same purpose, carried out trials in Victoria with satisfactory results. Their work has been chiefly confined to the application of producer gas fuel to heavy motor vehicles, and is fully reported in their publications. I quote the following extract from the 1928 report of this Committee:—

If, by the use of a cheaper fuel, the cost per ton mile were reduced by only 1d., a national saving of £304,260 would result, enriching primary and secondary producers to that extent, or expressed in other terms, placing them in a better position for meeting overseas competition.

Going on to discuss the effects on the Forestry Industry and the utilisation of waste forest products it is said in the same report:—

This amount of waste timber converted into charcoal would provide 850,000 tons per annum which at £2 per ton would be worth £1,700,000 to the saw-milling industry.

The same Committee of highly qualified experts concludes:—

The sub committee, as a result of its investigations to date and information obtained relating to the use of producer gas as a motor transport fuel, considers that the use of this type of fuel offers definite promise of effecting important economic savings in Australia, and further, of enabling material now having no commercial outlet to be used advantageously to the general benefit of the Commonwealth.

The *Bulletin*, in an article discussing the efficiency or lack of efficiency of some of our Australian industries, says:—

The one small sign of progress or attempted progress is in connection with the use of producer gas (from charcoal) for tractor purposes, and that has perhaps one millionth the attention which Test Cricket has commanded during the past six months.

This rather exaggerated and somewhat cynical statement I do not endorse, but it serves to show that the subject being dealt with was regarded as being of considerable national importance.

OTHER REPORTS.

Turning from the general aspect of the proposition to more specific cases, I would briefly refer to the report of an official trial conducted at the Hawkesbury Agricultural College, New South Wales, last year, written by the Director of Agriculture of that

State. Two Fordson four-wheeled tractors of the usual design were run side by side: one on producer gas and the other on kerosene. Each pulled a four-furrow disc plough, equivalent to a six-horse job. The comparison of the salient points was as follows:—

	Gas.	Kerosene.
Speed	2.56 miles per hour	2.8 miles per hour
Area	2 acres in 2 hours 30min.	2 acres in 2 hours 16 min.
	.8 acres per hour	.88 acres per hour
Fuel	24lbs. charcoal per acre	2½galls. kerosene per acre
	1gall. water per acre	

The Director states:—

The charcoal gas driven tractor created a very favorable impression and gives promise of being the means by which farmers can utilise cheap fuel. (Charcoal is quoted by him at 50s. per ton.)

Similar successful work has been done on farms in all the States, as I learn from reports in newspapers and technical journals sent me from time to time.

IN SOUTH AUSTRALIA.

Coming closer to home and reporting the results of my own observations, I refer to the very successful work done by Messrs. J. I. and W. F. Slattery on their farms at Belalie East and Canowie, near Jamestown, using 2-ton Holt tractors and producer gas generated from charcoal in gas producers designed by Mr. J. I. Slattery. The State Committee, above referred to, appointed by the Minister of Agriculture, conducted a trial with a unit outfit, consisting of a Holt tractor, Slattery producer, and 17-hoe combine on Messrs. Slattery Bros.' farm at Belalie East, and I shall quote a few extracts from their report:—

Inspector Longstaff's report shows that during 3 hours 4min. of engine running time, of which 2 hours 45min. was actual working time, 44lbs. charcoal and one-third pint of petrol were used, the total cost being 1s. The area cultivated was 12 acres, so that fuel costs were 1d. per acre. Water consumption was 2galls. per hour.

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[Papers Read at Conferences.]

The committee desires to emphasise the importance of the Government assisting in every possible way the development of producer gas power for farm tractors. It is difficult to over-estimate the importance of this to South Australia. Mr. Slaterry informed the committee that it cost him and his brother between £500 and £600 a year for liquid fuel and lubricating oil for three tractors, and he was confident he could reduce this outlay to about £200 by the use of charcoal gas.

The committee would again urge upon the Government the advisableness of encouraging the development of producer gas-propelled vehicles by reducing to a nominal amount the annual registration fee on such vehicles. Not only will the general adoption of producer gas power as applied to mechanical transport (and tractors) result in a very large reduction of tractor farming costs, but it will provide employment for a considerable number of men in preparing wood and charcoal. Further, it will retain in the State many thousands of pounds now expended on power fuels.

The members of this committee are highly qualified engineers, chemists, and executive officers. It may be added here that Messrs. Slaterry Bros. have consistently used producer gas with their tractors for the past eighteen months on their farms, and have cultivated and tilled about 5,000 acres in that time. It will be noted that I have throughout quoted the reports and opinions of highly qualified and disinterested experts, members of committees appointed to investigate the use of producer gas and others. This has been done, not in an endeavor to build up a particularly strong case in favor of the producer gas fuel, but in order to give the facts of the case.

On Eyre Peninsula producer gas is being used to some extent by farmers and motor vehicle users. Mr. W. H. Brownrigg, Agricultural Instructor, has kindly supplied me with some interesting information on this subject. He states:—

Mr. J. V. Evans, of Parabba, is getting almost ideal results from this fuel (producer gas), used in a 2-ton Holt tractor, having gone over 1,000 acres without any trouble. Mr. Evans pays great attention to the scrubbers, as he considers that this is the most important part of the plant. The tractor had very little trouble to pull a 20-tine combine over newly burned scrub land.

A Wallis (wheel type) tractor pulling an 8-furrow plough, following, has been covering 10 acres to the bag of charcoal, using petrol only to start; the lubricating oil has to be changed after three weeks' use and is still fairly good. The tractor was also used at harvest time to pull a large stripper, and the danger from fire was not considered serious. A Holt 15 tractor worked by a farmer here with charcoal gas pulled a mallee combine over 1,100 acres at a total cost for fuel and oil of £22 11s. 2d.; the oil consumption was unduly heavy.

Mr. Brownrigg also describes the running of an old Ford truck, carting wheat, using producer gas; it ran 2,820 miles on 12½galls. petrol and 2,820lbs. charcoal—a fuel cost of about ¾d. per mile.

Recent reports from Streaky Bay district indicate that a local maker is making and fitting gas producers to tractors, trucks, and motor cars (even sedan cars) which give most efficient and economical service on charcoal fuel.

After having submitted the foregoing information which would tend to prove that producer gas can be used as an economical and efficient fuel for tractor, truck, and car engines, the question naturally arises why it has not come into more general use in this country and why there have been a number of users who have tried it and abandoned the attempt. Among the several reasons for these disappointments is, I think, the fact that the farmer, generally speaking, is used to working comparatively simple, positively operated implements and machines which are to a large extent standardised and are adjusted ready for use. This is no reflection on the intelligence or initiative of farmers who are not supposed to be engineers or mechanics. The gas producer certainly adds to the complication of the tractor outfit, which alone can give sufficient mechanical troubles at times; the fuel must be generated in the gas producer continuously and uniformly as used, and the efficient making of the gas and its correct admixture with air is a process which requires some degree of skill and experience which will be attained much quicker by some men than by others who

[Papers Read at Conferences.]

perhaps do not possess the mechanical aptitude. The farmer pioneering this process, new to him, has no skilled teachers or advisers, but has generally to pick up the new technique as best he can. The cost of the gas producer, freight, and alterations to his tractor engine, about £60 to £70, is also a deterrent in these times of financial stringency. It is often deliberated on, and the result is a decision to play safe and spend the money on more kerosene. The use of the gas is certainly not as convenient and efficient as is the use of liquid fuel, for which the tractor engine was designed, so naturally and perhaps wisely the tractor owner hesitates before he embarks on the use of this new fuel. It must, however, be remembered that one cannot have it both ways: some sacrifice of convenience and comfort must be made in order to be able to work the land for a penny per acre for fuel cost.

I have viewed with misgivings the supplanting of horse teams on farms by tractors, and do not think it has been for the welfare of the farmer generally. It is not safe, however, to regard the advent of the tractor on the farm as a passing phase and in districts where the average rainfall is low and subject to irregular and often disastrous fluctuations, causing failure of crops through droughts, the right type of tractor using this very cheap and locally produced fuel can be profitably used for farm purposes by men who possess mechanical aptitude and who will persevere in learning the correct technique and management of the gas producer and engine. The cheap fuel allows of the unrestricted use of the tilling implements to work the soil, which practice is so necessary in a dry climate, and the expense of purchasing or providing fodder for the horse teams in times of drought is obviated.

MURRAY LANDS WEST BRANCHES, KAROONDA, AUGUST 3rd, 1933.

**THE CARE OF CREAM FROM THE COW TO THE FACTORY, AND
INCIDENTALLY, THE CAUSE OF SO MUCH SECOND GRADE BUTTER
IN SOUTH AUSTRALIA.**

[R. ELLIOT, Kulkawirra.]

The main point in the handling of milk and cream is careful cleanliness, there is nothing that will taint quicker than cream or butter, and it is not only necessary to keep everything connected with them absolutely clean, but also to keep them right out of contact with any foreign odour. This is often the cause of trouble on farms where only a small quantity of cream is produced, and where there are not all the necessary requirements for the care of cream, many people are doing their best to turn out a good article under very adverse circumstances, especially in newly settled areas. Some people are careless, but they are in the minority.

The main cause of the large quantity of second-grade butter is in the large number of small suppliers of cream, and their being scattered over a very wide area of country, and the fact of their having to keep the cream too long before sending to the factory, through having some distance to bring their cream to the railway station. Then the cream very often has to stand on the station overnight, and until the train goes the next day, with the lid of the can close shut. Nothing deteriorates cream more quickly than to be shut up in that way. To test this, shut a can of cream up tight for one night, then take off the lid and take a whiff of the air from the can. The only way to combat this difficulty is to have cream depots on railway stations of any considerable size, where there would be some one whose duty would be to see that all cans containing cream had the lids raised to allow of the circulation of air. It would be necessary that these depots be dustproof, and to give the best results they would need to be artificially cooled in summer. There would also need to be a cool compartment on the train, because cream travels very long distances on trains, and cannot do otherwise than become heated on the journey in hot weather.

[Papers Read at Conferences.]

There is another factor which must not be overlooked in the forwarding of cream; the container must be clean and sound, there must be no rust patches or places where the tinning is off the can. In Victoria, such cans would be condemned by an inspector, and their use prohibited.

No butter maker can make good butter from bad or tainted cream, and the fact that so much of South Australia's cream is produced as a farm sideline over such a scattered area is the main cause of so much second grade butter.

CONCRETE ON THE FARM.

[W. TRESTRAIL, Coomandook.]

It should be the aim of every good farmer to make substantial improvements on his farm from time to time as finances permit. It is true that in these days of limited incomes and small returns, we can do little to accomplish our aims and ideals. In most districts a good deal of natural material is available in the form of sand and limestone for the making of permanent improvements on the farm, such as the house, sheds, barns, concrete fencing posts, and other improvements. Most of the main buildings can be erected with masonry work that will fill the bill, but in the case of floors in out-buildings, verandahs, tanks, &c., concrete is the ideal.

Every task on the farm can be more easily and pleasurably carried out where concrete has been employed in the construction of the buildings, floors, and surrounding yard areas. Indeed, a temptation exists to wander around the farm generally and make a careful record of how much of the daily labor that is now somewhat fruitlessly expended in repeated endeavors to "clean up" and keep things in order, could perhaps be eliminated by replacing many farm structures with permanent concrete floors, walls, and even roofs.

Modern experience of building in all its phases, and in every variety of climatic conditions, indicates that, for the construction of every possible requirement of the farm having the nature of permanent fixtures, concrete will prove to be not merely an expenditure, but a capital investment, ever gaining in value along with the natural market price of a well improved farm.

LIME CONCRETE.

Lime concrete can be used in floors where not much weight will be carried, or in walls that can be cement coated and that are not vitally important.

With lime concrete it will be necessary to burn or procure the lime. This can be done on most farms where limestone and mallee roots or wood are available. Dig a kiln 6ft. deep and about 6ft. in diameter. At the bottom of the kiln dig a trench about 1ft. deep and 1ft. wide across the kiln. Then dig down a lighting opening on the west side say about 5ft. x 2ft. and 7ft. deep, and make a tunnel through from the kiln to the opening, which should connect the trench at the bottom with the opening which should be about a foot or two from the kiln. Place dry kindling wood and leaves in the trench right into the secondary opening to facilitate lighting the kiln. Place about 18in. of solid mallee roots or wood in the bottom of the kiln, then about 8in. of limestone cracked to about 4in. or 5in. lumps. Continue with alternate layers of wood and stone right up to the top. A larger amount can be placed above the surface, and this will burn down during the process of burning. Place an extra amount of fuel on top of the lot. If possible set the kiln alight in calm and dry weather. When the kiln has got well alight—say in about 10 to 15 minutes—throw in dirt to block the opening from the lighting opening to cut off the draught. Let the kiln burn itself out, and in 48 hours the lime will be ready to use.

The lime must be "slacked" by placing in a tub or other suitable container and about 8galls. of water used for every bushel of lime "slacked." Judgment must be used in doing this, depending on the quality of the lime used.

[Papers Read at Conferences.]

To make the work as easy as possible, a mixing board helps considerably. The mixing board should measure 8ft. x 8ft. and be supported by jarrah joists 3ft. x 2ft. apart upon which Baltic flooring boards are mounted. Failing this, select a nice smooth hard place as near to the work as possible and do the mixing of concrete thereon. Have all materials handy to save labor and time. The materials wanted for the job are good clean, coarse sand; rain water, if available, is best; cracked stone, according to the job to be done; cement or lime.

CEMENT CONCRETE.

If a floor is to be put down, the following will serve as a guide. If the floor is for a cowshed or where heavy weights are to be carried, it will need to be at least 5ins. or 6ins. thick and should be all cement concrete. A good formula is three parts sand, four parts cracked stone, and one part cement. Do not guess at quantities, but have some definite measure, such as a petrol tin, if it is a small job; or if a bigger job, a properly constructed box with handles that can be used by two men. Place the required quantity of clean, coarse sand on the board, then measure the cement and mix these two ingredients thoroughly until the color is uniform. Pebbles or broken stone are measured in the same way, spread on top, and the mixing process repeated until the color is again uniform. Open out the whole mixture in the form of a big ring. Add water slowly in the depression in the centre of the pile and mix well until the desired consistency is obtained—a jelly-like consistency. Do not use too much water. See that the place where the concrete is to be placed is thoroughly wet, and place the concrete in position as quickly as possible. It should be placed in "blocks" say 5ft. wide or square, a section at a time. This should be thoroughly tamped down so that the material is worked into a tight mass, thus expelling any air pockets that may have formed. Smooth off and leave for 24 hours, and then over the top apply a coat of three parts sand and 1 part cement to the thickness of $\frac{1}{2}$ in. Dust with neat cement and trowel over with a smoothing trowel. This work should be allowed to dry slowly, and covered with wet sacks for a number of days. The setting or hardening of cement is a chemical process which happens naturally, as well under water as in air. The process takes place slowly, and water is an essential factor in it, consequently the water used for mixing the concrete must be kept from evaporating or drying as long as possible. This is usually achieved by covering newly made concrete for about 10 days with not less than 2ins. of wet sand, earth, old bags, grass, straw, or other materials which will afford equally good protection. This is essential to prevent the rapid evaporation of the water mixed within the concrete compound, due to the action of the sun or wind.

The making of concrete in frosty weather should, if possible, be avoided. Freezing causes expansion of the water within the as yet soft concrete, preventing the correct bonding of the different layers, and often causing thin scales to peel off the surface, and sometimes in severe weather even a disruption of the concrete mass.

If the floor is for a shed where not much weight is to be carried, say, a chaffshed or a front verandah, a lime concrete can be made up of 3 parts stone, 3 parts sand, formed into a ring or bay, the lime slacked in the centre and mixed to the required consistency. This is placed the same way as cement concrete, and when it has been in place 24 hours and well tamped, spread over the top a coat of 3 parts good clean, coarse sand and 1 part cement, and when this has been done, sprinkle over with neat cement and trowel over and smooth off.

Another method if the floor is a deep one—as in a verandah wall that has to be filled up to the correct level—is to fill the bottom part with sand or earth and leave for some time until it has been well trodden or tamped down and then crack about 4in. of metal on the top and tamp well. Mix the cement of 3 parts sand and 1 cement very thinly so that it can be poured into the stone. Do this in 5ft. sections and finish off as mentioned before.

[Papers Read at Conferences.]

Corroded iron tanks that are badly out of repair can be made as good as ever again by using cement, sand, and wire netting. The following method will be found useful:—The tank must be thoroughly cleaned of all mud and foreign matter, both inside and out. Holes are punched in the walls. These holes should be approximately $\frac{1}{4}$ in. in diameter and spread about 12 ins. apart. Small mesh wire-netting of lin. mesh x 22 gauge is then lapped around the tank both inside and outside, the layer for the bottom overlapping the walls about 6 ins., both layers being laced through the holes, using fine wire. In the case of large tanks, the bottom must be cemented first, overlapping the walls about 6 ins. and allowing to harden to provide a foothold when plastering the walls. Before plastering, the tank is treated with a neat cement wash thrown on the surface by means of a brush. This is to provide a bond between the tank and the plaster. Mix a mortar of 3 parts fine clean sand and 1 part cement with only enough water to provide a workable mix. Apply in the thickness of $\frac{1}{2}$ an inch. When almost hard, scour the surface to provide a bond for the next coat. Allow each coat to harden, then apply damp cure for two days. Thoroughly moisten each coat before application of succeeding coat. Cure finished work seven days before using. The finished tank combines a neat appearance with strength and utility.

If fencing posts to be made from concrete are thought of, I advise a reference to Mr. Spafford's Bulletin No. 225, "Cement Concrete Posts for Fencing."

POINTS TO BE OBSERVED IN HANDLING AND MILKING COWS ON A MALLEE FARM.

[G. R. TREGILGAS, Yurgo.]

Owing to the unparalleled period of low prices offered for cereals, the wheatgrower has to investigate other sources of revenue to eke out an existence, and the cow has definitely proved itself to be one of the best servants on the farm. It has also been proved that from a few cows a weekly or fortnightly pay can be received throughout the greater part of the year. When a farmer decides to go in for cows, there are quite a number of essentials to be observed and adhered to to make the venture a profitable one. They are as follows:—(1) Kindness; (2) cleanliness, (3) feeding; (4) proper seating; (5) good milking; and (6) breaking in heifers.

Kindness.—Always bear in mind, a dumb animal loves kindness. When handling a cow or breaking in a heifer, handle her gently and quietly, and when proceeding to milk at all times speak to her. An occasional stroke or two anywhere on the body gives a cow confidence.

Cleanliness.—Whatever number of cows are kept, they should be tied up in their stalls, and before milking, all teats and the lower portion of the udder should be washed. If there are more than two cows to each milker, a spare bucket or tin which contains water should be provided, so that the hands can be washed before starting to milk the third cow. Stalls should be cleaned out daily and so arranged that urine will drain away immediately.

Feeding.—Whatever the time of the year, always feed cows at milking time, even when there is plenty of good green paddock feed. A cow will always relish a little chaff and bran and oats, and she is always more contented while being milked. When the paddock feed is going off, start to increase the bran or oat and chaff ration, bearing in mind that however well fed, the average cow will show a profit, and if it happens to be a cow that will not do so, then get rid of her. If one has a small paddock of good ground close to the homestead, try and grow a patch of lucerne or any summer fodder—the cows will always pay for it.

Proper Seating.—Proper seating is the first essential to good milking. Select the most convenient type of seat, and for this I prefer the three-legged stool and not a box or petrod tin as is often seen in too many cowyards. They are not handy, are

[Papers Read at Conferences.]

too cumbersome, and always collect dirt and filth. The stool should be a comfortable height to make milking a comfortable job. Good seating means comfort, ease, and quickness in milking.

Milking.—It is well to note that all cows are not alike to milk, therefore it is necessary to study the flow or delivery of milk in all quarters of the udder. There is no hard and fast rule as to which quarters should be milked first—it should be left to the common sense of the milker. It is best to combine that which will be the most convenient for the milker to operate and that which will give the quickest relief to the cow; therefore, it will be found that in some cases it is best to milk the front quarters first, while in others it would be best to milk the hind quarters. I advocate the method that will give the quickest relief to the cow, because with every cow there is a certain amount of strain on the muscles of the lower part of the stomach. This is to counteract the swing and pull motion of the milker; a motion that should be eliminated as much as possible. Some milkers have a most unnecessary habit of too much pulling and swinging. Milk with the full hand, avoiding as much as possible the finger and thumb method. Some cows are much better than others to milk, and however good a cow is to milk, it is an easy matter to spoil her with too much of the finger and thumb method, commonly called "stripping." Most cows need a little stripping when finishing off. Some cows can be milked efficiently and quicker by the full hand method from start to finish, and it is best to cultivate that method—quick time in milking is a big factor in the comfort of the cow. Always milk as quickly as possible and create a good froth on the milk; this usually denotes a good milker. Having a froth on the milk often enables the milker to keep the milk clean; for instance, should any dirty matter, such as manure or anything else which may be on the cow, fall into the bucket, it can be picked out of the froth without touching the milk. Without a froth, a milker may stick his fingers in the milk and lose the dirty matter, which immediately commences to dissolve in the milk. There should be one good milker in the family, so that he or she can educate the other members. It is essential that a beginner should be educated, because the many points of advantage in connection with good milking can be much more quickly taught than if they are left to be found out. Should there not be a good milker on the farm, then one member of the family should visit the nearest farm where there is an experienced milker and obtain a few lessons.

Breaking in Heifers.—Some people favor tying the heifer to a post if they have not a bail, and when she is thoroughly quietened do away with the rope and milk her anywhere. Almost any herd of cows can be trained to be milked anywhere, but that system has its disadvantages, because at times a cow may have a sore teat or flies be troublesome, causing the cows to fidget and move about; then the milker loses time following her about. Also, some cows eat more quickly than others; they then go and disturb and horn other cows. To avoid all that trouble a stall should be provided for each cow and every cow tied up. Have one bail only, and that for breaking in, particularly if the heifer is unruly; but if not, tie her up in a stall. Do not make a practice of using a legrope when breaking in; almost any heifer can be broken in without it, especially farm-bred heifers. This can easily be done by the following method:—Sit close in to or under her with the knee or lower portion of the thigh against her leg and your head against the upper part of the flank; a cow never kicks without first giving a warning. The milker can feel that warning the instant it is given. Immediately parry or ward off the intended kick with the left arm, and if she continues to kick viciously, grab the off-side hock with the left hand. The cow will then be powerless to act and will soon give in, providing she is not treated unkindly.

Always be punctual with milking times, and do not forget that kindness means confidence. "Cleanliness is next to Godliness." Proper seating means a saving of milk, time and defence against kicking. Feeding means better financial results, and good milking practically covers the lot.

[Papers Read at Conferences.]

POULTRY.

[E. PAPE, Wynarka.]

First, select the ground for the buildings on a nice, sandy spot, and build a shed the following size:—60ft. long by 15ft. wide, 6ft. 6in. at the back, 8ft. high at the front, with a lean-to roof; leave a space at the back the whole length of the building about 8ins. wide, and cover with wire-netting, then divide the shed in the centre, making two houses 30 x 15. Let the shed face east or north-east; the front should have 2ft. of galvanised iron at the bottom and the remainder wire-netting. When the shed is finished put a wire-netting yard at the front of the houses 60ft. x 60ft. Divide in the centre, which will give two houses and runs that will accommodate a flock of 300 birds as layers. Allow the birds to have the use of the runs until about 10 a.m.; provide free range over the farm until feeding time, say about 5 o'clock, and then give the evening feed inside the runs. When all the birds are inside, close the gates for the night and then all are safe for the night from foxes. Next, two houses will be required for runs for the breeders. Put up two iron houses, 10ft. x 6ft., open front, with wire netting runs 30ft. x 10ft., and each house and run will accommodate 12 hens and cockerel in each yard, which should keep the supply of pullets up to the 300 mark. The idea for these houses is to save expenses in losses by foxes. When fowls are perched in the trees and implement sheds, many are taken by foxes; a farmer loses more money in a year by foxes than will cover the cost of the fowl sheds.

SELECTION OF STOCK.

The most popular breed is the White Leghorn. This breed is used extensively by commercial poultry farmers throughout Australia.

Type of Birds to choose for Breeding Stock.—Hens: Go to one of the most reliable breeders who can supply second-year hens that lay eggs over 2ozs., and select the following as they are at liberty on the floor:—Good, big birds of fine bone; birds that stand well up from the ground, legs set well forward on the body, which should be a good length; eye bright and bold, back long and straight as possible from neck hackle to tail; comb and wattles of medium size and very fine texture, and comb evenly serrated. Pick up and handle the birds, pick out the one with a good long breastbone and good width between the pelvic bones. These hens, to my mind, should breed first-class birds. The cockerel to mate with these hens should be of good size, good length of back, a good flow of feather, good, well serrated comb of spikes, firm and straight, free from thumb marks and side sprigs, good, almond-shaped lobes, tail carried at a nice angle—not straight up—and bred from a hen that laid not less than 250 eggs as a pullet. A pen of this description should give a good foundation. Every year pick out the best laying pullets and reserve for breeders, taking particular care the eggs are not less than 2½ozs. in weight.

Heavy Breeds.—Australorps are the most popular breed up to date, with Rhode Island Reds coming into favor. When selecting a breeding pen of Australorps or Black Orpingtons, buy a few good second-year hens of a well-known strain. They should have good big body, legs fairly short and a good distance apart. Eyes black, beak short and thick, comb short and velvety, back short from neck to tail. Mate with a cockerel short and deep body, bright red comb, well serrated, eyes black, tail nice and short, amid long sickle feathers. Cockerel and hens should be a good beetle-green, not purple. This class of bird should breed first-class layers, but always bear in mind and only breed for the eggs over 2ozs.

Rhode Island Reds.—This breed is going ahead with leaps and bounds. In the last few weeks, on visiting a few of the largest poultry farms in the city, the demand for Rhode Island Reds is bigger than the supply. They are a good table bird and can be bred to lay as many eggs as any other breed. They lay a good sized egg of a nice brown color.

[Papers Read at Conferences.]

MATING.

To mate a pen, get a few good hens—not pullets—of good size, say about 8lbs. in weight, good length of body, full, low chest, not cut away from beak to thighs, and rather inclined to be square-bodied; and color, dark brick red as pullets. It does not matter if the feathers are faded in the old birds, but see that the breast feathers are dark red, the under-color to be red to the skin with a small portion of smutty color for breeding only, which helps to keep that nice glossy red in the pullets. Mate to a good upstanding cockerel about 8lbs. or 9lbs. in weight; nice, evenly serrated comb of medium size, good dark-red eye—a necessity in the hens also—a bright red color, all one shade, free from smut, and a nice black tail, not bronze color.

If I find a bird off color I pen up away from the rest of the birds, give one day's grace, and if not better without treatment in 24 hours, I kill the bird and burn it. At the time of writing this paper—July 23rd—egg merchants are quoting 6d. per dozen for ordinary eggs, infertiles higher. At the same date the New South Wales Egg Board is paying 1s. 6d. per dozen, less 1d. levy. We have a good association—the Red Comb Association—in this State, consisting of about 1,700 members, and I think an Egg Board should be formed in South Australia on similar lines as the New South Wales Board.

EASTERN EYRE'S PENINSULA BRANCHES, COWELL, AUGUST 10th, 1933.

MIXED FARMING.

[FRANK MASTERS, Roberts and Verran.]

This is recognised as the day of the specialist—the man with one aim, devoting his whole time, energy, and costs to achieve the best and highest that points the way and goes furthest.

But all cannot be specialists, either from inclination or ability, or the financial position of one may preclude the necessary expense.

In the agricultural history of South Australia we recall the work of such men as Marshall in wheat, and Murray in Merino wool, among others in the same and other directions who by their specialisation have largely benefited the mixed farming industry of the State. Roseworthy College, too, has supplemented private efforts and enabled producers to grow more wheat per acre, more wool per sheep, more butter per cow, and more eggs per hen, which, in these days of stress, are factors which must be practised to enable farmers to live and carry on.

In other words, specialisation in mixed farming has become a real necessity for the agriculturist. With low prices for all production of the farm, the above points will enable us to reduce losses or increase profits as the only way out.

I regard mixed farming as an insurance for successful operation. A lifelong experience in the farming vocation has shown me that never until the present have all prices of produce been down to the lowest together, but usually either wheat, wool, butter, eggs, pigs, or lambs have been higher in value than the depressed commodity, and has enabled the mixed farmer to pull through, whereas with wheat alone, and many of the others singly, disaster would have been inevitable.

By mixed farming practice the waste of the farm in offal, weeds, &c., can be controlled, eliminated, and turned into profit. Cases in point are the farm flock grazing partially at least on weeds encouraged by cultivation, the dairy herd grazing similarly and supplemented by storage of ensilage from the abundant winter growth, and pigs partially grazing weeds, supplemented by offal otherwise unsaleable.

Without these waste savers, the majority of farms would be unprofitable, even with good prices. No waste can be permitted to-day, and only the mixed farmer can make the best of this opportunity of converting the waste into saleable produce.

[Papers Read at Conferences.]

With fluctuating values for various products, mixed farming alone offers the agriculturist the opportunity of conversion into more payable products—those products which may be unremunerative when sold directly.

In this case wheat, oats, barley, and hay at low prices may be fed to animals and poultry on the farm and better returns secured. Too often we forget we have an advantage in doing this on the farm, instead of allowing the feeding specialist to do so, in the fact that expense of bags, partial cost of freight, &c., contributes towards the profitable conversion, together with the feeding specialist's profit.

Mixed farming widens the horizon of interests and one can find in it that variety which becomes the spice of life. Change from the humdrum of one thing brings recreation and relaxation that means invigoration of body, mind, and spirit. The watching, helping, and encouraging of the natural laws of breeding, feeding to secure higher and better growth and production, becomes an absorption once one tastes the fruits of success therein. Always ahead and before the enticing possibility of growing better wheat, better wool, better sheep, better lambs, better pigs, and poultry is the triumph which makes effort worth while.

FACTORS ESSENTIAL IN MIXED FARMING.

These are judgment, management, feeding, and marketing. Judgment really is included in the whole four and makes or mars the whole. It may be termed initial and incidental, and initially is concerned with securing the start or successful inauguration of mixed farming. In this district finance is usually the governing factor. Judgment demands purchasing the best, but here the settler on new country is limited to the funds at his disposal. Aim not at quantity, but quality. In Merino sheep, cast for age shed ewes form one of the best judgments of an initial character when they can be obtained, and followed up by purchases of good rams, the operator may quickly possess a flock of sheep of excellent quality.

He then has in his possession good groundwork for combining fat lamb production by introducing good Southdown rams upon a portion of that flock, or a Border-Leicester ram on portion, selling the male lambs for export and retaining the ewe lambs to be used as mothers for fat lambs for export. Faulty judgment would only have given this man a secondary product of lower value and hard to sell.

Pedigrees of stock are fully protected by herd societies and stock associations, and proper Governmental authenticated tests can be relied upon by the producer, so that in them he has an excellent guide for selecting initial and subsequent stock, and if he cannot for any reason purchase the best at the outset, he can, through the above records, be sure of buying later stock that will improve those he possesses, according to his judgment and pocket.

The process of improvement of quality will be slower, and for most will be the one followed. Management, however, must be on sound lines.

In wheat, starting with good varieties suited to the district, continual care is necessary regarding cultivation, manuring, harvesting, &c., so that the best sample is produced. Bad management means deterioration of returns and price. The admixture of foreign grains, notably barley, must eventually reduce its value.

Whilst the crossbred animal appears to be the ideal for meat purposes, yet the nondescript crossbreeding resulting in mongrels without type or character must be avoided. The fat jowelled pig must disappear from farms, being displaced by the longer, leaner, and small headed pig, with the Large White predominating in crossing, but the Tamworth-Mid York mother seems the ideal, with the Large White sire. Produce what our customers require and get away from anything of our own fancy. This is true of all production, but notably true regarding the pig.

More judgment is required in managing cows. The weighing and testing of milk is the only certain way of finding out the boarder. Here again the registration of bulls gives an excellent avenue to secure increased quality in the herd. Combination

[Papers Read at Conferences.]

in a locality of a number of farmers would make it easy to secure excellent blood of cattle and horses in the purchase from time to time of good sires. It has been said that half the breed is in the feed, and here a few suggestions are offered. Understock rather than overstock, but adequate stocking is necessary. Research has shown short grass to be the best, and here the moving of sheep frequently and grazing each paddock quickly, will prove beneficial.

All stock must be kept growing, any setback or stunting means loss of quality and increased cost to restore that quality, which indeed is not always possible, therefore reserves of fodder in the form of hay, straw, cocky chaff, silage, or grains such as oats and barley are necessary.

Once a farm is properly fenced, every effort should be made to carry the most stock possible, consistent with proper results, thus making the return for improvement greater.

Regarding the question of marketing, much remains to be done in the way of organisation. The individual selling of production without due consideration of effect on prices appears to be a question which needs mature consideration. The bulking of consignments of given quality of lines of production may give confidence to customers, and for such lines increased prices should result. The aggregation of our production at overseas ports is essential in many lines for direct shipments. This is notably the case regarding lambs, pigs, butter, and eggs at Port Lincoln, where there are all requirements for processing and handling. In this case it is worthy of notice that last season's Port Lincoln lambs secured the highest average price for the State, but it was regrettable that double the number were not marketed that way, which means increasing the values of stock remaining and preventing the local market from being glutted with the surplus which should have been exported. The main thing is to export our surplus and the sooner this is recognised the better.

The mixed farm should be conducted from the standpoint of realising the highest returns to the owner and the foregoing will contribute to that end.

So convinced am I of the necessity of mixed farming that I am inclined to propound the axiom "The farm which is not a mixed farm is no farm at all." In the same way a farm without permanent supplies of water cannot be considered a farm, but both are essentials.

CONSERVATION OF FODDER.

[C. F. JERICHO, Butler.]

During seasons of periodical drought farmers turn their attention to the all important question of fodder storage. A large number of farmers do not give this important matter due consideration from a business point of view. While seasons are bountiful they are apt to forget the bitter lessons learned in drought years, instead of conserving a reserve of fodder for lean years which will come again. An important operation of farm activities should be the conservation of fodders of some description. On Eyre's Peninsula farmers have been advised to have a side line such as dairy cows. Many farmers have adopted this side line in the last two good seasons, but after a few good seasons lean years will follow, and unless those farmers who have adopted dairying make preparation for the ensuing years, they will be in a sad position with their cows if they have to buy feed at £7 a ton.

Hay conservation does not appear to be the most successful, because of mice. Every farmer should make large stacks of straw in good seasons which will last for many years without getting damaged by weather or mice, and in time of drought can be chaffed, and should the farmer have to buy oats, bran, and molasses to mix with it, it would be much cheaper than to purchase hay chaff at about £7 a ton.

[Papers Read at Conferences.]

The best method of storing feed for dairy cows in good years is to make ensilage. It can be made out of any green fodder that grows on the farm. Very often in wet years the hay crops are full of barley grass and are not fit to cut for hay; this kind of crop is best to cut just as the grass is coming out in head. It can be turned into ensilage and will make good summer feed for dairy cows or sheep. It can be stored in stacks or pits, will last for years, and no mice can damage it. I have fed ensilage for two years to cows all through summer and have found there is no other feed to equal it for milk production. Oats, wheat, or barley make the best of ensilage, but anything else on the farm, very often not fit to cut for hay and turned into ensilage, makes good feed.

BREEDING MERINO SHEEP.

[R. P. SMITH, Miltalie.]

Breeding plays a very important part in returns for the producer's labor, and the purpose of this paper is to outline a few points for the benefit of those who have not had much experience in this branch of agriculture.

BREEDING.

Find out the class of sheep best suited to the district—fine, medium, or strong. Take note of established farmers and see which has done best with them. Medium wool sheep will be found suitable for most agricultural districts. Having settled the desired type do not change unless for a good reason; never try and follow fashion; this means the breeder as well as the class of wool grown.

Many flocks are ruined and much money wasted because farmers insist on changing the blood, in other words, their breeder. It is only possible to fix a type and keep it by following a definite blood line. One "fixed type" of sheep makes classing at shearing time much easier, and gives better results.

Constitution is the first essential; no flock is worth spending time with if it has not got a good constitution. Constitution comprises a good frame, big bone, plenty of width between the eyes, and a good, broad nose. In the sire, look for a masculine head with heavy horns, carried well away from face and not too close at base. The chest should be deep and broad, giving plenty of lung room, feet strong and straight, big, broad teeth, but not too long, legs set well apart, ribs well sprung, not too much flank or many lambs will be lost while young, because this makes it difficult for the young lamb to find teats.

Both rams and ewes should have clean, soft faces, free from harshness, with eyes, eyelids, nose, lips, and tongue as free from black spots as possible. Sheep showing much black on these points are likely to leave black, or partly black, lambs.

The ears should be short, thick, and covered with a soft velvety covering and the neck in as straight line as possible with the back; a dip either before or behind the withers is objectionable, if before it indicates a weak constitution.

Look for a level top line. In rams the horns should be evenly marked; if a strong wool sheep big corrugations in the horn; if fine wool sheep small corrugations. If the marks on a ram's horn do not correspond with his wool, he will not give good results because he is of mixed type.

WOOL.

The wool should not vary too much between the shoulder, sides, back, breech, or belly; the more even the wool the less pieces at shearing time and more fleece wool.

Farmers should not try to put too much wool on their sheep. Get weight of wool with length of staple instead of growing short, tight wool; remember that it is not possible to have the maximum of density and length on the same sheep. Too tight a wool means wrinkly sheep and "fan tails" and no end of trouble with the blowfly.

[Papers Read at Conferences.]

An open woolled sheep always does better than a wrinkly sheep, and the air penetrates the open fleece and makes wool a better color.

Try and breed true Merino wool with a pronounced crimp, even all over, and watch for substance in the wool; put your hand on the sheep's back and see what resistance the wool gives, the more resistance, the more substance, providing it is not heavy in grease.

Too much grease is very objectionable; it makes the wool low yielding, gives poor price per pound, overloads the sheep, and is the forerunner of bad constitution. In summer in dusty districts it is the means of collecting much dirt, because it usually is a hot day on a dusty day; the grease is then dissolved and collects the dust. Do not try and grow a heavy fleece, but have as much as possible of what you do grow. Substance and crimp will keep out the dirt if anything will.

Open the wool and while open run a finger through the opening to see how many cross fibres it has. If many cross fibres are found, that wool is "noily," which helps to spoil the yield.

Aim for a bright wool with plenty of crimp, one that opens freely. Woolbuyers want a sound, high yielding, bright wool. Some countries have imposed an import duty; that of France is, or was, about 1s. per pound. If one man breeds a 33 per cent. yield, another 53 per cent. yield, which can the buyer pay the most for? Less import duty and less freight, &c., on the latter. The five essentials in wool are substance, evenness, crimp, color, and yield.

SOME HINTS ON THE CARE OF SHEEP.

[W. G. SMITH, Miltalie.]

This is a subject which seems to be neglected at Bureau meetings and Conferences, more particularly on this side of the Gulf. Eyre's Peninsula will never come into its own until wheatgrowers generally of this great Peninsula take up sheep more seriously and the facilities necessary for the successful carrying of flocks. There is probably nothing on the farm that will show over a period of time a better net return than sheep, providing they are run under proper management.

There are no animals that respond more readily to care and attention or show a greater profit for the value of the food consumed. They will eat a greater variety of vegetation than any other domestic animal, goats excepted, but at the same time they are most fussy about feed and water should it be rank in any way, fouled, or tainted; therefore be careful to see that there is plenty of clean water situated as centrally as possible. See that the drinking troughs are kept clean and do not run more than about 350 grown sheep in one flock in the winter months; twice this number may be run in one flock when the feed is dry, because they do not travel over the paddocks so much and at the same time dry feed does not foul like the green feed paddock.

SHEARING.

There are many sheep shorn four to six weeks earlier than necessary. This is a matter that each individual has to decide for himself, taking into consideration the circumstances of the case, watching the safety of his sheep and wool with flies and grass seeds.

Take those cases where shearing could be delayed one month with safety. That is to say, the grower is getting one-twelfth more of the clip in the woolpack, which is grown under the best conditions of the year; whereas if that month's wool goes out on the sheep's back for the year, it is exposed more or less to dust, weather conditions, and grass seeds, which are an economic loss on the following wool clip. Such early shorn sheep are at a considerable disadvantage throughout the year; in summer they

[Papers Read at Conferences.]

are encumbered with that one month's extra wool; in winter, which is a critical time, such early shorn sheep have to carry not only an unnecessary amount of wool, but moisture. This is very hard on lambing ewes should autumn rains be late, as in the past season, when in the hills district over 2½ in. of rain fell in May in 14 recordings. This meant that approximately for half the month the fleece of the sheep was more or less heavy with moisture.

Apart from the advantages already mentioned in favor of shearing in season, it can be carried out with much more ease when the feed has hardened in spring; then sheep can be off the feed for a longer period without harm, the shed is cleaner, the days longer, there is more yolk in the wool, and the sheep shear better.

LAMBING.

The best time of the year to lamb is a very important question. There are quite a number of points to be considered. The April-May lambs should, in a run of years have the best chance. If earlier, they are likely to get a bad start and it is hard on the ewes. Lambs of this age have a better chance than younger lambs to go through the following summer. They are more out of the way at shearing time and at a suitable age to shear and wean, cutting more wool, worth more per pound. Shear as near as possible each year to the same time.

Do not have the ewes lambing any time of the year. If a ewe rears one good lamb a year and cuts a good fleece of wool she has done well. If there are young lambs coming along all the year round, it means that the lambs' wool will be a variety of lengths. It would be an advantage if flockowners timed their flocks to lamb at about the same time; such management would not give the fox such an advantage.

When lamb marking, do the job as quickly as possible and get the sheep back into the paddock. If an instrument is used for ear marking, the same is generally suitable for putting a small notch in the ear as an age mark. This method will be found very convenient in drafting, culling, and working with sheep in various ways.

When drafting sheep through the yards, much invisible harm can be done by allowing sheep to crush through gates, more particularly off shears. When legging sheep, do not drag the animal out with its leg pulled up in an unnatural position; this is likely to cause lameness. Do not hang on to a sheep by the wool; this is cruel. Skin the next sheep you do this to, and you will be convinced.

DAIRYING IN THE DISTRICT.

[J. S. JACOBS, Miltalie.]

It always pays to keep a few cows on the farm, even though local producers are isolated as regards a market, and only receive small returns for their labor. Further, there is only one boat per week by which to send cream to the factory. This means that great care must be taken of the produce or it will market second grade cream, which means another cut in the returns, which are already small enough.

Do not have more cows than can be properly fed and cared for. As this district is subject to long, dry spells, without any or very little green feed, five or six cows well looked after will return more money in the year than nine or 10 left to get what they can pick up in the paddocks.

The Milking Shorthorn strain is one of the best for our trying conditions. They are very quiet and contented and easy to fatten in spring when feed is good. Although perhaps not great butter producers, the cows keep in milk through very hard times. It is also necessary to dry them off before they come in again.

There is also another good point about the Shorthorns, one has not long to keep the bull calves if not wanted for bulls. At 16 or 18 months old a beast will weigh about 600 lbs. for the butcher.

[Papers Read at Conferences.]

Another important point is to obtain the services of a pure bred bull, and even if the cows are not first-class there will soon be enough heifers to replace them.

As regards feeding, oats grow well in this district and are one of the best feeds for cream. If fed with a little chaff, cows do well on them.

GAS PRODUCERS ON TRACTORS.

[MESSRS. R. F. MAYFIELD AND J. E. BEINKE, of Kelly Branch.]

[Read by Mr. Mayfield.]

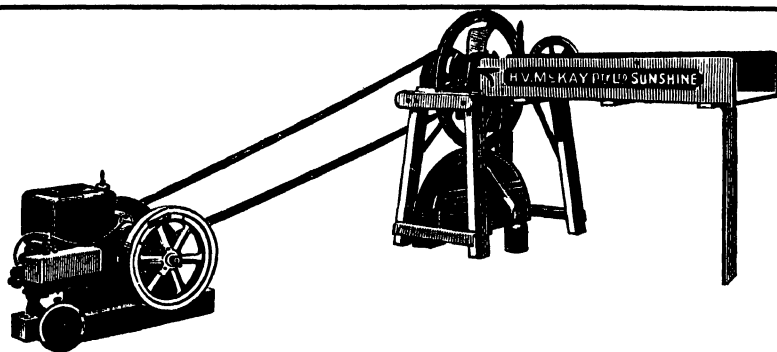
In these times of low prices for wheat and relatively high costs for power and equipment of production, farmers must of necessity search everywhere for means of lowering costs. The increase in the price of tractor fuel during the past eight or 10 years has been rapid and has at last reached that state where substitutes for kerosene and petrol are being eagerly sought after. Many farmers have laid their tractors aside and gone back to horses, but the price of this means of power has risen much beyond its economic value when compared with wheat.

Up to the present charcoal gas producers have come nearest to reducing production costs. The mallee farmer can burn his own charcoal and thus turn mallee stumps, which are pulled up from his land in the course of cultivation, from a liability into an asset.

The preparation of the charcoal is of the utmost importance. It should be well burnt, but not overburnt, and when taken from the pit should be broken into lumps not bigger than a pint pannican and thoroughly screened. Clean charcoal is probably the greatest factor in securing satisfactory results from a producer.

SUNSHINE CHAFFCUTTER & ENGINE

The Cheapest Power Chaff - Cutting Plant.



No. 5 Chaffcutter, 2-Knife, 2 h.p. Sundial Engine

H. V. McKAY'S Sunshine Farm Implements

DISTRIBUTED FROM

95-97, NORTH TERRACE, ADELAIDE.

(H. V. MCKAY MASSEY HARRIS PTY. LTD).

[Papers Read at Conferences.]

To prepare charcoal from mallee roots the best method is to sink a hole in the ground about 3ft. 6in. deep, 5ft. in width, and 12ft. in length. Seven 7ft. sheets of 24 gauge iron are required for a covering. To burn the charcoal first light a fire in the bottom of the pit and feed it until there is sufficient fire to cover the bottom of the pit. Then slowly fill up the pit, allowing the fire to keep burning freely until the top is reached. When the fire is burning all over and the stumps well alight, cover with sheets of iron and put loose dirt on all joints to make them gas tight. Along each side at intervals of about 3ft. leave openings or flues for the smoke to escape and allow the material to gradually smoulder until the stumps have all turned to charcoal. These openings must be regulated in size according to the fire. The iron covering should never get too hot for one to put his hand on it. The pit will burn about 15 to 18 hours, according to how fast or how slow the fire burns before closing it down completely. One can tell when the pit is ready to smother by the color of the gas which emanates from the flues. The charcoal should cool off sufficiently in from 48 to 72 hours to allow of its being removed from the pit with safety.

I have a 28-50 tractor and a producer attached and have been using this combination for about 11 months. I did not have the high pressure pistons put in the engine, but have continued to work the tractor as it was. It still has 12 of its original rings after going over more than 9,000 acres of ground and doing several weeks of other work besides. I am able to pull a 14-furrow plough or a 24-row combine or a 10ft. harvester over undulating country at 2½ miles per hour. In her present state, the tractor develops 2,000lbs. on the drawbar in top gear and 3,000lbs. in low gear. If the engine was rebored and high pressure pistons fitted the tractor's present power would be increased by 35 per cent.

Mr. E. J. Beinke has a 18-32 tractor and a gas producer attached. The engine has been rebored and high pressure pistons fitted. On this plant a very small quantity of kerosene is introduced to the cylinders with the gas with very satisfactory results. Mr. Beinke considers that his tractor is developing 90 per cent. of its original power on this mixture. His power plant handles a 20-row combine comfortably. In tests to compare costs, Mr. Beinke used 25galls. of kerosene to combine 45 acres, and with the gas and kerosene combined he used 5galls. of kerosene on 48 acres—a saving of 20galls. in a day's work.

Mr. Beinke has combined about 430 acres and ploughed about 90 acres. He has added about 2galls. during that time, whereas had he been using kerosene he would have used 21galls. of oil at 7s. 6d. per gallon, or an amount of £7 17s. 6d., and when allowing for the 2galls. added represents a saving of £7 2s. 6d. Pulling a 9-furrow plough while fallowing 90 acres the saving was £3 in oil alone, or 8d. per acre. Under ordinary circumstances, the tractor would have used 150galls. of kerosene to do this work, and with the gas it has used barely one drum, about 40galls.

The varying conditions of the soil control the consumption of fuel. The land this year is very hard indeed, and this is all in favor of kerosene in these tests. Even now the gas producer shows a saving of 2s. 8d. per acre against kerosene.

The actual cost of fuel, apart from charcoal, was 8½d. per acre. In ploughing 200 acres the only fuel used to supplement the charcoal was 10galls. of petrol, which cost £1. This represents a cost of 10 acres for 1s. or 1½d. per acre. The oiling system on the tractor is force feed and the oil is only used once, so that there is no saving in cylinder oil on this tractor; only it can be drawn off from the final gears fit to use on farm implements. I used 12galls. of oil to plough 200 acres, which cost £4 10s. or 5½d. per acre, making a total cost, apart from charcoal, of 6½d. per acre.

Both Mr. Beinke and I are satisfied that there is not the wear on the tractor while using charcoal gas that there is when working with kerosene. The charcoal gas is much softer in its action than kerosene, and consequently the life of the pistons, rings, cylinders, and bearings is greatly increased. Keep the charcoal dry—wet or damp charcoal in a producer gives poor results.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

EYRE'S PENINSULA.

The Branches of the Agricultural Bureau on the eastern side of Eyre's Peninsula held their Conference at Cowell on August 10th under the auspices of the Miltalie Branch. The Branches represented were Butler, Kelly, Yadnarie, Mangalo, Roberts and Verran, Miltalie, Elbow Hill, Mangalo Women's, and Balumbah Women's. Mr. J. P. Story (Elbow Hill) presided, and the Conference was opened by Mr. A. L. McEwin (Advisory Board of Agriculture). The Department of Agriculture was represented by Messrs. W. J. Spafford (Deputy Director of Agriculture), H. B. Barlow (Chief Dairy Instructor), H. D. Adams (Agricultural Instructor), and H. C. Pritchard (General Secretary).

The following papers were read:—"Conservation of Fodder" (Mr. C. F. Jerich., Butler); "Mixed Farming" (Mr. F. Masters, Roberts and Verran); "Dairying in the District" (Mr. J. S. Jacobs, Miltalie); "Gas Producers on Tractors" (Messrs. R. F. Mayfield and J. E. Beinke, Kelly); "Breeding Merino Sheep" (Mr. R. T. Smith, Cowell); "Some Hints on the Care of Sheep" (Mr. W. G. Smith, Miltalie).

A number of questions were discussed and replies given by Department Officers. The following resolutions were carried:—"That simultaneous destruction of foxes in March be made compulsory"; "that the Government be asked to consider the opening of the Minnipa Experimental Farm for the benefit of settlers on Eyre's Peninsula"; "that this Conference strongly urges the Minister of Education to give full consideration to the curriculum of all schools in agricultural districts with a view to introducing subjects that will be of practical benefit to children of men on the land. Subjects suggested for consideration are "Animal physiology, soil amendments, plant growth, and such like for children from ages of 12 to 14 years"; "that this Conference ask the district council to enforce the Noxious Weeds Act with regard to boxthorn"; "that the railways be asked to extend the reduced rate of freight on super from February to the end of March"; "that representation be made to the Government that in the opinion of this Conference the selling of the Port Lincoln freezing works by the Government to private enterprise would be inimical to the best interests of primary production export and react disastrously upon the development of Eyre's Peninsula, and requests that the Government discuss the question with a deputation during Show Week, of delegates from Eyre's Peninsula before proceeding in the matter"; "that the next



GRUBBING

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FOR STUMPS LARGE OR SMALL, GREEN OR DRY,
SHORT OR HEAD-HIGH. THE ENORMOUS-POWER OF A

MONKEY GRUBBER

EASILY ACCOMPLISHES THE TASK

Removing the most stubborn obstacles cleanly, with most roots intact.
Easy to handle, simple to operate, expeditious—its only need, regular oiling.
The Standard equipment will clean up everything over 1½ acres from one anchorage.

Each part designed for simplicity, easy handling and long trouble-free service.

A TIME SAVER AND PROFIT MAKER

ADELAIDE STOCKISTS—Australasian Implement Co., Colton, Palmer & Preston, Harris Scarfe Ltd.,
McPhersons Pty. Ltd., South Australian Farmers' Union.

TREWHELLA BROS. PTY. LTD., TRENTHAM, VIC.

Conference be held at Cleve." A motion dealing with legislation enabling farmers to obtain a more reasonable price for wheat was referred back to Branches.

The members of Women's Branches held a special session at which papers were read by Mrs. F. Coles, Miss J. James, and Miss Beryl Cleave, and an address was given by Mr. H. B. Barlow (Chief Dairy Instructor).

CONFERENCE OF MURRAY LANDS WEST BRANCHES.

Delegates from the Borrika, Netherton, Moorlands, Coomandook, Karoonda, Nunkeri, Kapunda, Kulkawirra, Yurgo, Copeville, and Wynarka Branches, representing the Murray Lands West districts, held their Annual Conference at Karoonda on Thursday, August 3rd, under the auspices of the Wynarka Branch. Mr. A. J. Cooke (Chairman Advisory Board of Agriculture), Messrs. W. J. Spafford (Deputy Director of Agriculture), H. B. Barlow (Chief Dairy Instructor), C. F. Anderson (Government Poultry Expert), A. H. Robin, B.V.Sc. (Veterinary Officer), R. L. Griffiths, and P. H. Suter (District Officers), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary Agricultural Bureau) attended as representatives of the Department of Agriculture). Mr. A. Hood, of the Wynarka Branch, presided, and the opening address was delivered by Mr. A. J. Cooke.

The following papers were read and discussed:—"Handling Cows on a Mallee Farm," G. R. Tregilgas (Yurgo); "Concrete on the Farm," W. R. Trestrail (Coomandook); "Care of Cream from Cow to Factory," R. Elliott (Kulkawirra); "Poultry," E. Pape (Wynarka); "The Wheat Crops in the Murray Lands West Districts in the 1932-33 Season," E. Cowled (Borrika).

It was decided that the 1934 Conference should be held at Karoonda, with arrangements in the hands of the Nunkeri Branch.

Departmental officers took part in the discussions on the papers, and, in addition, replied to questions relating to ensilage, suitable rams for Merino ewes, and the susceptibility of Merino sheep to blowfly attack.

The evening session was occupied with an address by Mr. A. H. Robin.

CONFERENCE OF UPPER NORTHERN BRANCHES.

Delegates from Wilmington, Wepowie, Willowie, Blackrock, Murraytown, Wirrabara, Jamestown, Booleroo Centre, and Morchard Branches, representing the Upper North districts of the State, held their Annual Conference at Morchard on July 19th.

Mr. F. Coleman attended on behalf of the Advisory Board of Agriculture, and the Department of Agriculture was represented by Messrs. W. J. Spafford (Deputy Director of Agriculture), H. B. Barlow, (Chief Dairy Instructor), C. F. Anderson (Poultry Expert), E. L. Orchard and J. O. Hatter (District Instructors), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary Agricultural Bureau). Mr. S. Lange (Morchard) occupied the chair and the opening address was delivered by Mr. Coleman.

Papers as follows were read and discussed:—"Efficiency on the Farm," A. McCallum (Morchard); "The Farm Orchard," P. J. Curnow (Wirrabara); "Gas Producer Tractors," L. W. Judell (Jamestown).

Questions dealing with the "Bulk Handling of Wheat," "Quality of Cornsacks," and subjects relating to livestock ailments were answered by departmental officers, and the following resolutions were carried:—"That the 1934 Conference be held at Wilmington;" "That the Advisory Board be asked to again bring under the notice of the Customs Department the inferior quality and variation in the size of cornsacks;" "That the rule making it compulsory for members to take the *Journal* be rescinded;" "That this Conference recommends that a qualified veterinary surgeon be attached to the Department of Agriculture;" "That the present Federal Commission have their powers increased to inquire into the excessive price of power kerosene."

The Evening Session was devoted to an illustrated lecture on "The Poultry Industry," by Mr. C. F. Anderson.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on Wednesday, July 26th, 1933, there being present Messrs. H. N. Wicks (Chairman), A. J. Cooke (Vice-Chairman), A. M. Dawkins, A. L. McEwin, F. Coleman, P. J. Baily, J. B. Murdoch, Dr. A. E. V. Richardson (Director Waite Agricultural Research Institute), Professor A. J. Perkins (Director of Agriculture), and Mr. H. C. Pritchard (Secretary).

Apologies were received from Messrs. Geo. Jeffrey and S. Shepherd.

Election of Officers.—Mr. A. J. Cooke was elected Chairman and Mr. R. H. Martin Vice-Chairman for the ensuing 12 months.

Life Membership.—The following names were added to the roll of Life Members of the Agricultural Bureau:—Messrs. H. Duhring (Wilmington), R. Fowler (Blackwood), P. J. Curtin (Beetaloo Valley), S. B. Manning (Euvelia), A. A. Magarey and G. W. Summers (Blackwood).

New Members.—The following names were added to the rolls of existing Branches:—Sutherland—V. Weis, G. W. Thiele; Belvidere—H. Easton, G. Cross, H. Jackson, G. Vivian; Kalangadoo—V. H. J. Moritz, G. L. Dean, J. A. McKenzie; Tantanoora Women's—Mrs. R. Randall, Miss Jessie Telfer; Cungen—A. E. Forbes, F. Malvino, P. C. Roberts, J. S. Anderson; Gawler River—K. Hillier, A. J. Carter; Mundalla Women's—Mrs. R. A. Dinning; Wilmington—S. C. Genders, G. W. Connor, Rev. S. T. Harper; Aldinga—S. A. Hall, C. S. Hall, W. Cox; Cherry Gardens—A. C. D. Blakely; Roseworthy—G. Tremlett, H. Humphreys, F. Geue, B. Window, W. Ferguson, A. Stewart; Collic—S. P. Scott, M. J. Anderson, E. P. Anderson, K. C. Scott, J. R. Lynch, H. H. Gray; Roberts and Verran—B. W. K. Hayward, A. Ramsey; Moorlands—L. A. Miatke, B. Cameron; Ramco—H. Rogers; Gumeracha—R. Laing; Kyancutta—E. S. May; Overland Corner—J. L. Jones, J. H. Schultz, C. W. Schultz; Murraytown—A. Scholz; Maltee—V. B. Schwarz, P. E. Schwarz; Chilpuddie Rock—H. Cox; Redhill—P. Kellock; Black Springs—N. Heinrich, J. Rusiack, R. Heinrich, P. Mullins, V. Gilbert, O. Kermod, E. Seigert, W. P. Heinrich; Nantawarra—C. H. Belling, L. G. Belling, E. G. Herbert, T. M. G. Dixon, R. T. Forrest, C. W. Young; Berri—W. B. James; Butler—P. R. Lange, J. Edwards, C. R. Young, A. A. Young, H. G. Turner; Penwortham—V. J. Duke, J. Stevenson; Penola Women's—Misses E. J. Shanks, M. W. Shanks, M. Aitken, L. Sandiford, R. Hill, Mrs. F. Fowler, Miss A. Fowler, Mesdames D. McAdam, E. Balnaves, W. McLean, — Winter; Kelly—L. J. Toole, K. K. A. Moore.

Number of new members for approval, 87.

Present number of members, 8,066.

Present number of Branches, 331.

The meeting went into committee to consider other items submitted to the Board.

DAIRY AND FARM PRODUCE MARKETS.

MESSRS. A. W. SANDFORD & CO., LIMITED, reported on August 1st, 1933.

BUTTER.—Usually at this time of the year production increases very rapidly, but owing to the backwardness of the season because of the dry June and July, the quantities are considerably less this year than last. A good heavy general rain is required to bring along the feed and increase the flow of milk on the farms. Quantities submitted for export so far this season are less than half for the corresponding period last year, and this indicates how vitally the dryness of the season has affected the production. It is pleasing, however, to record that the reports from London indicate better markets there, although the improvement so far has not been very marked, but with the upward tendency, the position is brighter than for some time past. Choicest creamery fresh butter in bulk, 1s. 1½d.; prints and delivery extra. (These prices are subject to the stabilisation levies.) Store and collectors, 7d. to 7½d. per pound at store door, less usual selling charges.

EGGS.—This commodity also is backward, and although fair quantities are now being packed for London, the consignments from country districts are less than was expected, but no doubt will improve with milder weather conditions. Ordinary country eggs, hen or duck, 6d. per dozen; selected, export quality eggs, 1½ozs. and over, to 10d.

CHEESE.—The South-Eastern factories are now increasing their output, and within the next few weeks exporting to Britain will be in full swing. However, in the South-East also the conditions are drier than was hoped, but indications seem to show that an improvement will take place, and already some of the manufacturers there report increasing supplies of milk. New makes, medium and large, 7½d. to 8d.; loaf, 7½d. to 8½d.; semi-matured and matured, 9½d. to 10½d. per lb.

BACON.—A strong winter demand for bacon was experienced throughout the month, and with higher prices ruling for the live hogs, values for all cuts of bacon advanced. Supplies have been sufficient for local requirements, and values are steady. Best local sides, 8½d. to 9d.; best factory-cured middles, 9½d. to 10d.; large, 9d.; rolls, 7½d.; hams, 10½d. to 11d. per lb.; cooked, 1s. to 1s. 1d. Lard, prints, 4s. 6d. per dozen.

ALMONDS.—Fair supplies of almonds came to hand from country districts, and these were readily cleared to local buyers attending the markets from day to day. Prices have continued steady both for shell lines and kernels, and at date were as follows:—Softshells and Brandis, 8½d. to 9½d.; hardshells, 5d. to 5½d. per lb.; kernels, 1s. 11d. to 1s. 11½d. per lb.

HONEY.—A better demand for honey was experienced during the last few weeks, but more especially for prime quality lines both liquid and candied. Dark-colored and inferior flavored lots, however, continue difficult to quit. Prime clear extracted in liquid condition, 3d. to 3½d. per lb.; lower grades, 1½d. to 2½d. per lb.

BEEWAX.—Selling steadily at quotations. 1s. 0½d. to 1s. 1d. per lb., according to sample.

LARD.—Is meeting with stronger demand due to the usual winter consumption, and supplies are short.

LIVE POULTRY.—The catalogues of live poultry submitted throughout July were extensive, but demand was well maintained throughout. Poulterers during the winter months carry only very light stocks, and therefore rely on the markets from week to week for their requirements. This has resulted in a steady and continuous demand, and rates for well conditioned stock were satisfactory. Prime roosters, 3s. to 4s.; nice conditioned cockerels, 2s. 4d. to 2s. 9d.; fair conditioned cockerels, 1s. 11d. to 2s. 3d.; chickens, lower; heavy-weight hens, 2s. 2d. to 3s.; medium hens, 1s. 10d. to 2s. 1d.; light hens, 1s. 6d. to 1s. 9d.; couple of pens of weedy sorts, lower; geese, 2s. 6d. to 3s. 6d.; goslings, lower; prime young Muscovy drakes, 3s. 3d. to 4s. 3d.; young Muscovy ducks, 2s. to 2s. 9d.; ordinary ducks, 1s. 6d. to 2s. 3d.; ducklings, lower; turkeys, good to prime condition, 7d. to 8½d. per lb. live weight; extra prime, to 9d. per lb.; turkeys, fair condition, 5½d. to 6½d. per lb. live weight; turkeys, fattening sorts, lower; pigeons, 4½d. each.

POTATOES.—Local new, 6s. 3d. per cwt.

ONIONS.—New season's, 5s. 6d. per cwt.

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., MAY AND JUNE, 1933.

IMPORTS.

Interstate.

	May.	June.		May.	June.
Apples bushels)	868	1,271	Roots—		
Apples, custard (bushels) . .	2	12	Grass (bags)	8	23
Bananas (bushels)	8,285	7,924	Vegetable (bags)	—	2
Citrus—			Seeds (packages)	41	57
Grape fruit (bushels)	—	4	Trees—		
Oranges (bushels)	—	25	Fruit (packages)	47	27
Passion fruit (bushels)	505	366	Ornamental (package)	—	1
Pears (bushels)	4	—	Wine casks (No.)	2,006	2,637
Pineapples (bushels)	309	859	<i>Fumigated—</i>		
Tomatoes (bushels)	27	2	Citrus—Oranges (bushel) . .	—	1
Nuts—			Potatoes (bags)	—	96
Peanuts (bags)	112	80	Plants (packages)	—	14
Peanut kernels (bags)	23	69	Roots, grass (bags)	8	—
Walnuts (bags)	7	—	Trees, fruit (packages)	46	20
Beans (bushels)	—	42	Wine casks (No.)	5	—
Cabbages (bags)	17	20	<i>Rejected—</i>		
Cauliflowers (bags)	61	8	Bananas (bushels)	2½	—
Potatoes (bags)	1,166	5,896	Potatoes (bags)	—	26
Pumpkins (bushels)	—	2	Case, second-hand (No.) . .	1	—
Swedes (bags)	—	26			
Bulbs (packages)	34	22			
Plants (packages)	95	72			

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC.—*continued*.

OVERSEAS.

(State Law.)

Wine casks (No.) 499 1,424 *Fumigated*—Wine casks (No.) — 161*Federal Quarantine Act.*

	May.		June.	
	Packages.	Lbs.	Packages.	Lbs.
Seeds, &c.	5,130	865,097	2,157	476,660
Canes	102	—	56	—
Cocoanut chests	277	—	570	—
Tea Chests	1,928	—	801	—
Timber	113,235	Sup. ft. 2,167,026	212,655	Sup. ft. 9,314,788

PARAFIELD POULTRY STATION.

NOW BOOKING ORDERS FOR SPRING, 1933.

EGGS FOR HATCHING AND DAY OLD CHICKENS**WHITE LEGHORNS.****EGGS.**—7s. 6d. per Setting of 15 Eggs. Incubator Lots, £2 per 100.**DAY OLD CHICKENS.**—15s. per dozen; £4 per 100.**BLACK MINORCAS.****EGGS.**—7s. 6d. per Setting of 15 Eggs. Incubator Lots, £2 per 100.**DAY OLD CHICKENS.**—15s. per dozen; £4 per 100.Free on Rail,
Salisbury.**DELIVERY.**—CHICKS—August and September.
EGGS—July to September.

Intending breeders should recognise the importance of establishing their flocks with only the very best of stock also, pay particular care to the size of the egg. The future of the poultry industry in South Australia is almost entirely dependent on the export trade; the size of the egg for export is of the greatest importance. The breeding stock at Parafield is carefully selected and every egg set or sold is of a minimum weight of 2ozs., and a large percentage considerably over.

All Eggs and Chickens sold from Parafield Poultry Station are guaranteed to be produced at Parafield.

EARLY BOOKING IS ADVISABLE.

Further particulars can be obtained from the Manager, Parafield Poultry Station, Salisbury, or Poultry Expert, Department of Agriculture, Flinders Street, Adelaide.

C. F. ANDERSON, Poultry Expert.

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC.—*continued.**Federal Commerce Act.*

		May.	June.			May.	June.
		Packages.	Packages.			Packages.	Packages.
England	Apples	40,803	537	Straits	Other Vege-		
	Citrus—			Settlements	tables	15	11
	Oranges...	—	320	Singapore	Apples	295	250
	Grapes.....	6	—		Citrus—		
	Pears	582	—		Lemons ..	52	52
Scotland	Apples	5,052	—		Oranges...	—	57
Germany	Apples	621	—		Pears	3	5
	Citrus—Oranges	—	8		Vegetables..	93	151
India	Citrus—			Netherlands,	Apples	980	1,087
	Lemons ..	2	—	East Indies	Citrus—		
	Pears	20	—		Oranges ..	120	101
Colombo	Apples	1,926	2,561		Pears	150	65
	Citrus—Oranges	25	35		Vegetables..	15	27
Straits	Apples	10	9	New Zealand	Plants	—	19
Settlements	Pears	2	2		Seeds	—	3
	Potatoes	25	25				

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., DURING THE MONTH OF JULY, 1933.

IMPORTS.

Interstate.

Apples (bushels)	643	Bulbs (packages)	24
Apples, custard (bushels)	19	Plants (packages)	72
Bananas (bushels)	5,742	Roots, vegetables (bags)	19
Citrus—		Seeds (packages)	30
Grape fruit (bushels)	3	Trees, fruit (packages)	63
Lemons (bushels)	3	Wine casks (No.)	1,932
Oranges (bushels)	26		
Passion fruit (bushels)	385	<i>Fumigated—</i>	
Pineapples (bushels)	500	Plants (packages)	1
Peanuts (bags)	435	Roots, vegetable (bags)	19
Peanuts, kernels (bags)	84	Trees, fruit (packages)	50
Beans (bushels)	31	Wine casks (No.)	13
Carrots (bags)	139		
Cucumbers (bushels)	10	<i>Rejected—</i>	
Onions (bags)	269	Bananas (bushels)	3
Potatoes (bags)	3,889	Pineapples (bushels)	5
Swedes (bags)	80	Second-hand cases (No.)	1

*Overseas.**(State Law.)*

Wine casks (No.)	4	<i>Fumigated—</i> Wine casks (No.)	4
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Federal Quarantine Act.

	Packages.	Lbs.		Packages	Lbs.
Seeds, &c.	5,327	962,966	Canes	43	—
Plants	8	8 (No.)	Cocoanut chests	215	—
Timber	236,013	4,754,804 sup. ft.	Tea chests	2,515	—

EXPORTS.

Federal Commerce Act.

Packages.			Packages.		
England	Citrus—Oranges.	4,222	Singapore	Pears	5
Scotland	Citrus—Oranges.	1,500		Vegetables	138
Malta	Trees	1	Netherlands E.I. ..	Apples	399
Colombo	Apples	1,441		Citrus—	
	Citrus—Oranges.	35		Lemons	3
St. Settlements ...	Apples	10		Oranges.....	329
	Vegetables	12		Vegetables	16
Singapore	Apples	380	New Zealand	Plants (roses) ..	4
	Citrus—Lemons.	11			
	Oranges.	84			

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department* show the rainfall at the subjoined stations for the month of July, 1933, also the average precipitation for the month of July, and the average annual rainfall.

Station.	For July 1933.	Av'ge for July.	Av'ge Annual Rain-fall.	Station.	For July, 1933.	Av'ge for July.	Av'ge Annual Rain-fall.
FAR NORTH AND UPPER NORTH.				LOWER NORTH.— <i>continued.</i>			
Oodnadatta	0.29	0.22	4.70	Brinkworth.....	0.75	1.75	15.74
Marree	0.29	0.33	5.89	Blyth	1.26	1.85	16.77
Farina	0.10	0.36	6.47	Clare	1.97	3.10	24.53
Copley	0.44	0.46	7.94	Mintaro	2.17	2.88	23.42
Beltana	0.85	0.55	8.54	Watervale	2.32	3.17	26.91
Blinman	1.58	1.07	11.95	Auburn	2.68	2.99	23.98
Hookina	1.09	1.16	11.53	Hoyleton.....	2.00	1.93	17.32
Hawker	1.52	1.24	12.30	Balaklava	1.93	1.67	15.49
Wilson	1.12	1.20	11.78	Pt. Wakefield ..	1.09	1.35	12.93
Gordon	1.00	0.93	10.63	Terowie	0.63	1.33	13.35
Quorn	1.22	1.45	13.29	Yarcowie	0.69	1.41	13.57
Port Augusta ..	0.49	0.72	9.42	Hallett	1.43	1.86	16.40
Bruce.....	1.05	0.94	9.93	Mount Bryan ..	1.56	2.02	16.65
Hammond	0.69	1.05	11.31	Koorunga.....	1.29	2.17	17.89
Wilmington	1.67	2.04	17.43	Farrell's Flat ...	1.23	2.17	18.65
Willowie	1.30	1.27	12.19	WEST OF MURRAY RANGE.			
Melrose	2.32	2.85	22.85	Manoora	1.85	2.13	18.83
Booleroo Centre	1.16	1.62	15.15	Saddleworth ...	1.76	2.26	19.55
Port Germein ..	1.54	1.14	12.43	Marrabel	1.97	2.32	19.84
Wirrabara	1.69	2.39	19.21	Riverton	1.41	2.43	20.75
Appila	1.20	1.55	14.57	Tarlee	1.42	1.97	18.11
Craddock.....	0.69	0.97	10.83	Stockport	1.39	1.83	16.88
Carrieton.....	0.66	1.27	12.31	Hamley Bridge ..	1.49	1.79	16.54
Johnburg	0.43	0.96	10.61	Kapunda.....	1.69	2.33	19.79
Eurelia	0.87	1.28	12.87	Freeling.....	1.57	2.01	17.85
Orroroo	0.75	1.34	13.21	Greenock.....	1.92	2.52	21.56
Nackara	0.46	1.00	11.16	Truro	0.88	2.37	19.96
Black Rock	0.56	1.20	12.41	Stockwell	1.32	2.37	20.12
Oodlawirra	0.55	1.11	11.56	Nuriootpa	1.76	2.51	20.64
Peterborough ...	0.82	1.25	13.21	Angaston	1.49	2.74	22.43
Yongala	1.13	1.46	14.42	Tanunda	1.68	2.65	22.02
NORTH-EAST.				Lyndoch	1.81	3.01	23.45
Yunta	0.42	1.58	8.50	Williamstown ..	2.01	3.71	27.71
Waukaringa ...	0.72	0.57	8.00	ADELAIDE PLAINS			
Mannahill	0.40	0.58	8.28	Owen	1.30	1.82	14.33
Cockburn	0.33	0.61	7.96	Mallala	1.39	1.83	16.56
Broken Hill	0.63	1.71	9.63	Roseworthy	1.63	1.96	17.34
LOWER NORTH.				Gawler.....	1.61	2.20	18.96
Port Pirie	1.54	1.24	13.17	Two Wells	1.34	1.83	15.70
Port Broughton ..	1.34	1.52	13.93	Virginia	1.48	1.96	17.12
Bute	1.20	1.93	15.36	Smithfield	1.72	1.99	17.50
Laura	1.50	2.06	17.91	Salisbury.....	1.37	2.11	18.54
Caltowie	1.43	1.78	16.69	Adelaide	1.75	2.66	21.10
Jamestown	1.28	2.05	17.71	Glen Osmond ..	2.20	3.43	25.96
Gladstone	1.46	1.81	16.29	Magill	1.75	3.20	25.50
Crystal Brook ..	1.04	1.69	15.78	MOUNT LOFTY RANGES.			
Georgetown	1.41	2.07	18.35	Teatree Gully ..	1.97	3.24	27.30
Narridy	0.92	1.71	15.85	Stirling West ..	4.44	6.32	46.91
Redhill	1.12	1.90	16.55	Uraidla	4.25	6.00	43.91
Spalding	1.20	2.12	18.99	Clarendon	2.73	4.29	32.82
Gulnare	1.14	2.23	18.56	Morphett Vale ..	1.94	2.94	22.64
Yaaka	0.95	1.73	15.33	Noarlunga	1.45	2.74	20.34
Koolunga	0.85	1.76	15.40	Willunga	2.18	3.65	26.01
Snowtown	0.97	1.76	15.64	Aldinga	1.42	2.7	20.21

RAINFALL—continued.

Station.	For July 1933.	Av'ge for July.	Av'ge Annual Rain-fall.
MOUNT LOFTY RANGES—contd.			
Myponga	2.82	4.57	29.48
Normanville ...	2.04	2.96	20.69
Yankalilla	2.62	3.15	22.85
Mount Pleasant ..	1.34	3.62	27.18
Birdwood	1.83	3.94	29.15
Gumeracha	2.01	4.31	33.39
Millbrook Res. .	2.23	4.67	34.86
Tweedvale	3.03	5.00	35.89
Woodside	2.54	4.37	32.25
Ambleside	2.53	4.75	34.87
Nairne	2.31	3.75	28.09
Mount Barker ..	2.16	4.40	31.79
Echunga	2.75	4.27	33.15
Macclesfield	2.82	4.08	30.43
Meadows	3.19	4.82	36.12
Strathalbyn	2.02	2.51	19.34

MURRAY FLATS AND VALLEY.			
Meningie	1.10	2.39	18.37
Milang	1.41	1.82	14.92
Langhorne's Ck. .	1.54	1.74	14.76
Wellington	1.13	1.50	14.56
Tallem Bend ...	1.42	1.50	14.70
Murray Bridge ...	0.88	1.38	13.59
Callington	1.66	1.75	15.20
Mannum	0.97	1.13	11.47
Palmer	0.69	1.78	15.43
Sedan	0.44	1.19	12.11
Swan Reach	0.38	0.91	10.60
Blanchetown ...	0.38	0.90	11.04
Eudunda	1.46	1.88	17.11
Sutherlands	0.61	1.03	10.82
Morgan	0.33	0.71	9.20
Waikerie	0.66	0.69	9.66
Overland Crnr. .	0.29	0.78	10.41
Loxton	0.59	0.95	11.59
Renmark	0.68	0.79	10.49

WEST OF SPENCER'S GULF.			
Eucla	0.96	0.87	9.98
Nullarbor	0.74	0.97	8.73
Fowler's Bay ...	3.16	1.69	11.82
Penong	2.77	1.69	12.12
Koonibba	2.80	1.61	11.82
Denial Bay	2.10	1.56	11.36
Ceduna	2.03	1.28	9.95
Smoky Bay	2.13	1.54	10.28
Wirrulla	1.69	1.37	10.08
Streaky Bay	2.53	2.32	14.82
Chandada	2.76	—	—
Minnipa	2.52	1.84	13.68
Kyancutta	1.35	—	—
Talia	2.61	2.30	14.63
Port Elliston ...	3.47	2.64	16.39
Yeelanna	2.91	2.57	15.72
Cummins	3.31	2.92	17.35
Port Lincoln ...	3.24	3.02	19.34
Tumby	2.33	1.98	13.92
Ungarra	2.16	2.49	16.73
Carrow	1.73	1.55	13.08
Arna Bay	2.18	1.48	12.44

WEST OF SPENCER'S GULF—contd.			
Rudall	1.66	1.74	12.19
Cleve	1.98	1.68	14.66
Cowell	1.40	1.03	11.10
Miltalie	1.75	1.36	13.54
Darke's Peak ..	2.07	1.80	14.92
Kimba	1.22	1.49	11.52

YORKE PENINSULA.			
Walleroo	1.17	1.59	13.91
Kadina	1.11	1.95	15.61
Moonta	1.19	1.85	15.05
Paskeville	1.11	1.89	15.46
Maitland	1.21	2.56	19.90
Ardrossan	1.06	1.51	13.93
Port Victoria ...	1.51	1.91	15.40
Curramulka	2.04	2.40	17.87
Minlaton	1.82	2.33	17.80
Port Vincent ...	1.32	1.74	14.40
Brentwood	2.47	2.06	15.45
Stansbury	1.49	2.22	16.81
Warooka	1.68	2.62	17.51
Yorketown	1.77	2.34	16.94
Edithburgh	1.59	2.16	16.34

SOUTH AND SOUTH-EAST.			
Cape Borda	3.70	4.20	24.83
Kingscote	2.21	3.02	19.11
Penneshaw	2.76	3.03	18.85
Victor Harbor ..	2.09	2.98	21.27
Port Elliot	2.07	2.65	19.91
Goolwa	1.89	2.34	17.81
Copeville	0.50	0.96	11.44
Meribah	0.72	1.15	11.10
Alawoona	0.73	1.09	10.02
Mindarie	0.73	1.12	11.91
Sandalwood	0.76	1.34	13.57
Karoonda	0.70	1.33	14.33
Pinnaroo	0.49	1.38	14.54
Parilla	0.47	1.37	13.90
Lameroo	0.51	1.67	16.08
Parrakie	0.78	1.47	14.49
Geranium	1.10	1.79	16.41
Peake	0.69	1.68	16.03
Cooke's Plains ..	0.75	1.69	15.38
Coomandook ...	1.07	2.07	17.11
Coonalpyn	1.07	2.15	17.42
Tintinara	1.09	2.24	18.60
Keith	1.07	2.15	17.87
Bordertown	0.90	2.29	19.22
Wolseley	1.01	2.15	18.41
Frances	1.23	2.41	19.99
Naracoorte	1.28	2.81	22.59
Penola	1.18	3.32	26.06
Lucindale	1.65	3.31	23.16
Kingston	1.45	3.58	24.33
Robe	2.97	4.00	24.64
Beachport	4.15	4.48	26.93
Millicent	3.02	4.35	29.76
Kalangadoo	1.80	4.63	32.03
Mount Gambier ..	1.87	4.11	30.52

AGRICULTURAL BUREAU REPORTS.

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		Aug.	Sept.			Aug.	Sept.
Adelaide	*	—	—	Geranium	*	26	30
Allandale East	†	4	1	Gladstone	*	4	1
Appila-Yarrowie ...	†	4	1	Gladstone Women's	†	11	8
Ashbourne	*	2 & 30	—	Glencoe	*	8	12
Auburn Women's ..	*	25	—	Goode	*	9	6
Balaklava	†	—	—	Goode Women's...	*	9	6
Balhannah	*	—	—	Greenock	†	—	—
Balumbah	*	—	—	Green Patch	†	3 & 31	—
Balumbah Women's	*	2	6	Gumeracha	*	8	4
Beetaloo Valley ...	99	—	4	Hanson	*	1 & 29	—
Belalie Women's ...	†	—	—	Hartley	†	9	6
Berri	*	9	6	Hindmarsh Island..	*	—	—
Belvidere	†	—	—	Hope Forest	†	7	4
Blackheath	†	10	7	Hoyleton	*	17	18
Black Rock	*	1	5	Inman Valley	*	17	21
Black Springs	†	—	—	Jamestown	†	16	20
Blackwood	*	14	11	Jervois	*	10	14
Blyth	*	25	22	Kalangadoo Women's	*	12	9
Booborowie	*	—	5	Kalangadoo	*	12	9
Booloroo Centre ...	*	4	1	Kalyan	*	16	20
Boolgun	*	3	28	Kangarilla Women's	†	17	21
Boor's Plains	†	3	—	Kanni	*	—	—
Bowhill	†	—	4	Kapinnie	*	—	—
Brentwood	*	3	7	Kapunda	*	11	8
Brinkley	*	2 & 30	—	Karoonda	*	9	6
Brinkworth	*	—	4	Keith	*	3 & 31	—
Brownlow	†	—	—	Kelly	†	5	2
Buchanan	†	—	—	Kilkerran	†	8	5
Bugle	*	8	12	Kongorong	*	—	4
Bute	*	17	21	Koolunga	†	—	—
Butler	†	—	—	Koonibba	*	3 & 31	—
Caliph	†	1	5	Koppio	†	1 & 29	—
Caralue	*	2 & 30	—	Kringin	*	7	4
Carrow	*	2 & 30	—	Kulkawirra	†	3	21
Cherry Gardens ...	†	5	2 & 30	Kyancutta	†	1	5
Chilpuddie Rock ...	†	—	—	Kybybolite	†	3 & 31	—
Clare Women's	†	—	—	Kybybolite Women's	136	1	5
Clarendon	†	—	4	Lameroo	*	5	2
Cleve	*	5	2	Langhorne's Creek .	*	2 & 30	—
Collie	*	2	6	Laura	*	5	2
Coomandook	†	25	29	Laura Bay	†	—	—
Coonawarra	95	20	7	Lenswood and Forest			
Coonawarra Women's	133	16	20	Range	*	—	—
Cummins	*	11	8	Light's Pass	*	—	—
Cungena	†	3	7	Lipson	†	5	2
Currency Creek ...	†	7	4	Lone Gum and			
Dudley	†	1 & 29	—	Monash	*	2 & 30	—
Elbow Hill	†	3 & 31	—	Lone Pine	†	—	4
Eudunda	†	7	4	Lowbank	*	2 & 30	—
Eurelia	*	12	9	Loxton	*	11	8
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Frances	*	—	—	Women's	†	3	7
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Maltee	†	3 & 31	—	Riverton	*	14	11
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Marama	†	—	—	Roseworthy	*	—	—
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Meribah	*	—	—	Saddleshworth	*	4	1
Milang	*	12	9	Saddleshworth Women's	†	1	5
Millicent	*	25	29	Scott's Bottom	†	5	2
Millicent Women's ..	†	—	—	Shoal Bay	†	1 & 29	—
Miltalie	†	5	2	Smoky Bay	†	—	—
Monarto South	†	—	—	Snowtown	†	11	8
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Morchard	†	4	1	Springton	†	2 & 30	—
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Mount Gambier	96	11	8	Sutherland	†	3	7
Mount Hope	†	1 & 29	—	Tailem Bend	*	10	7
Mount Pleasant	*	—	—	Talia	*	25	29
Mudamuckla	*	12	9	Tantanoola	98	5	2
Mundalla	†	—	—	Tantanoola Women's	143	2 & 30	—
Mundalla Women's ..	†	3	7	Taplan	†	1 & 29	—
Murray Bridge	†	..	—	Taragoro	*	3 & 31	28
Murraytown	†	—	—	Tarlee	*	8	5
Mypolonga	*	2	6	Truro	*	21	18
Myponga	*	17	21	Tulkineara	*	3	7
Myrla	*	2 & 30	—	Tweedvale	*	17	21
Nantawarra	101	3 & 31	—	Ungarra	*	10	7
Naracoorte	*	12	9	Upper Wakefield ..	†	3 & 31	28
Nelshaby	*	—	—	Uraidla and Summer-			
Netherton	†	2 & 30	—	town	*	7	4
Nunjikompita	*	3 & 31	—	Waddikee Rocks ..	*	5	2
Nunkeri	*	30	—	Waikerie	*	11	8
O'Loughlin	*	14	11	Wallala	104	9	13
Overland Corner	†	2 & 30	—	Wanbi	*	23	27
Owen	102	14	11	Wandearah	*	1 & 29	—
Palabie	†	—	19	Warcowie	98	1 & 29	—
Parilla	†	—	19	Warcowie Women's ..	144	1	3
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Parilla Well	†	15	19	Warramboo Women's	†	—	—
Parilla Well Women's	*	15	19	Wasleys	†	10	14
Parrakie Women's ..	139	22	26	Wasleys Women's ..	†	3	7
Paruna	*	4	1	Watervale	*	21	18
Paskeville	*	1 & 29	—	Wauraltee	*	1 & 29	—
Pata	*	4	1	Weavers	†	14	11
Penola	*	5	2	Wepowie	98	—	4
Penola Women's	140	—	—	Williamstown			
Penwortham	†	3 & 31	—	Women's	†	2 & 30	—
Petersville	*	1 & 29	—	Willowie	*	28	25
Petina	*	26	23	Wilmington	*	15	19
Pibong	*	—	—	Wirrilla	*	5	2
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Ramco	†	—	4	Yandiah	100	11	8
Redhill	†	—	4	Yaninee	†	—	—
Rendelsham	†	5	2	Yeelanna	*	2 & 30	—
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* No reports received during the month of July.

† Held over.

R In recess.

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

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[Branch Secretaries are reminded that the following are exempt from payment of the Annual Bureau subscription:—Life members, Branch Secretaries, members appointed before August 1st, 1930, and new members who reside in the same house as (a) a life member, (b) Secretary, or (c) another member who already subscribes.

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MEN'S BRANCHES.

SOUTH-EASTERN.

COONAWARRA.

May 11th.—Attendance, 31.

DEBATE.—For purposes of the debate, Mr. J. Kain, leader of the affirmative side, moved: "That a settler coming to the Coonawarra district be better advised to become a stockraiser than a fruitgrower." He was supported by Messrs. N. McBain and D. McGillivray. Mr. H. Richardson led the negative side, with Messrs. E. Alder and R. Childs as supporters. Strong cases were made for and against both occupations, some of the points touched on being finance required, future returns, national and economic values of each industry, known and possible diseases, possible scientific discoveries and improvements, home and foreign markets, Eastern trade expansion, prices of world parity, financial outlook and accommodation, cost of living, storage facilities and costs, transportation costs, social status, upkeep, bad debts, stability of markets and purchasers, &c. Figures were quoted by each team, and at the conclusion the adjudicators (Messrs. Reschke, C. Skinner, and C. Provis) declared the result a draw. Mr. Richardson, in moving a vote of thanks to the adjudicators, referred to the interest the Bureau had created in the community by holding its first debate, apparent by the numbers present, particularly of the younger men.

A previous meeting attended by 11 members was held on March 3rd. Mr. H. H. Orchard (District Instructor) attended, and the following points are taken from his address:—*Manuring of Fruit Trees.*—Further experiments should be carried out in the South-East. As regards experiments conducted elsewhere, allowances should be made to some extent. Use of fertilisers should receive more attention from South-East orchardists. Cultivation of soil and consequent growth of vegetation depletes soil of organic matter. This should be replaced. Potash was the most important plant food needed here by fruit trees. Nitrogen might be supplied by artificial fertilisers and stable and green manure. Supplies of stable manure was limited nowadays, but use should be made of all available. Complete manures as made up by various companies were preferable to dressings of the constituent fertilisers, being more economical. The best results on apple trees at Kybyholite came from trees treated with 3lbs. of super and 10lbs. of lime. Mr. Orchard referred to negative results obtained at Blackwood and Light's Pass from apricot trees treated with super and positive results obtained with sulphate of ammonia. Green manures supplied a local deficiency of humus. Leguminous crops were best for this; probably best of all was field peas. Another favored crop was *Purple Oat Grass*. The green manure crops should not be growing when trees were in active growth, but ploughing under must be done before that time. Advantage should be taken of the first early rains to get them sown. Alternate rows could be planted, leaving clear ground for gathering fruit, depositing prunings, &c. Top-dressed natural grasses and clovers ploughed under could to a certain extent take the place of green manure crops. As regards artificial fertilisers for this district, Mr. Orchard recommended a complete manure containing 5 per cent. nitrogen, 4.5 per cent. potash in water soluble form, and 28 per cent. phosphate at the rate of 6lbs. per tree, applied in spring.

A special meeting of about 30 members and visitors was held at Mr. E. L. Gaffney's yards on April 1st. Mr. McMillan, veterinary surgeon, of Mount Gambier, gave a practical demonstration and lecture on veterinary work on dairy cattle. (Secretary, J. Kain.)

MOUNT GAMBIER (Average annual rainfall, 30.52in.).

June 9th.—Attendance, 10.

SHEEP BREEDING.—Mr. K. Macrow read the following paper:—“The first sheep to be brought to this country were the native Cape fat tail sheep from South Africa, consisting mostly of tail with negligible wool. But the introduction of the Spanish Merino, which developed so wonderfully in its new environment, proved to be the foundation for Australia's pre-eminence in wool production, a pre-eminence that Australians not directly concerned are rather prone to undervalue and lose sight of. Captain Waterhouse has the distinction of having brought the first Merinos to Australia—29 of them. He landed in New South Wales in 1789 and was immediately offered £15 15s. per head for them, and subsequently the Merino figured in the success of all the early pioneers and squatters in their search for and settlement of good pastures. One phase of the improvement from that time in the wool-carrying capacity of the Merino is of more than passing interest, namely, the intense development of body wrinkles that went on from 1890 until about 1907, finally evolving a type of sheep after the style of a concertina. This was done on the principle that the more skin the greater the weight of wool produced, which was borne out by results. As an instance, a plain-bodied ram sold in 1874 for 680 guineas cut 12lbs., whereas one of his progeny, a mass of folds, sold in 1907 for 1,000 guineas, and cut 36lbs. of wool. However, this period (1907) saw the end of this type, as the failing constitution, lack of wool quality in the folds, and many other disadvantages, resulted in the modification of wrinkles, which are still retained within certain limits into the Merino of to-day. The conditions of climate and pasture and the type of country on which they have been bred for centuries, has stamped them with certain characteristics of wool and carcass in wide variation to each other. However, they can be separated under three groups—long wools, short wools, and mountain breeds. Of the long wools, the history of the Leicester is of most interest in that Robert Bakewell—whose name must remain honored among sheep breeders for all time—was the first man to set about improving the sheep of his country, and it was with the Leicester that he set to work in the year 1755. Bakewell's fundamental reasoning was that ‘like begets like,’ and he came to realise that certain desirable properties of parents mated together could be transmitted to their offspring until a fixed type was effected, and the rapid improvement he attained in early maturity, ability to fatten, symmetry of form, and utility of carcass was nothing short of marvellous, and almost every breed of sheep owes its improvement in part to Bakewell's Leicesters. Not only this, but Bakewell's methods proved the foundation of selective breeding of all livestock the world over, and interesting it is to realise that prior to this breeding was left entirely to Nature, resulting in the survival of the fittest and development of means to withstand the particular conditions under which stock had to exist. Other long wools used in Australia are Lincolns, Border Leicesters, and Romney Marsh. The short-woolled breeds, to which all the Down breed belong, are distinct from the long wools in their smaller, better mutton quality carcasses and finer wool. In this class the Southdown was the foundation breed, the others being developed by crossing. It is not within the scope of this paper to deal at length with each of these breeds, much as there is of interest in them all. Those belonging to the group seen in Australia, being used mainly for export lamb, comprise Suffolk, Southdown, Dorset Horn, Ryeland, Shropshire, and a few Hampshire. To the third group—mountain breeds—such sheep as the Cheviots, black-faced, and many others having no significance to sheep breeders in Australia, being breeds that are wrapped up in the conditions of the Old Country. In an effort to retain the valuable fleece of the Merino and yet develop a sheep with better mutton capacity and generally more suited to rich pastures, two breeds, the Corriedale and the Polwarth, have been established in Australia. The Polwarth was originated by the late Mr. R. V. Dennis, his objective being a fixed type of comeback sheep suited to cold country and producing a 58 to 60 quality wool. Mr. Dennis made use of the pure Lincoln, the line of breeding adopted being the mating of pure Merino and Lincoln, the ewe progeny of which cross were put back to Merino and the progeny of this cross were mated together for five generations, when they became eligible for inclusion in the stud book. The Corriedale, while originating in New Zealand, has long been established in Australia. It is a half-bred long wool Merino sheep. Mr. Jas. Little experimented, while managing a property known as Corriedale, in New Zealand, with crossing Lincoln and Merino sheep in 1866, and later many half-bred flocks were started, Border Leicesters, Romneys, and Lincolns all being

used, though the Lincoln-Merino strain was eventually most favored, a society even being formed with a stipulation that only flocks of pure Lincoln Merino blood should be registered. In spite of its mixed origin, the Corriedale is now recognised as a definite breed, with very desirable characteristics for grazing on the more settled areas, though the desired characteristics are taking longer to fix, as the crossing of two opposites, the reversions or throw-backs being more common than where there is domination either side. In the establishment of any fixed breed or type of livestock by crossing there are certain laws of breeding, without some knowledge of which success must be limited. Take, for example, a Tamworth-Berkshire cross of pigs; the first litter bears the characteristics and markings of the parents in a blended form. But in mating these crossbreds together, anything seems to happen—some marked like Berkshires, some like Tamworths, and some cross. However, by the aid of experiments, strangely enough made in the breeding of tulips centuries ago by an Austrian monk named Mendel, these variations can be controlled, anticipated, and more or less understood, this Mendel's law showing that similar results are obtained in cross-breeding both in plant life and livestock. It is only in comparatively recent times that Mendel's work has been understood and applied. Cross-breeding results either in a blending of such as red to white and producing roan, as in Shorthorn cattle, or in one breed being dominant to the other, as we find in Yorkshire-Berkshire. The latter cross results in all white pigs, but when these whites are bred they break into 75 per cent. white and 25 per cent. black. The white of this cross when mated again break into certain definite proportions of black and white, some of the white remaining pure and showing no more black when bred. But the 25 per cent. black of the second cross are recessives; that is, bred pure black with no trace of white ever appearing, though they come of all white parents. What can be understood from this in a general way is that where blending does not occur, one breed is dominant to the other, showing its dominance in color, and in further breeding resulting in a proportion of pure of either side, though the dominant breed or characteristic gains the majority. While I may not have made this aspect of breeding clear, and it is hardly possible in so few words, it nevertheless may serve to show the difficulty of fixing a breed where cross-breeding results in blending, but where there is dominance on either side the dominant characteristics can easily be retained and fixed if the dominant animal can be recognised. Inbreeding is another intriguing subject which there is no time to do justice to, but while it is a practice that is generally condemned, it has been used to obtain some magnificent animals. Experiments in consistent close breeding of pigs resulted in declining numbers in litters until finally only one pig was dropped, which failed to breed, thus ending the experiment, though when mated to outside blood it bred quite normally. Telegony is another subject allied to breeding that has interesting features. It is the name given to the question whether a dam's future breeding is impaired by being put to a sire of another breed. For example, say Merino ewes having been bred to Merinos the previous year are mated to Suffolk rams and then put back to the Merinos the following, their lambs show Suffolk markings. There are conflicting opinions on the question, a few noted breeders of horses and dogs claiming that it is so. However, scientific investigation has never discovered any evidence in support of the theory, the claims referred to probably being examples of reversion to type. In conclusion, I should like to give you as my opinion that with regard to fat lamb breeding in this district, if it were possible by some means to confine breeders to the use of one particular breed of ram, one approved of by buyers

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or those with a definite knowledge of overseas market requirements, it would result in large consignments of an even type being shipped from the district, thus obtaining a reputation which would be the means of higher prices for all."

NOTE.—In the report of this Branch for the month of May there was an error. The annual social was stated as being held by the Crop Competition and the Bureau. To this should have been added the Agricultural and Horticultural Society, who were associated on this occasion.

TANTANOOLA.

May 13th.—Attendance, 14.

At the previous meeting Mr. G. Altschwager distributed poisoned grain to members for killing sparrows. Several members reported very satisfactory results.

The meeting took the form of a Question Box. Mr. G. Altschwager asked: "What is the best way to make a ewe take to a lamb if it had left it?" The general opinion was to make a small yard with hurdles and place them both in it. Mr. J. Chant found that a little oil of aniseed sprinkled on the lamb would sometimes induce the ewe to mother her lamb. Mr. J. Chant asked if it would be harmful to sow rye grass with oats. He was advised not to sow them together. The rye grass seed should be sown on top of the ground, because it should be sown very shallow. Mr. L. Osborne asked if it was necessary to always pickle wheat and barley. The general opinion was that it was safest to always pickle. (Secretary, H. Kennedy.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Allandale East .	7/7/33	17	Address—W. H. Downes	J. Laslett
Mundalla	6/7/33	17	Question Box	A. Ross
Rendelsham	1/7/33	11	Annual Meeting	F. White
Mount Gambier	14/7/33	17	Annual Meeting	G. Gurry
Kybybolite	4/7/33	26	Question Box	A. Shepherd

UPPER-NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

WARCOWIE (Average annual rainfall, 11.42in.).

June 6th, 1933.—Attendance, 19.

Meeting was held at Mr. A. F. Crossman's residence. Mr. R. Bairstow read the following paper on CEMENT FLOORS.—*Putting Down a Cement Floor.*—First of all the space for the floor should be levelled off, any holes filled up, and rammed down. Then wet the ground and leave it stand for a few hours, preferably to stand overnight. This prevents the floor from caving in and cracking. *The Concrete Mixture.*—If the gravel is clean a good mixture is 8 to 1; if inclined to be dirty, 6 to 1 would be best. Mix the gravel and cement over about three times dry, and about the same wet. This body should be put down at once. Most cement floors are put down in blocks about 4ft. square. This is done in case a crack starts. If it does it will stop instead of going right across the floor. A fair thickness is about 2in. to 3in. For a top dressing 3 of sand to 1 of cement is a good mixture. This should be put on about $\frac{1}{2}$ in. thick and worked over first with a wooden and then an iron floating trowel. A groover is used in between the blocks. The more the cement is worked the better the surface will appear." (Secretary, A. Crossman.)

WEPOWIE (Average annual rainfall, 12.46in.).

May 30th.—Attendance, 13.

SHEEPSKINS.—Paper read by Mr. D. Crocker:—"A serious loss is sustained by many farmers and graziers through lack of necessary attention to sheepskins. Instead of being carefully treated, dried, and marketed in the best condition and in the most profitable market, they are left to dry on fences or rails where they are liable to damage by dogs or cats and loss in weight and condition by the sun and weather. When stacked at a later date in a shed, treatment is not always given to prevent weevil attack. When it comes to marketing they are very often disposed of to the first dealer who comes along to the property who usually allows a liberal margin

for consigning and trade profit. The skin should be removed carefully to avoid cutting or flesh being left on the pelt, then placed in a shed after killing is finished, spread out wool side down and shortly after painted with an arsenic wash to prevent damage by weevil. When reasonably dry the skins are stacked wool side up putting one skin on top of the other. The drying process if carried out in the shade, together with the stacking of skins, results in a greater weight being retained in the skin, also better condition and quality. The arsenic wash is very cheap and made as follows:—Boil one dessertspoonful each of arsenic and washing soda in one pint of water, then add water sufficient to fill an ordinary seven pound treacle tin. The arsenic wash can easily be applied to the skin with a brush.” (Secretary, E. Roocke.)

Other Report Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Eurelia	20/7/33	24	Address. W. J. Spafford..	E. Wall

MIDDLE-NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

BEETALOO VALLEY (Average annual rainfall, 23.50in.).

June 5th.—Attendance, 9.

CARE OF FARM FLOCK.—Mr. J. Fradd read the following paper:—“For this district I favor the Merino; it is a district that will grow a medium wool of good quality, and in addition the Merino is more easily controlled than are the English or mutton breeds. If a flock is kept for breeding, endeavor to procure the best class of sheep

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that finances will allow. Large framed, plain bodied ewes of good constitution should be kept, using rams of similar type, with soft clean faces and wide open horns. The man who puts like to like to get like will usually come out on top, whether he wishes to breed fine, medium, or strong wool. Shearing is a good time to class the flock, marking off any sheep that do not conform to the desired type. Quality of wool, conformation, constitution, hairy breach, faulty mouth, &c., should be kept in mind when classing. It is desirable to dispose of any sheep not required, especially young sheep, before grass-seeds get troublesome. Peas can be sown if necessary for fattening the lambs. If possible, have the ewes lamb when a supply of green feed can be expected. The ewe's milk is poor in quantity and quality on dry feed and liable to cause impaction amongst lambs. On the farm where paddocks are small, 2 to 2½ per cent. of rams should be ample. Under normal conditions a ewe comes in season every three weeks; a joining of six weeks means that each ewe is on at least twice, so that a few days over the six weeks is ideal. Ewes should be crutched out three or four weeks prior to lambing; at the same time shear wool from around the udder to give the lamb a better chance to find the teat. Crutching and jetting help to minimise fly trouble, but any sheep that are struck should be attended to at once. Give ewes well watered and well sheltered paddocks in which to lamb. All water supplies must be kept very clean; sheep will not drink unless very thirsty if water is at all fouled or dirty. Maiden ewes, when possible, should be lambed down with the older ewes; the old ewes have a steadying effect on the young ones, who are usually timid and easily frightened when lambing, and will sometimes bolt and leave their lambs. Ewes should be gone through as often as possible when lambing, and any having trouble assisted. It is a good practice to sow an area with green feed for the ewes and lambs each year, thus ensuring earlier feed and a good start for the lambs, which is most essential. Tailing can be done when lambs are from four to six weeks old, providing the weather is not frosty. Before lambing commences, baits should be laid for foxes and continued throughout the period of lambing. This can be done by dragging a trail and laying baits treated with strychnine; also any lambs that die can be poisoned. Eagle, hawks and crows are sometimes troublesome and should be destroyed when possible." (Secretary, B. Giddings.)

YANDIAH.

June 9th.—Attendance, 14.

THE FARM CLIP.—Paper contributed by Mr. A. Borgas:—"Sheep are a popular sideline on the farm, and the clip is recognised as a handy asset during the year, but farmers do not pay enough attention to the handling and classing of it. Few farmers shear their own sheep, and it is essential that the services of good shearers be obtained who can handle sheep carefully and shear quickly and cleanly. Much depends on the throwing of the fleece on the table. When this is correctly done a fleece can be quickly skirted, and any soiled pieces removed. The back of the fleece is usually dry in appearance and breaks very easily, and when not removed reduces the value of the whole of the fleece to the price of that of the poorer quality. The fleece with the back removed should then be folded and rolled from the tail to shoulder, thus showing the brightest and best quality of the fleece. All bales should be neatly marked and numbered with stencil plates; fleeces, bellies, and lambs' wool being placed in separate lots. It is advisable with small lots to ask the brokers to reclass, for which they make a small charge. The farm clip is then classed by experts, interlotted with wool of its own class and then brings the highest possible price. Farmers should take great care with the clip and they will find that it will help to raise the price of wool." (Secretary, F. Jettner.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Appila	7/7/33	14	Annual Meeting	E. Wurst
Murraytown ...	12/5/33	8	Address—J. O. Hatter ..	E. Pitman
Murraytown ...	8/7/33	12	Annual Meeting	E. Pitman

LOWER-NORTH DISTRICT. (ADELAIDE TO FARRELL'S FLAT.)

NANTAWARRA (Average annual rainfall, 15in.).

May 6th.—Attendance, 9.

THE AGE OF THE HORSE.—Mr. W. Starkey read the following paper:—“The foal at birth has no teeth, but they can be plainly seen and soon come through the gums, two in the top and two in the lower jaw. This refers to the incisors, or front teeth, as they are easily seen; the pre-molars can be felt under the gums. At six months four incisors will be found in the top and four in the bottom jaws, the corner incisors in the top jaw will have made their appearance, and when the jaws are closed the centre incisors are in full contact, while those next to them are not quite down and the corner ones are just showing in the upper jaw. At six months milk molars are fully ‘down’ or developed, these are 12 in number, three each side of the top jaw and three each side of the lower. At one year the incisors number six in the top and six in the bottom jaw, the corner incisors do not quite come into contact, and the ‘marks’ are present in all teeth. At this age the first molar appears through the gum, the first pre-molars are also showing (wolf’s teeth), sometimes the molar will come a little sooner, but these marks will ensure the age within a month or two. At two years—when viewing the mouth from the front—the corner incisors can be seen, they are much flatter and the marks have not quite disappeared in all the incisors of the lower jaw, though they are distinct in the upper. At two years the second molars come through, making 16 teeth (incisor and molars) top and bottom. At three years there are two permanent incisors in the top and bottom, and it is advisable to have a look at a young horse’s mouth

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1934 CALENDAR 1934											
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occasionally to see if the milk teeth are not interfering with the permanent teeth. From this age until the horse has all his teeth it is a good plan to give them a look over now and then. At four years the centre incisors are level, the next two are down and are level with them, or nearly so, the corner milk teeth are well worn and the upper ones are ready to be pushed out, and the tushes show through about this time. At this age the molars are somewhat uneven, because the first pre-molar is present, the fourth permanent pre-molar has come, and the third molar is just appearing. Watch the manger about this time for crowns, and if the horse should fall back, have a look into his mouth to see if one of the crowns has joined between the back teeth, so that he cannot close his mouth properly. At five years the horse has the best mouth, he has all his teeth and they are level, though the corner incisors have not come into use on their inner edge. If the teeth are viewed from the side at this age, it will be noticed that the neck of the corner incisor is about the same as the table of the tooth; also notice the marks are going from the centre low incisors. At six years the centre incisors are becoming long when viewed from the front, the marks have gone in the centre incisor and are getting small in the next pair, and the corner incisors in the top jaw—when viewed from the side—become almost square, being a little narrower at the gum than they are on the table, and the side nearest to the tushes about the same length as the width at the gum. The marks are quite plain in the lower corner incisors though they are level—the centre with the outside. In some cases it will be found that the incisors next the centre have lost the marks, when this is the case check up the upper jaw. The inner edge of the corner incisors is worn level with the outer edge, and the central enamel of these teeth forms a ring, and the face or table of the centre incisors tends to the oval form. At this age the centre incisors are slightly whiter than at five years. At seven years the neck of the upper corner incisor shows a marked decrease in width, and the corner incisor in the lower jaw is well in advance of that of the upper—except in the case of a parrot-mouthed horse. Viewed from the front, the teeth have increased in length and the necks decreased in width. When looking at the tables of the lower teeth, all marks will have disappeared except those in the corner incisors; the marks in the upper are more oval and the centre ones smaller. At eight years the horse loses the 'marks,' though one can make a very good guess by studying mouths of horses whose ages are known. At this age there will be noticed a well-marked decrease in the width of the neck of the upper incisors, and there will be a swab spot on the bottom corner incisors. There will also be noticed a groove forming under the gum of the upper corner incisors, the grooves in the other teeth being well defined. At nine years the upper corner incisors have a well-defined hook formed by the bottom corner incisor, caused by the teeth growing out, the groove will show in the neck of the top corner incisor, and the grooves in the other teeth are well down and starting to leave the gums. At 10 years the groove on the upper corner incisor is well marked, and the increased length of crown will be noted as well as a decrease in the width of the neck of the corner incisors of the upper jaw. When viewed from the front, the top corner incisors are well in evidence, and the lower centre incisors are becoming narrower. These ages are only approximate, because after eight years the marks disappear. As the horse grows older, the age can be judged by the length and narrowness of the incisors. At 11, 12, 13, 14 the angle becomes more acute in the incisors until 20-21 years, when the incisors become very long, and in some cases they may be seen under the lips. As the good old servant's age goes on the other incisors start to part company." (Secretary, W. Hamdorf.)

OWEN.

May 8th.

SHEEP ON THE FARM.—Paper contributed by Mr. J. Harkness:—"Most farmers in this district keep a flock of sheep as a side line, and although, with present prices for the products of a flock, fortunes cannot be made, it is the little profits that come from these side lines that help to keep the farmers on the land. With sheep constantly grazing on the paddocks, the land is enriched by their droppings. Thus we are turning the grass, which would otherwise be burnt, into plant food which has a beneficial effect on the subsequent wheat crop. The flock is a source from which the farmer gets his meat supply; at the end of the year, when the balance-sheet of sheep dealings is compiled, one should not forget to credit the flock with the meat bill it has saved. Sheep in this locality are kept mainly for the dual purpose of producing wool and lambs. Being close to the market, lambs can be dispatched with very little loss of condition, and with an ideal climate the district is admirably suited for this side line. Take a ewe that rears a lamb—the lamb returns considerably more than the fleece, and this fact induces a preference for a flock with lamb-raising qualities. It is not always possible to raise a lamb from every ewe, so that one would be inclined to give preference to a ewe that, should she lose her lamb, will shear a fleece that will compensate for her keep. The crossbred ewe undoubtedly makes the best and most prolific mother, but her wool is less valuable than that of the Merino. An argument that is often raised against crossbreds is that they have no respect for fences, but keeping

fences in repair is part of farm work. Our flocks consist of about 60 per cent. cross-breeds, and we do not have a great deal of trouble in this respect. The progeny of a crossbred ewe is stronger at birth than that of the Merino, and is better able to withstand a cold snap. They mature quicker, and therefore often help the farmer to obtain an early price, which is often the best. When this ewe is culled—if in good condition—she will provide a big carcass of first-class meat, which commands a good price in the market. The Merino ewe is essentially a wool producer, but if properly mated will produce quite a good lamb. In mating for lamb-raising, do not forget that of the two parents the influence of the sire predominates. Therefore, it is most necessary to use good rams. Although the offspring of the Merino is not the quickest maturing, an extra three weeks or so in the paddock will produce a good export lamb. The best type of ewe for this district is a crossbred that will shear a good fleece, such as the Leicester-Merino. At the same time the large framed, robust Merino is not undesirable. Shearing is carried out at between the end of winter and the falling of grass seeds. This is a convenient time for a general overhaul of the sheep, such as trimming toe nails, removing ingrowing horns, &c. The ewes are usually mated about mid-November, this brings the lambs in April when green feed can be expected. Should there be a dearth of green feed, hand feeding is resorted to, chaff and oats being usually used. All our rams are of the Dorset Horn breed, they are of the low set type, and leave nice, stocky lambs. In most breeds breeders are concentrating on producing animals low set with compact body. Rams produce lambs more or less of their own type, and the export trade demands a short-bodied, well-quartered carcass. Crutching is usually done two or three weeks before the earliest lambs arrive, and the opportunity is taken to clear away any wool that is interfering with the sheep's vision, also to trim the feet, &c. The lambs are tailed on a bright, sunny morning, or when the temperature is mild. This gives the lamb a chance to get over the shock of the operation before nightfall. Lambs are considered old enough at the age of 10 days, and if done at this age the lamb does not receive a severe setback. The knife is used for tailing, and a little disinfectant is applied to cuts. Last year the lambs were kept until they dressed about 40lbs. This did not suit the export trade, but financially it was much better than accepting the higher price per lb. of export weights. The flock yielded a bigger cheque, while with the abundance of feed available it did not cost any more for the extra weight. After getting most of the lambs off to market, the ewes are usually mouthed. Those with teeth wide apart, or worn down in centre, are culled, and branded with a cull mark in a conspicuous place. These culls should be marketed as soon as they are fit for meat. Sheep that have been struck with flies are caught and the wool on and around the infected part is clipped as short as possible and dressed with kerosene and uzona. When flies are very troublesome the sheep should be yarded occasionally and all wet wool clipped from around the tails." (Secretary, M. Freebairn.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Wasleys	13/7/33	25	Address—W. Bennett, B.V.Sc.	C. Currie
Lyndoch	4/7/33	18	Annual meeting	J. Hammatt, Williamstown
Sutherlands ...	6/7/33	29	Address—W. C. Johnston	E. Schiller
Owen	12/6/33	16	Annual Meeting	M. Freebairn
Owen	10/7/33	19	Address, W. Bennett, B.V.Sc.	M. Freebairn
Lone Pine	10/7/33	19	Discussion	T. Fromm
Penwortham ...	29/6/33	10	Discussion	A. Jenner
Gawler River ...	3/7/33	9	Address—J. H. Dawkins	K. Roediger
Nantawarra ...	6/7/33	6	Discussion	S. V. Herbert
Redhill	4/7/33	15	Address—T. H. Torr ...	S. Pengilly
Rosedale	5/6/33	12	"Seeding," — Heinjus ...	S. Sinecock
Rosedale	3/7/33	20	Question Box	S. Sinecock
Snowtown	14/7/33	13	Annual Meeting	A. Hocking
Greenock	10/7/33	45	Annual Meeting	A. Schubert

YORKE PENINSULA DISTRICT.*Other Reports Received.*

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Paskeville	9/5/33	13	Address—J. P. Pontifex .	J. Prouse
South Kilkerran	4/7/33	9	Annual Meeting	R. Hasting

WESTERN DISTRICT.**WALLALA.**

May 10th.—Attendance, 8.

HORSES.—Paper read by Mr. H. Brown:—"The Clydesdale is the most suitable breed of horse for farm work. The sire should be of pedigree stock, well ribbed up, and carrying a fair amount of fine hair on the legs. It is always advisable to put the best mares to the horse. Stint the mares when they are young, because they are more capable of rearing a foal than an old mare, and they develop into better brood mares. A mare can be worked up to within a week or two of foaling, so long as care is taken not to give the mare any heavy work. Mares should be put to the horse in time to foal in August. Allow the foal to run with the mother until it is nine months old. The mare should be well looked after while suckling her foal, or her supply of milk will soon go off, and a stunted foal will result. Once the foal is weaned it is sometimes turned out in the paddock to fend for itself. This is a mistake. The foal should have every care, because later on it will have to replace one of the older horses on the farm. Young horses should be handled when they are 2½ years old. Care should be taken when handling them. On no account should they be hit or knocked about, they do not forget ill-treatment, and are likely to be more troublesome. Catch the young horse and tie him up over night, and in the morning he will usually lead. Do not keep the colt tied up too long without feed and water. Put the young horse in the wagon, here he will be properly under control, and there is not much chance of him getting tangled up in chains. A young horse should not be worked for more than two or three hours for a start. A good fitting collar should be selected for the colt, and if the shoulders are washed with hot water after he is unharnessed there will be little danger of sore shoulders." (Secretary, C. Zippell.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Kelly	13/5/33	19	" Good Farmers v. Instructors," W. Hutchens	I. Grund
Kelly	8/7/33	18	" Gas Producers," R. Mayfield and J. Bienke	R. Mayfield
Balumbah	10/5/33	17	" Marketing Wheat," F. Griffen	—
Palabie	10/6/33	13	Discussion	L. Miller
Kyancutta	6/6/33	12	Discussion	J. Dyke
Wudinna	10/6/33	10	" Cost of Wheat Growing," A. Johnson	D. Duguid
Petina	8/6/33	—	Address—C. Goddard ..	W. Stone
Petina	27/6/33	—	Address—W. H. Brownrigg	W. Stone
Yaninee	19/6/33	23	Addresses—C. Goddard and W. H. Brownrigg	J. Boehm
Maltee	6/7/33	11	Annual Meeting	E. Schwarz
Chilpuddie Rock	5/7/33	14	Debate	H. Brown
Palabie	7/7/33	12	Annual Meeting	C. Rashleigh, Wudinna
Smoky Bay	1/7/33	12	Address—W. H. Brownrigg	K. Harrison
Wudinna	14/7/33	10	" Sheep Management," F. Johnson	D. Duguid
Lipson	8/7/33	7	Discussion	M. Barraud
Laura Bay	11/7/33	20	Annual Meeting	W. Edson
Cungena	12/7/33	150	Annual Social	A. Voumard
Butler	13/7/33	21	Address—H. D. Adams .	W. Tilly
Miltalie	13/7/33	15	Annual Meeting	G. Smith

EASTERN DISTRICT.
(EAST OF MOUNT LOFTY RANGES.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Kulkawirra	6/6/33	10	Address—R. L. Griffiths .	H. J. Elliot, Karroonda
Kulkawirra	11/7/33	9	Annual Meeting	H. J. Elliot, Karroonda
Coomandook ..	30/6/33	11	Address—H. B. Barlow .	W. Trestrail
Netherton	5/7/33	8	Address—M. Aird	C. Wilkin
Ramco	3/7/33	11	Annual Meeting	J. Odgers
Overland Corner	4/7/33	20	Annual Meeting	H. Löffler
Taplan	12/7/33	14	Address—Mr. Stannard	P. Hodge
Marama	12/7/33	10	Annual Meeting	T. Hinkley
Parilla Well ...	20/6/33	—	Address—R. L. Griffiths .	E. Slater, Pinnaroo
Parilla Well ...	4/7/33	—	"Milk Testing," J. Johnston	E. Slater, Pinnaroo

SOUTH AND HILLS DISTRICT

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Springton	3/5/33	12	Discussion	E. Brokate
Currency Creek	10/5/33	17	Address—R. Hill	D. Jeff Gordon
Currency Creek	10/7/33	8	Discussion	D. Jeff Gordon
Cherry Gardens.	1/7/33	16	Paper from <i>Journal</i>	A. Stone
Hope Forest ...	3/7/33	25	Address—M. Aird	E. Muldoon
Clarendon	24/6/33	—	Annual Social	T. Brooks
Springton	7/6/33	9	"Currant Drying," W. Roesler	E. Brokate
Springton	5/7/33	20	Demonstration—Vacuum Oil Co.	E. Brokate
McLaren Flat ..	6/7/33	—	Annual Meeting	P. Wait
McLaren Flat ..	19/7/33	17	Visit to Blackwood Orchard	P. Wait
McLaren Flat ..	21/7/33	—	Annual Social	P. Wait
Macclesfield ...	20/7/33	11	"The Separator," K. Bowen	H. Ross
Frayville	6/7/33	18	Question Box	V. Eichler
Balhannah	14/7/33	21	Annual Meeting	C. Grasby
Hartley	5/7/33	17	Annual Meeting	D. Harvey
Port Elliott ...	15/7/33	14	Annual Meeting	J. Colebatch, Victor Harbor
Mount Barker .	17/7/33	—	Addresses—G. Jacobs and H. Wicks	P. Wise
Belvidere	20/5/33	14	Address—H. Eckert	M. Pearce
Scott's Bottom	3/6/33	6	Discussion	E. Atkinson
Scott's Bottom	8/7/33	—	Discussion	E. Atkinson
Blackheath	13/7/33	9	Annual Meeting	E. Paech

USES FOR WOOL AND SHEEPSKINS IN THE FARM HOME.

[By MISS ELLIE CAMPBELL, Dip.Dom.Econ., Inspector Domestic Arts,
Education Department.]

On the farm where numbers of sheep are handled during the year there is very often a quantity of wool and pelts that are difficult to turn into cash, for freight is high, and the return is not always remunerative. Thus the question, "What can be done with them?" is often discussed. But it is surprising how many useful and comforting articles can be made from surplus wool and sheep skins, and great is the feeling of satisfaction when the finished articles are appreciated and praised. It is worth all the thought and effort put forward to use the material on hand.

There are two types of articles that can be made, one in which the wool detached from the skin is used, and the other where the skin is tanned and used with the wool on the leather.

TO PREPARE THE WOOL FOR USE.

When wool only is to be used it is removed from the skin with sheep shears or scissors, and has then to be cleansed and freed from yolk.

Wash the wool in hot soap suds—several washings may be necessary. Wash by moving and dabbling the wool in the soapy water, being careful not to tangle the staples, otherwise the wool will have to be teased, and the process is tiring. Wash thoroughly until there is no yolk or stickiness left in the wool, then rinse under running water (if possible) until the water runs clear. When dry, shake well to remove any burrs and to free the tips of the wool. The wool should be white and fluffy, and may be stored in calico bags or spare pillow cases until sufficient wool has been cleansed for the task contemplated. The foregoing method has been used successfully by some housewives, but the system adopted and recommended by Mr. Henshaw Jackson is as follows:—

"The first and essential requirements are soft water and good soap, and secondly, vessels of sufficient capacity to soak and rinse off the wool, for which three large washing tubs, preferably of oval shape, will be found suitable.

"The method is to tease or break up the wool so that it is in an open and loose condition before placing it in the washing liquor, then fill the first tub three parts full of hot water, about 140° F., and mix in with it ½ lb. of good soft soap to make the scouring liquor. Soak the wool in this for about 20 minutes, working it about in the liquor occasionally with a small garden fork; then fork it through the other two tubs, which should be three parts full of hot water, about 120° F., and contain a little soap, say, 2ozs. each. It will be better if the wool can be squeezed through a wringer or mangle between each wash.

"As the wool is liable to mat or rope if handled when wet, care should be taken when agitating the wool in the tubs that it be not lifted out of the water, and when transferring from one tub to another, lift it on the fork in one mass, a little at a time and drop it into the water without too much handling. To get the best results, each separate forkful should be 'swished' or worked through the two rinsing tubs by itself, returning to the first tub each time for a fresh forkful.

"A good scouring soap can be made by dissolving 1lb. (one pound) of caustic soda in three pints of water. Then melt 6lbs. of tallow free from salt, and when both are cool pour the soda liquid into the melted tallow, stirring it well at the same time. Let it stand overnight, and when cool (about blood heat) cut up the soap thus made and boil 10lbs. of it in 10galls. of soft water and add 1lb. of caustic soda; this will give a good soft soap."

MATRESSES FOR BEDS.

For perfect rest and relaxation whilst sleeping, it is necessary to have a firm mattress; one that will not go into a trough when being used, although it must be very comfortable and restful to lie upon; a wool mattress (Plate I., Figure 2), will fill all these requirements. It will be as cosy, yet not over-heating, as a feather mattress. With careful tabbing there will not be the great expenditure of exertion to smooth the mattress when making the bed each day, as the tabs keep the filling in place.

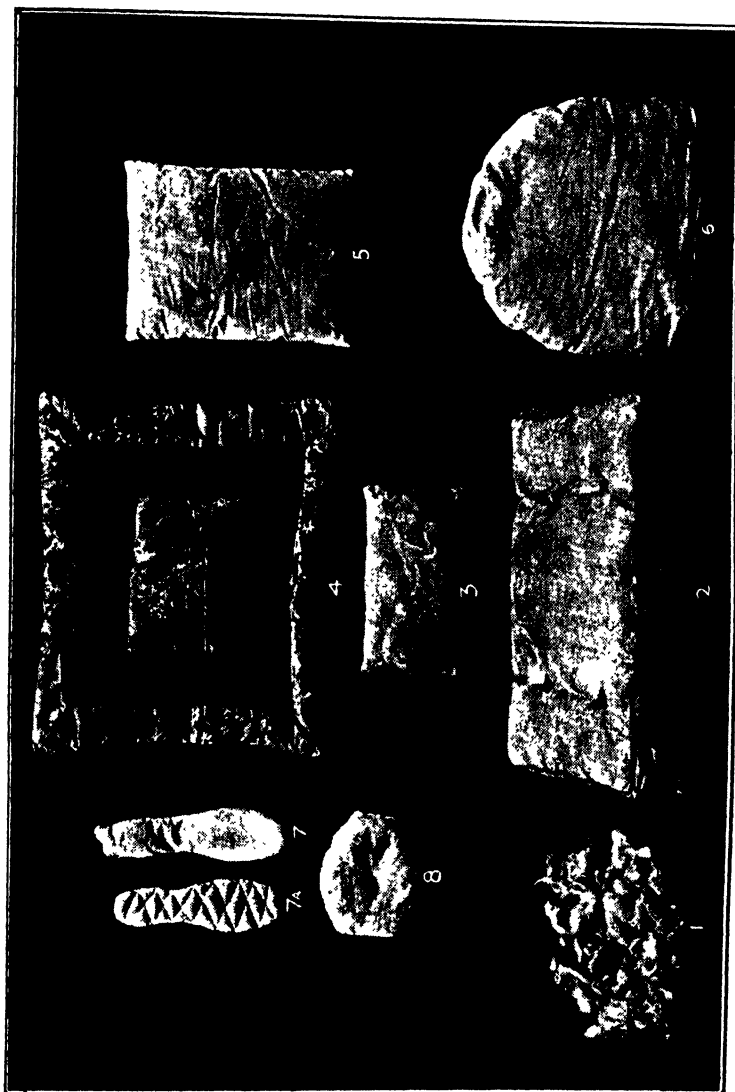


Plate I.

Scoured wool (Plate I., Figure 1), will wear indefinitely, and will not lump like flock, nor powder away like kapoc. This will reduce the amount of fluff to be swept from under the bed each day.

Materials Necessary to Make the Mattress.—Procure a good quality linen ticking and allow 2in. for turnings and also 2in. extra for each foot in the width of the bed to be taken up with the filling. For example, if the bed measures 6ft. by 3ft.,

the ticking will measure 6ft. 2in. by 3ft. 8in. It is necessary to have two lengths of ticking, also a strip of ticking 5in. wide by 18ft. long; this is to form a 4in. side for the mattress. A much improved appearance is gained if the sides are piped, with the same material or material of another colour, but the piping is not essential.

To Make the Mattress Casing.—Fold a 1in. wide strip of material in two and insert between the top ticking and the side strip, the fold to project $\frac{1}{2}$ in. on the right side of the ticking to form the piping, machine together, taking particular care to have the corners secure and smooth. It is a good plan to put two rows of stitching around, as there is a strain on the seams. Follow the same method with the bottom ticking, but leave half of each end open to put the filling in—it is easier to work from both ends as the mattress is so long.

To Fill the Mattress.—Thirty pounds of wool are necessary for a double bed mattress. Pack the case firmly with the scoured wool, be sure that the wool is not matted together when being used. Keep the mattress slightly higher, or thicker, in the centre than at the sides, for when it is in use the stuffing is forced to the sides, and it will always spoil the appearance of the finished article if hollow in the centre. When sufficiently packed from both ends sew up the ends, not forgetting the piping.

Now it is necessary to tab the mattress, although this tabbing takes time and is a little awkward to do, it means a lot to the life of the mattress and saves much energy when turning and smoothing the mattress each day. The tabbing simply keeps the stuffing in position. In a kapoc-filled mattress the kapoc powders away and then there is nothing to support the twine, and the leather tabs become detached; but wool does not powder away as kapoc does. Leather, felt, or wool tabs may be used, but a soft leather is to be preferred. Felt or wool tabs are likely to harbor moths; of course the moths cannot get into the stuffing for they do not like linen or cotton materials, and whilst there are no breaks in the ticking through which they may enter, the mattress will be quite free from these pests. Use a mattress twine to sew on the tabs, or a strong linen thread will do quite well. The tabs should be opposite one another on top and bottom of mattress; they should be placed so as to form triangles or diamonds with a side of 12in. to 15in. The sides do not need the tabs sewn on, but it is very advantageous to stab the side and sew the wool in place. Perhaps three rows of sewing, being alternately placed around the sides, will be plenty.

PILLOWS.

Pillows to match the mattress, as seen in Plate I., Figure 3, could be made, but they would not require to be piped nor stabbed; and they will be more comfortable if they are not packed too tightly.

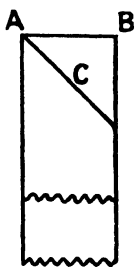
QUILTS.

The size of quilt for a double bed is usually 60in. by 66in., and it takes about 5lbs. of wool for a quilt similar to the one shown in Plate I., Figure 4. The cost to buy one filled with fleece wool is in the vicinity of 50s. to 60s.

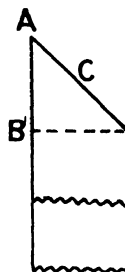
Over the foundation material, a good sateen or good quality unbleached calico is very suitable; place a piece of butter muslin which should be a good 2in. larger all round than the size of the quilt. With a dark thread for tacking, or a pencil, outline the proposed design of quilt, marking the material into the various divisions. There will be required another piece of muslin to cover the wool (muslin is suggested, as it will not add much weight to the quilt, and yet will keep the wool together and make the task much easier). Over this is placed the decorative covering of the quilt. Choose colours that will wear and that will add brightness to the room, but they must harmonise with all the furnishings. Cut the decorative covering to the size and shape required—generally an oblong 20in. by 26in. for

the centre, and four long strips 5in. in width, allowing liberal turnings on all pieces. Contrasting colors may be used; if so, they are placed on alternately. Of course, the top covering may be one piece, then it is not necessary to cut it into strips, but be sure to place the centre on the centre of muslin.

To Make the Quilt.—Having outlined the foundation muslin, tease the wool and place a liberal amount on the centre, cover with muslin and oblong piece of covering, and tack down. There is no need to turn in the edges of centre piece as the first strip with edge turned in is placed on this and machined into position, stitching as near the edge of the strip as possible. The corners of the strips should be smoothly vandyked or mitred, and all the joins should be in a straight line in order to have a pleasing effect. Press the seams before joining the covers.

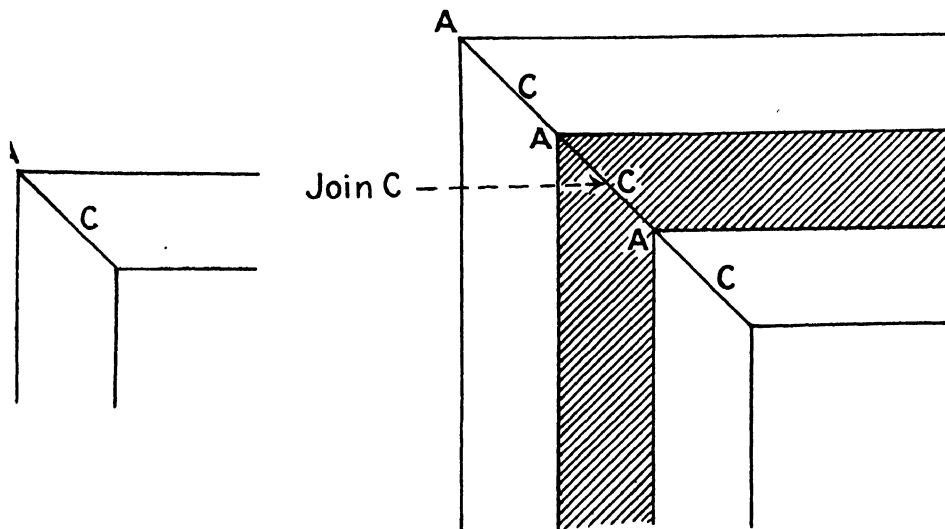


To make a vandyke corner take the strip and double it keeping the edges even; the fold should be at the point (a) marking the corner on the longest side of the strip. Now fold back point (b) until a right angle triangle is formed, having the crease (c) at 45° to the edge of strip. Crease well and machine on the crease. The result should be that the strip forms two sides of a square.



If care is taken to get the point (a) correct

for each strip there should be no difficulty in getting the seams to form a continuous line. This is essential for a good effect when quilt is finished. Only the inner edge of each strip, except the final strip, need be turned in, as each successive piece is placed on top of previous piece. Be careful with the corners. If a mitre is required the folded triangle is cut away after stitching along the crease (c), but there is no advantage in so doing.



Now raise the first strip and place the wool in position between the muslins. It will be found easier to manipulate if a short section is filled and tacked down at a time, instead of trying to do the whole side. Proceed with the second and then the third strips, keeping the corner joins in line with the previous joins. Before stitching down the outer edge of quilt see that the muslin is turned in so that a firm edge is secured. This edge may be piped if desired. Piping is just

for effect. When machining the long sides avoid having to pass the whole of the filled quilt under the arm of machine. Do not have the outer strip as well filled as the centre, although it must not be loosely filled, for if it is too full it will not lie smoothly on the edge of the bed, but rather curl back on to the top.

Work one or two eyelets in centre of quilt if no design is stitched across the centre. This is to hold the wool in position and not allow it too much room to move. Also it gives a finish to the quilt.

TEA COSIES.

The object of a tea cosy is to keep in the heat around the tea pot. As wool is a poor conductor of heat it is an ideal article with which to fill the cosy. Make a casing of calico and fill it with teased scoured wool, then mount it with an attractive cover made of wool embroidery on a fine canvas foundation. A most useful and pleasing article is the result (Plate I., Figure 6).

TABLE MATS.

If wool-filled table mats (Plate I., Figure 5) are used there will be far less likelihood of the table being marked with hot plates. Also, as they will be softer than cork mats, the plates will sink into them slightly and thus the plates will not be continually slipping away or moving whilst father is trying to carve the joint. These mats may have a decorative cover slipped on them before using; the cover could be embroidered either in white or coloured threads.

IRON HOLDERS.

How annoying, not to mention how painful, it is to burn the fingers by catching hold of a hot iron or saucepan handle! "Prevention is better than cure," so the proverb says, therefore, to follow the advice make a wool-filled holder (Plate I., Figure 8). All wool-filled articles can be easily washed and dried.

INNER SOLES.

Winter time often means cold feet, and this can be partly avoided by having wool-filled inner soles (Plate I., Figures 7 and 7A). Cut two pieces of calico the size of the sole and machine together, leaving the heel open. Turn seam inside and fill with wool, then sew up the heel. They may be quilted, if desired, but the quilting will take up the material and cause the finished sole to be slightly smaller—this can be allowed for when cutting out the soles. Also, quilting makes the sole much firmer. Children love a sole into which their little feet can sink. These inner soles can be washed, and they dry fairly quickly.

SMALL MOP FOR LAMP GLASSES.

A small mop (Plate II., Figure 3) is very handy for cleaning lamp glasses or bottles or jars. A small piece of wood (the model was made on a butcher's wooden skewer), smoothed in order to avoid splinters, has the scoured wool securely fastened on to the end by binding it with strong fine string. Take care to cover the end of stick. It is so easy to keep clean and sweet. Rinse well after use each time, then dry and hang where the air can circulate around it.

TOYS.

All toys that need filling are best if filled with wool, as they are light and soft. For the little chap who is just commencing to run about and play with balls, there is nothing more attractive than a multi-colored, soft football, one that is not hard for a child to kick, yet is soft and cosy for him to hold—even father will not be able to resist having a kick. Small lengths of wool may be knitted into strips, narrow at both ends, and then sewn together and filled with scoured wool. The ball illustrated in Plate III., Figure 8, has been worked in moss stitch. A harder ball for an older child can be made by using a tennis ball and tying string around it, making eight strands, then with scraps of colored wool work the cobweb stitch over the strands of string, mixing the colors as the ball is covered.

To work the cobweb stitch pass the needle under the string and come back over and under the same string, then pass needle under the next string and continue in this way. An illustration in Plate III., Figure 9, shows an old tennis ball with the cobweb stitch started.

Dolls, teddy bears, golliwogs, and animals can all be filled with wool. They are washable and do not wear away nor lose their shape as do those filled with kapoc or sawdust. The toys are soft, warm, and cuddlesome.

A TEDDY BEAR.

Teddy, as seen in Plate III., Figure 6, is crocheted, and small round pieces of cardboard (about the size of a 2s. piece) are placed in the end of the legs and arms, where they are to be sewn to the body. This helps to keep the limbs in good shape.

A GOLLIWOG.

Golliwog (Plate III., Figure 5) is knitted in garter stitch, the eyes and mouth are buttonholed with white wool. The hair is knotted on with the stitch used in making a pile wool rug, as is explained for the mat (Plate IV., Figure 2). Red buttons and a red flannel tie or bow complete the toy.

PREPARATION OF SHEEP SKIN BEFORE USE.

For the other type of articles made from the skin there is more preparation needed, as the skin must be tanned in order to preserve it. The scouring of the wool and the tanning of the skin is proceeded with at the same time. The skin of a lamb is much better for the smaller articles, as it is not necessary to clip the wool. For mats and door slips the sheep's skin with longer wool is very effective, and it may be cut into the size desired before tanning.

DRESSING THE SKINS.

Try to keep the skin whole while treating it; although this is not essential, it is often possible to obtain more articles with careful planning from the whole skin than endeavoring to fit patterns on to small pieces. Remove as much fat and tissue as possible from the flesh side of the skin, using a blunt knife or similar article. This saves a considerable amount of energy later, for the skin must be free from all these scraps when finished. Have at hand about 9qts. of bran, 3lbs. of alum, 2lbs. of salt, 1lb. of saltpetre, 1½lbs. of good household soap, and plenty of water.

If the wool on the skin is very dirty and contains a high percentage of yolk, it will be advisable to soak it in bran water for 24 hours. Use 1qt. of bran to 4galls. of water. The bran water is very soft and has a cleansing effect. It is not necessary to strain the bran water before immersing the skin, nor is it necessary to rinse the skin before proceeding with the tanning.

TANNING THE SKINS.

Melt 1½lbs. alum, 1lb. salt, ½lb. saltpetre, and 12ozs. soap in hot water, add to this 2qts. of bran and sufficient cold water to cover the skin. Stir well to get the bran mixed. Soak the skin in this liquid for 24 hours. Work the skin several times whilst it is soaking, and press well down, although it should not be too tightly packed, for the solution must penetrate to all parts of the skin. Lift out and squeeze out as much water as possible. Dissolve the remaining 12ozs. of soap and add 2qts. of bran with sufficient cold water to cover the skin. Soak the skin, working it as much as possible for another 24 hours. Lift out and rinse well—under the running water is the easiest. It is necessary to get all the soapy and greasy water out, so the water should run clear. If the wool is still sticky with yolk, wash it again and again in very hot soap suds, and rinse well. Now dissolve 1lb. alum, 1lb. of salt, and add sufficient cold water to cover the skin. Allow

the skin to remain in this solution for another 24 hours. Remove the skins and squeeze out as much water as possible, then place the skin over a fence or box to drain. When nearly dry rub into the back a mixture of $\frac{1}{2}$ lb. of alum and $\frac{1}{2}$ lb. of saltpetre, well powdered. Then rub the skin with a piece of pumice stone, or a piece of brick, to remove any loose fibres and also to soften the leather. The leather must be made soft and pliable in this stage. The wool should look fluffy, clean, and white. It will probably need a little combing to free the tips.



Plate II.

CUTTING OUT THE ARTICLES.

With a soft pencil draw the outline of the desired article on the leather side of the skin, then with a sharp knife, or razor blade, cut the skin along the lines, and when the pieces are separated the wool will part easily. If scissors are used the wool is often and unavoidably cut in the wrong place, causing a lot of trimming of the leather as the work proceeds.

To Join Pieces of the Skin.—Place the edges of skin together and top sew with a strong thread (24 cotton). Do not take a very small stitch, as the edges of skin will tear easily. Free any wool that has been caught down with the stitches, and the join will not be easily detected.

BEDSIDE MATS.

After tanning the skin as previously explained, the centre part can be cut out for a floor mat (Plate II., Figure 1). Any skin could be used instead of sheep skin. The mats are quite serviceable without a lining, but some folk like to have them lined, and a small edge of lining is allowed to project, forming a mounting for the skin. The disadvantage of having the mats lined is that all the facings and linings have to be removed when it is desired to wash the mat to freshen it, then when the mat is dry they have to be resewn into place. They wear well unlined, and very often do not slip as much as lined mats when used on polished floors. A good depth of wool on a mat has a most attractive appearance when used on the hearth before a fire; it gives every suggestion of comfort. The mats may be dyed if desired. Of course, they cannot be boiled, as that would ruin the leather.

FLOOR POLISHERS.

How convenient it is to have a polisher on a long handle so that the necessity to crawl on the floor is abolished (Plate II., Figure 5). Have a block of wood, fairly heavy though not excessively weighty, and in the top of the block have a broom handle fixed. Cover the face and sides of the block with sheep skin, wool side out, taking special care to completely cover all corners with the piece of skin. Tack on the skin to make it firm and secure. This polisher is such a help, as with the corners covered it is possible to rub up the surrounds in all rooms without marking the skirting boards. When dirty it is very simple to wash, and it does not take long to dry. Of course, instead of the long handle a short strap may be attached to the top of the block, and the hand slipped through the strap when the polishing is to be done. These polishers may be any desired size, but if too large they are too trying to push about quietly, and for the purpose 9in. by 12in. is a good convenient size.

FURNITURE DUSTERS.

To be able to keep a supply of good soft dusters is a big problem in most households, especially when dusters are also in demand for the car. Highly polished furniture requires a very soft duster with no attachments, such as buttons or hard seams, as these scratch the furniture.

Here is the ideal— a piece of sheep skin a little larger than the hand (Plate II., Figure 4). Sew to three sides of the leather a piece of calico, leaving one end open to enable one to insert the hand. When dusting, the duster is slipped on the hand and the fingers can still bend sufficiently to allow all grooves, carvings, and turnings of the furniture to be properly dusted. The staples of wool collect the dust instead of flicking it from one place to another.

When the duster is soiled just hold it under the running water and wash with soap, then rinse well, hang it in a breezy place to dry. It quickly dries, and there is always a clean soft duster on hand.

BOOT POLISHERS.

These are made very similarly to the furniture duster, only two pieces of skin are sewn together by top sewing, leaving one side open for the fingers to be inserted. Being a light, soft duster, it can be moved very quickly, and the result is a high polish on the shoes. Again, these dusters do not wear away as quickly as do the cloths.

INNER SOLES.

During the winter time it is sometimes difficult to keep the children's feet warm and dry. Their little shoes are not heavily soled, but with inner soles cut from the sheep skin and the wool clipped down a little (Plate II., Figure 6), the most cosy shoes can be obtained, little toes can be kept much warmer, and the additional layer of leather, although very thin, will help to keep the feet dry. At first the soles seem to fill the shoes, but as soon as the pressure of the feet has

pressed the wool into place there does not seem to be any inconvenience. These inner soles, of the necessary size, will also help to give adults comfort during winter. Think how the chilblains can be saved!

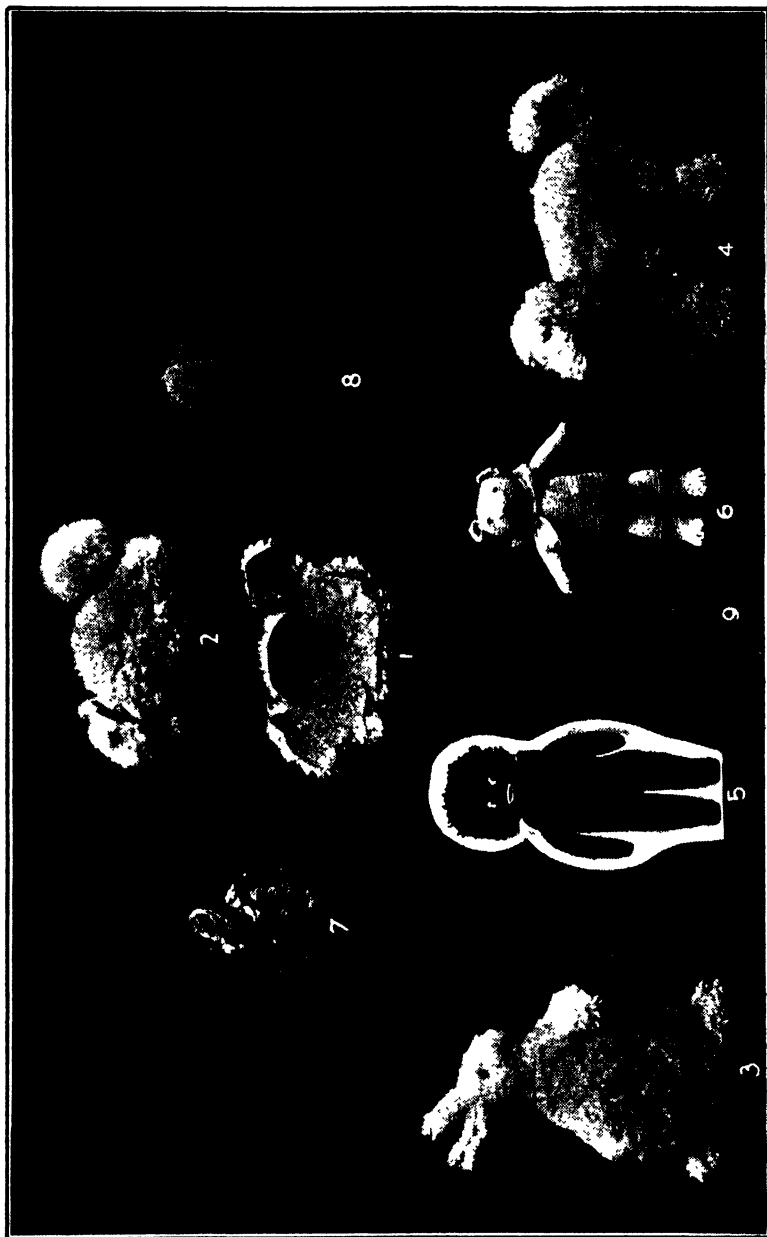


Plate III.

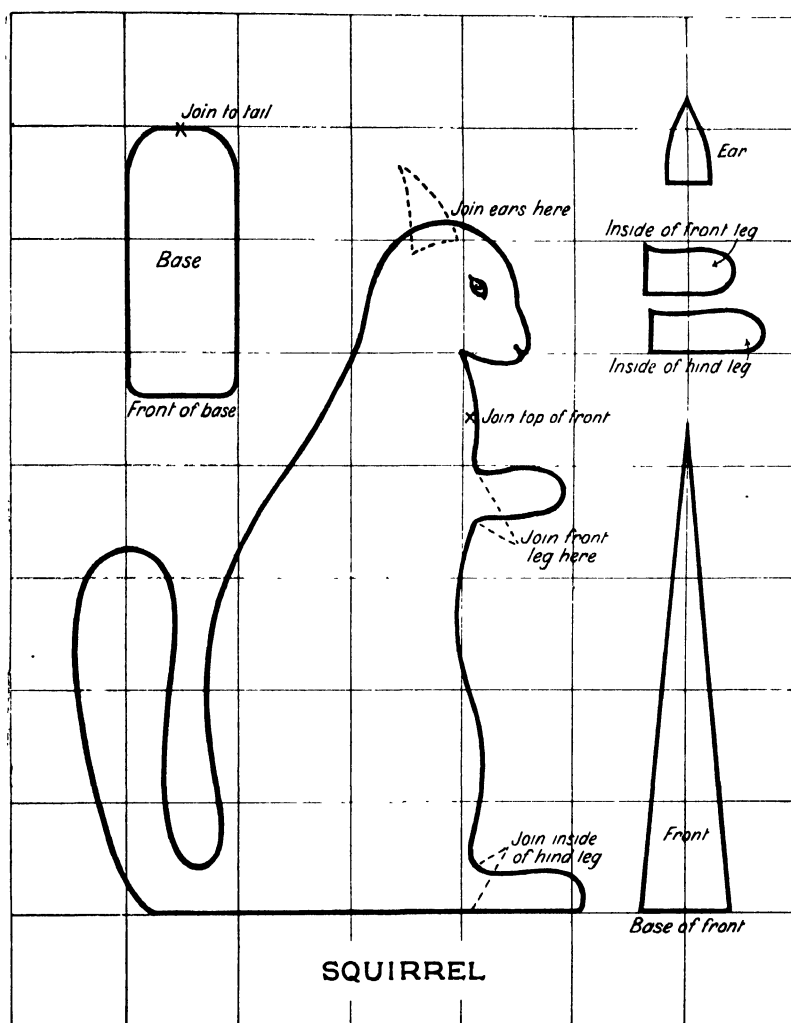
POWDER PUFFS.

Many folk like to use face powder, and there is always a striving to have pretty dainty toilet ware. If a small circular piece of thoroughly cleansed sheep skin is lined with satin, and a dainty edging put around, the result is a useful and neat

powder puff that any lady or girl would be delighted to receive as a gift (Plate II., Figure 8). They are washable, thus a change of powder will not necessitate additional puffs.

POWDER PUFF FOR THE BACK.

The puff for the back is made by two pieces being joined together and filled with scoured wool, then tacked on to a long handle which has been inserted into the filling (Plats II., Figure 2). The handle can have ribbon plaited around it, or it can be lacquered to harmonize with the other toilet requisites.



ANIMAL TOYS.

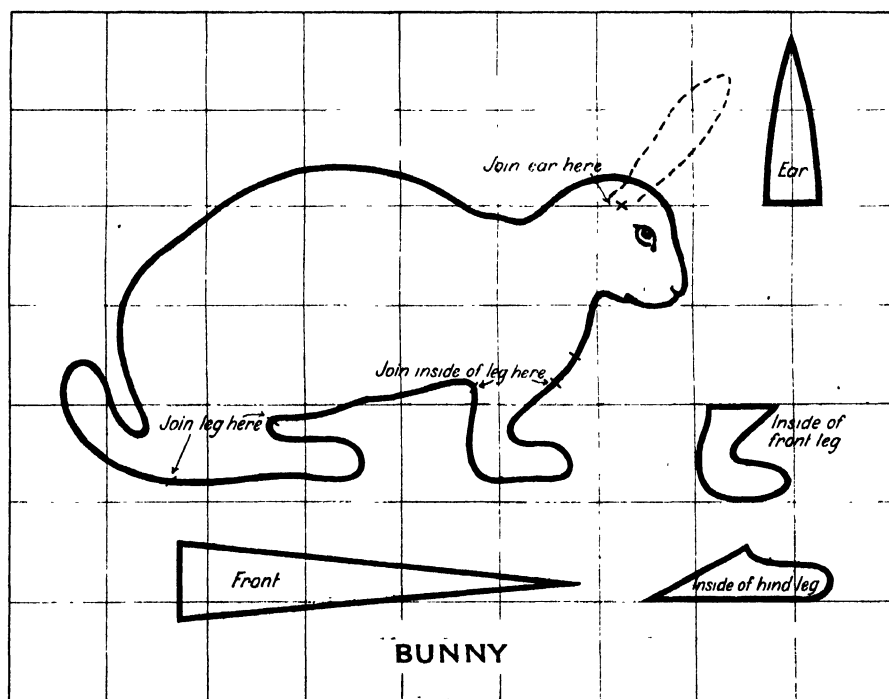
In making models of animals draw the outline on the leather side and cut along the line with a sharp knife or razor blade, then when the leather is separated the wool will part easily. Place this side on the skin again, two skin sides together, now draw around this piece to mark the second side, and cut it out—this assures that the two pieces are not for the same side. If possible cut the tail and the legs in one piece with the side, this does away with the constant sewing on of the various pieces, as they cannot be pulled off so easily. A small strip about 1½ in.

wide at one end and sufficiently long to come from neck to tail, but shaped to a point to fit into the neck, and four small pieces to make inside of the legs; and two pieces for the ears are necessary for all animals.

The joining should be done with a strong cotton, and a fairly large stitch, about 3/16in. should be made each time—a smaller stitch often tears the edge of the skin. The accompanying diagrams are drawn to scale, and by increasing or reducing the size of the squares, models of any discreet dimensions can be made.

SQUIRRELS.

To Make a Squirrel (Plate III., Figure 2).—Cut two pieces as in diagram, place the skin sides together and join by top sewing, starting at the tail, and when it is done stuff it with the scoured wool, and any clippings of wool from the skin when cutting out the animal. It is very much easier and more interesting to complete the various small parts as they are sewn up. Top-sew along the back, taking a fair amount of the skin, about 1in. on each side, with each stitch, sew around to the chest. Then fill the head. Before joining up the remainder of the body, sew



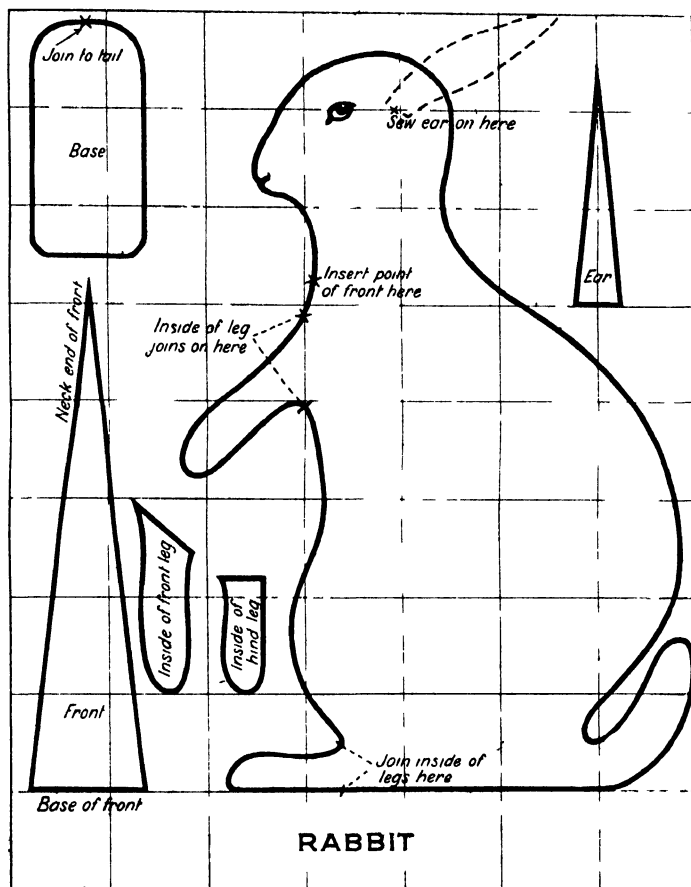
the small pieces on to each leg, making as it were, a pocket. Do not stuff the legs until they are sewn on to the front piece. Join the point of front piece to chest and continue sewing along one side, taking care to join on the inside of legs only. When sewn nearly to the tail, join the other side. Stuff the legs very firmly, otherwise they will bend after a little use, then stuff the wool into the body, using a pencil or a long, thin stick to work the stuffing well along the body. Make the chest and the sides very firm.

When as much wool as possible has been worked in, the base must be sewn into position, joining the front, the back of legs, and the tail.

For the eyes use black mending wool, about six satin stitches on top of one another worked each side of the head, and the white wool slightly clipped away around it. A piece of colored ribbon around the neck will give a little color to the toy.

RABBITS.

A rabbit (Plate III., Figure 3) is made similarly to the squirrel, but the ears are long triangular pieces of skin. To sew the ears in place, double the base of triangle and just part the wool at the side of the head and securely sew on the ear, then ruffle the wool back into place to hide the join. Do the same on other side. When the sewing is finished comb all the wool and make it look quite fresh.

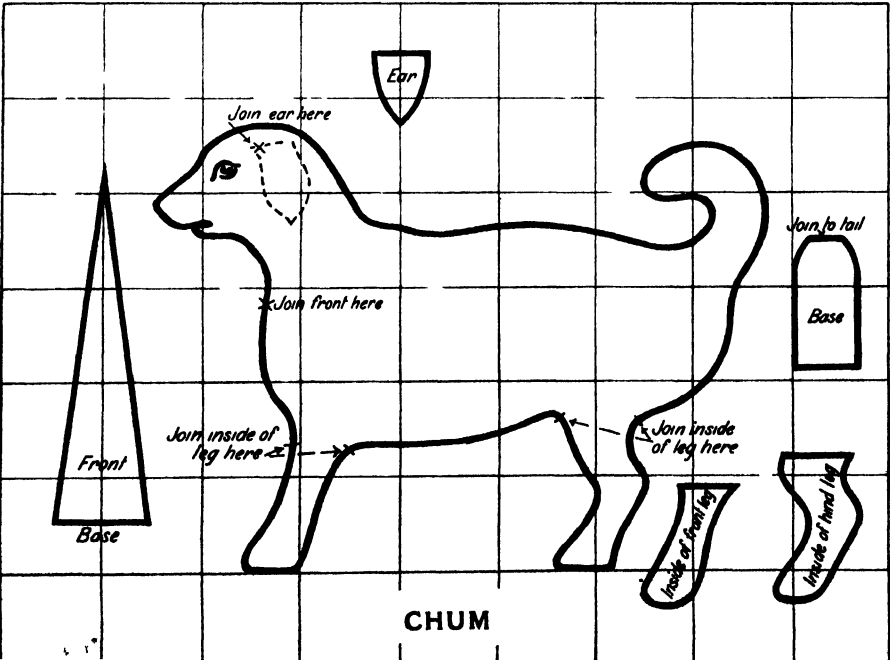
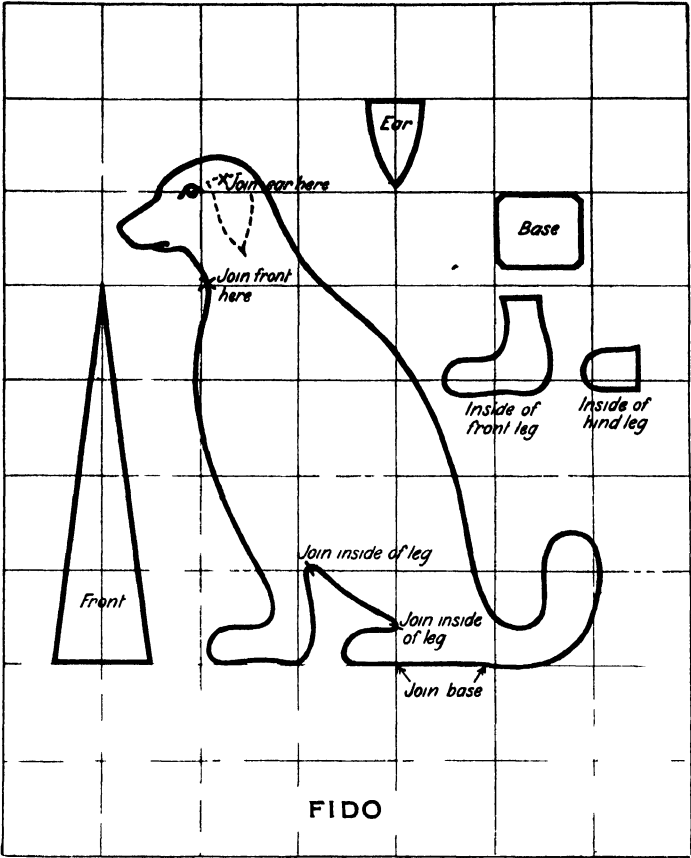


DOGS.

The dog (Plate III., Figure 4) has its ears sewn on so that they will hang down. The wool from top of nose is clipped fairly short. The diagram shows the pieces necessary for the dog.

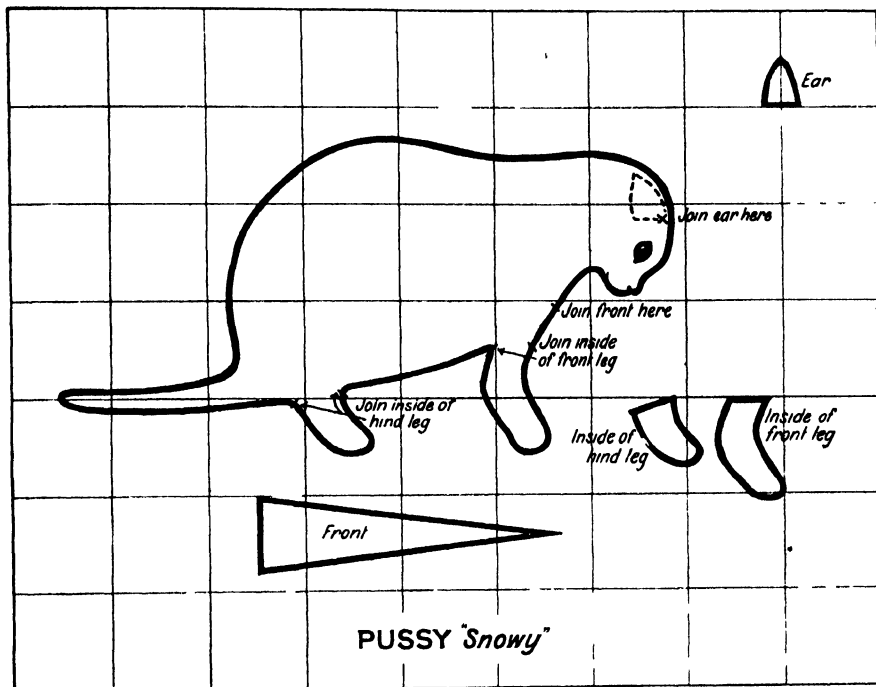
CLEANING THE TOY ANIMALS.

When these animals are washed do not immerse them in the water, for it would soak through the wool used in filling. If they are held under the running tap and rubbed with soap, it is all that is necessary. To dry them suspend them from the clothesline, first upright, but before they are properly dry they should be inverted in order to have the ears and tail keep their proper shape. They will only do so if dried the way they are required.



DIAGRAMS OF TOY ANIMALS.

Diagrams of only a few animals have been given, but the method of making each animal is very similar. These diagrams can be enlarged to any size required by enlarging the squares on the paper.



WOOLLEN GARMENTS.

The most popular wool work is the making of garments with woollen thread. Some are knitted, crocheted, netted and woven. There are hundreds of books giving directions for making all manner of woollen goods, and so only a very few will be dealt with in this article.

Should anyone possess a spinning wheel, it is far more interesting to spin the thread, dye it, and then weave it in some way into a useful article. The art of spinning is to retain a steady, even, and fairly slow spin of the wheel, and all the while to be feeding the staples, just a few at a time, into the spool attachment. It is very easy when the necessary skill has been acquired. Do not treadle quickly, and never be in a hurry to get all the wool into the spool.

WOOL MATS.

Plate IV. shows the making of a small mat (Figure 2), worked in the pile rug stitch. Figure 1 shows the canvas that has been used as a foundation for this mat, although a coarser one can be obtained. Turn in the edges of canvas and bind with wool, making firm, clear edges. The wool that is used to bind the canvas should harmonise with the wools used in the design. It is necessary to have the wool cut into equal lengths, this is best done by winding the wool around a smooth, even board, then cutting down one edge. Take a single piece of wool and double it in half, with a crochet hook (Plate IX., Figure 1) draw the loop through two holes, passing under one cross thread. Now pass the ends of thread through the loop and draw it up tightly, keeping the ends even. The tighter this is drawn up the more securely will the wool be fastened to the canvas. Put the threads closely

together if a very thick mat is desired, and the wool should be of such a thickness that it will fill each space. The foundation can be made of hessian, just as successfully as of canvas.

The mat may be lined and bound if wished, although the wool is neat and flat on the reverse side, yet it will wear longer if lined.

There are various tapestry stitches that are suitable for making hearth rugs, mats, and stool covers, but they do not give the loose pile to the mat.

A mat worked in tapestry stitches is much lighter than one worked with a pile. Stitches such as the herring-bone, cross, and diagonal satin stitch, and their variations work up very well, and if colors are worked in the result will add brightness to the room. Plate IX. illustrates several tapestry stitches:—A.—Pile Stitch, B.—Diagonal Satin Stitch, C.—Lock Stitch, D.—Chain Stitch, E.—Fern Stitch, F.—Signal Stitch, G.—Tile Stitch, H.—Herring-bone, I.—Knotted Stitch, J.—Cross Stitch, K.—Padded Half-cross Stitch, L.—Half-cross Stitch, M.—Half-cross Stitch. Figures 1 and 2 of Plate IX. illustrate crochet hook used for rug-making.

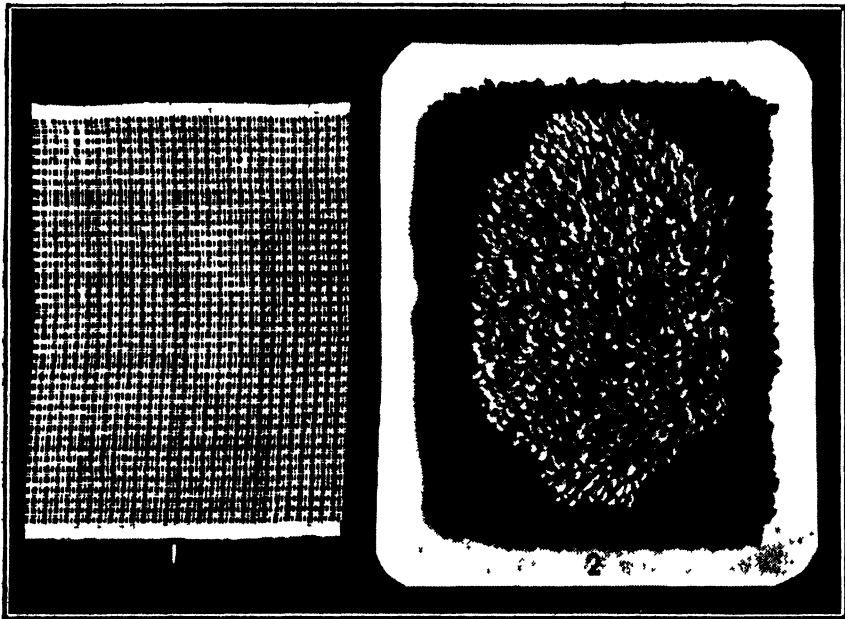


Plate IV.

WORKED TEA COSY COVER.

Figure 1 of Plate V. shows the fine canvas that has been used as the foundation for the tea cosy shown in Figure 2. The design is carried out in perpendicular satin stitch. Care must be taken to be sure that the stitches are kept regular by covering the same number of threads each time. The hem is turned up $\frac{1}{2}$ in. and a cord of wool is fastened along the join, and two woollen pom poms mount the top.

The house has been worked in yellow and red. The lawns in two shades of green, the trees in green with black trunks, and the pathways in fawn.

The reverse side may be worked similarly or worked as a gay garden, keeping the stitchery confined to the upright satin stitch.

The two sides are worked and then joined together, having about $\frac{1}{2}$ in. turnings. The work may be pressed on the wrong side, using a damp cloth under a fairly hot

iron. Whilst pressing, the opportunity should be taken to pull the work into a good shape. Often when working on canvas the work gradually gets out of shape through having an uneven tension on the thread, but when the canvas is damp and hot it can easily be pulled back again and then pressed dry.

TRIMMINGS.

Motifs are such useful things to decorate a child's crib cover, or little rompers, and tunics. They can be easily made or else bought ready made, and then sewn on to the other material. Muslin is usually the foundation, and after the design or outline has been drawn the colored wools are worked in by either the looped

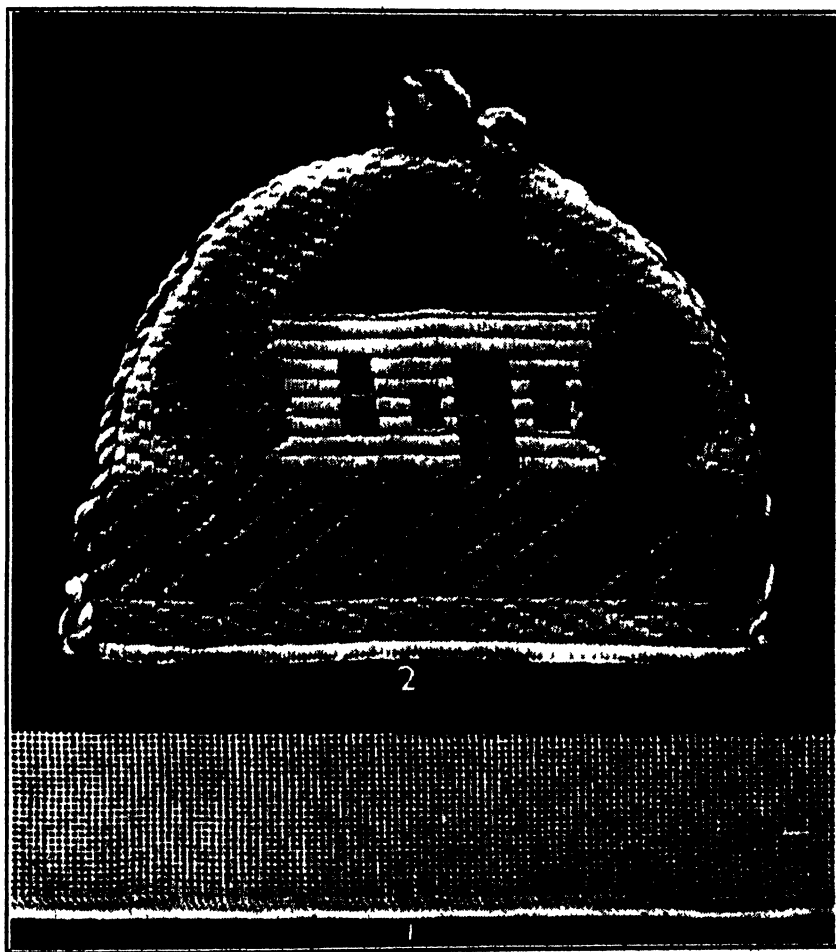


Plate V.

rug stitch, previously explained, or the horizontal satin stitch, or a combination of both stitches, as in the rooster (Plate VI., Figure 4). Where necessary the outline may be brought into prominence by the use of the stem stitch.

The Rooster (Plate VI., Figure 4).—The rooster has been worked in two-ply wool. Red has been used for the comb, which was worked in short satin stitches. Yellow wool was used for the feet.

The Twins (Plate VI., Figure 5).—These toys have been worked in three-ply wool, and the hair and faces were worked with silk, the short satin stitch being used. A deeper pile was left on this motif than on the rooster.

Micky Mouse (Plate VI., Figure 6).—Micky is a favorite of the children's, and this one has been worked on black material for the ears and top of body and white material for face, hands, trousers, and shoes. Then the white pieces overlap the black pieces.

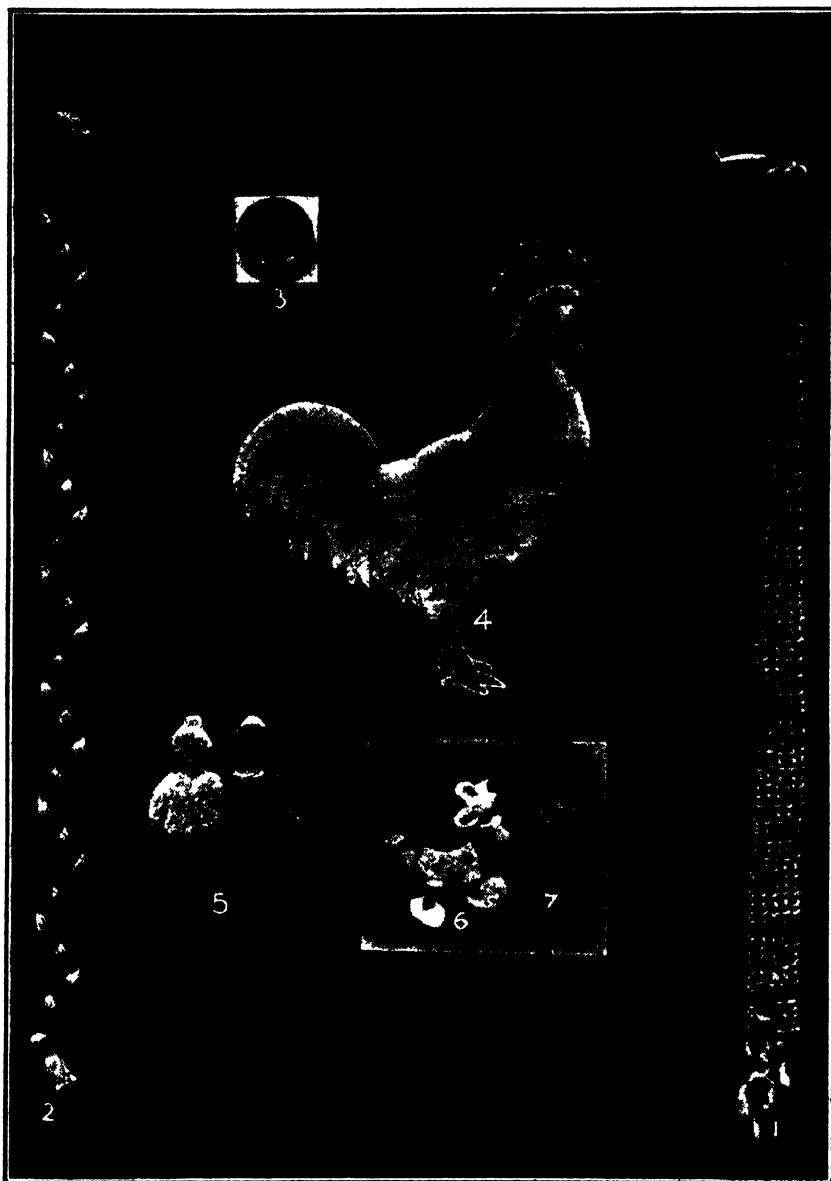


Plate VI.

Teddy Bear (Plate VI., Figure 7).—This little teddy bear has been worked in horizontal satin stitch, working in two tones of colored wool. The outline of limbs has been defined with stem stitch worked in black silk.

Woollen Brooch (Plate VI., Figure 3).—With a woollen frock a brooch made of wool is in keeping. The one shown is made on an old curtain ring, button-holed all round, with the purl of the stitch to the centre of the ring. Across the top

half of ring draw a number of threads from side to side catching them into the purl. They must be very close together. Over these threads work a series of French knots, using various colored wools. From the centre work another group

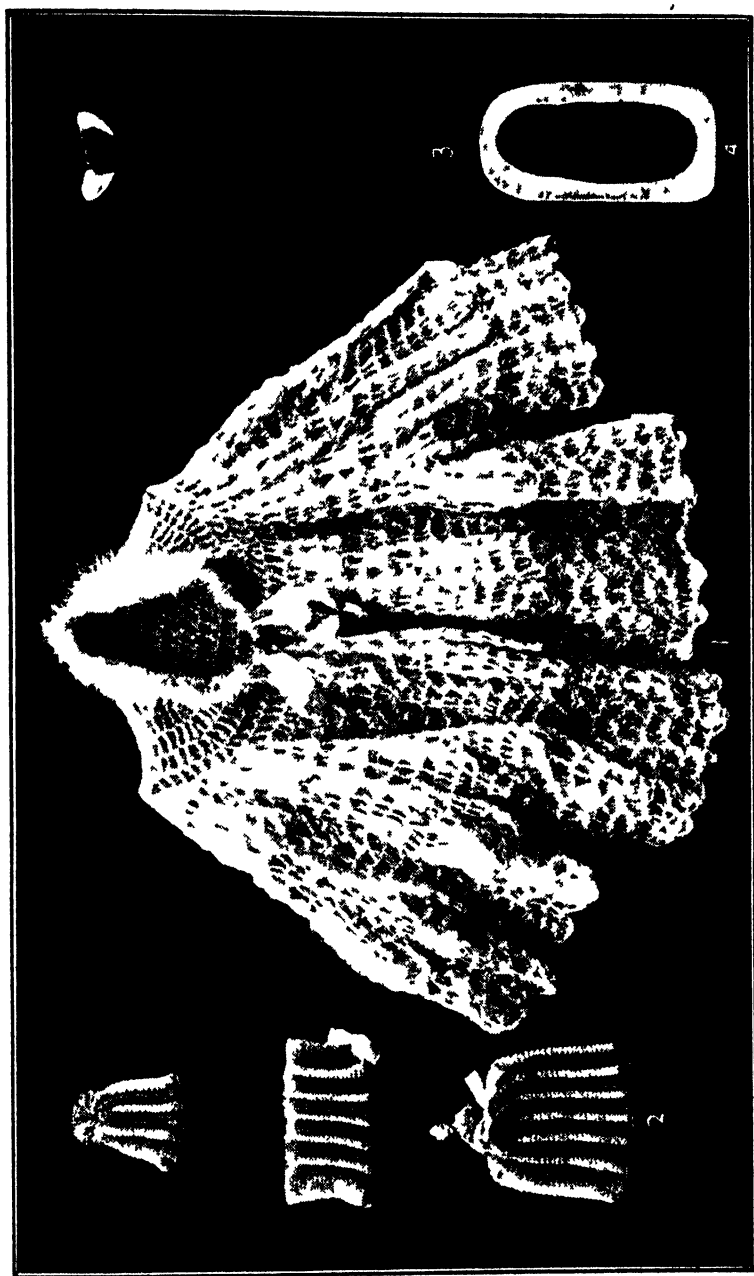


Plate VII

of green threads, at right angles, down to the purl of ring stitches. This will form the stem of the posy. Do not use a coarse wool or the effect will be spoilt.

Trimmings for Berets (Plate VI, Figures 1 and 2) — A plait of woollen threads gives a very soft effect around the edge of a beret. This trimming could be made to work in the various colours of the jumpers and scarf that is to be worn with

the heret. For a trimming that is required to be a little firmer, there is the woollen astrachan. These trimmings can be bought by the yard, and they are relatively cheap.

Woollen Ties (Plate VII., Figure 3).—It is one of the worries of a gentleman's life to keep his ties free from creases. Very often the plea comes forth for the tie to be pressed. Well here is a tie that does retain its shape and freshness much more than the silk or cotton material ties. They are woven in various colors and patterns, and may be purchased at any of the leading drapers.

KNITTED AND CROCHETED ARTICLES OF WOOL.

Nearly everybody can knit and crochet these days, there has been a revival of these particular methods of fancy work, and it is most interesting to be working out a pattern and all the while watching the garment grow. The styles of garments and the stitches that can be used for each are far too numerous to be enumerated. and they can be obtained from many books, therefore, in this article just typical garments and articles are mentioned. Whatever can be made for a small child can be enlarged and made for an adult. The successful slogan was "All's well if all's wool," therefore use as much wool as possible.

The Circular Bed Jacket (Plate VII., Figure 1).—The illustration is of a most attractive bed jacket worked in crochet, a very simple stitch is used—a long treble. The whole garment is double, having straight sleeves within the fuller outer sleeves. The jacket was made from the directions given in "Woolcraft" book.

When the jacket has been folded in half, any trimming desired may be sewn on to the fold to give a softening effect around the neck.

Morning Tea Set (Plate VII., Figure 2).—Here is illustrated small tea and egg cosies with a teapot holder completing the set. This set was prepared for a breakfast tray, so that mother could have a real rest on Sunday morning. The articles are worked in the fluted garter stitch. Two colours were used—green and white. A small china figure is fastened on top of cosy, but a loose tassel is on the egg cosy. The holder has been lined with a piece of plain knitting.

Child's Slipper (Plate VII., Figure 4).—A warm comfortable slipper is made by using wool and crocheting in any simple stitch when the upper is joined into shape, it is then sewn to a leather sole and an inner sole of sheep skin (Plate II., Figure 6) is placed inside. A cord or tie is laced around top of slipper to complete it.

BABY'S OUTFIT.

Coverlet (Plate VIII., Figure 1).—Over baby's pram a little coverlet looks so cosy and soft. This "Bunny Cover" has been worked in the simplest of stitches, the centre is in stocking stitch and it has a border of garter stitch. The three white bunnies were worked in chain stitch after the coverlet had been pressed. It may be lined to make it a little warmer.

Baby's Hug-Me-Tight (Plate VIII., Figure 2).—These hug-me-tights are so simple to make, all rows of plain knitting. Do the cuffs on finer kneedles so that they will grip the wrists. Finish the edges with a row or two of crochet, using the silky rabbit wool. Turn down a small piece around the neck and thread it with the ribbon—this double piece makes the wrap much more comfortable around the neck.

Baby's Coat (Plate VIII., Figure 3).—A knitted coat is very warm and light in weight. The coat illustrated has been worked in the "Feather and Fan" stitch, with the yoke and cuffs of "Moss" stitch.

Small Bloomers (Plate VIII., Figure 4).—These little under-garments ensure that the small child is warm—they are worked in "Ribbed Moss" stitch. They may have elastic or ribbon around the waist.

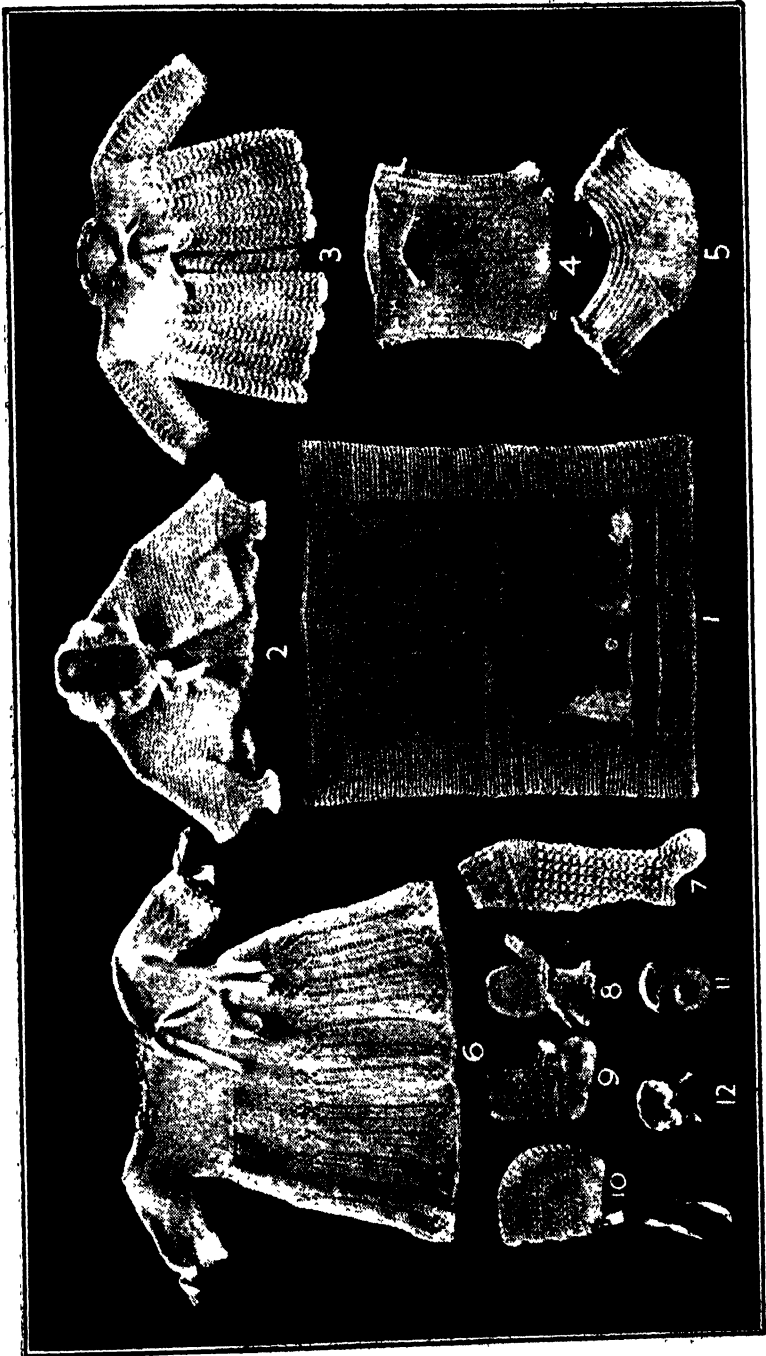
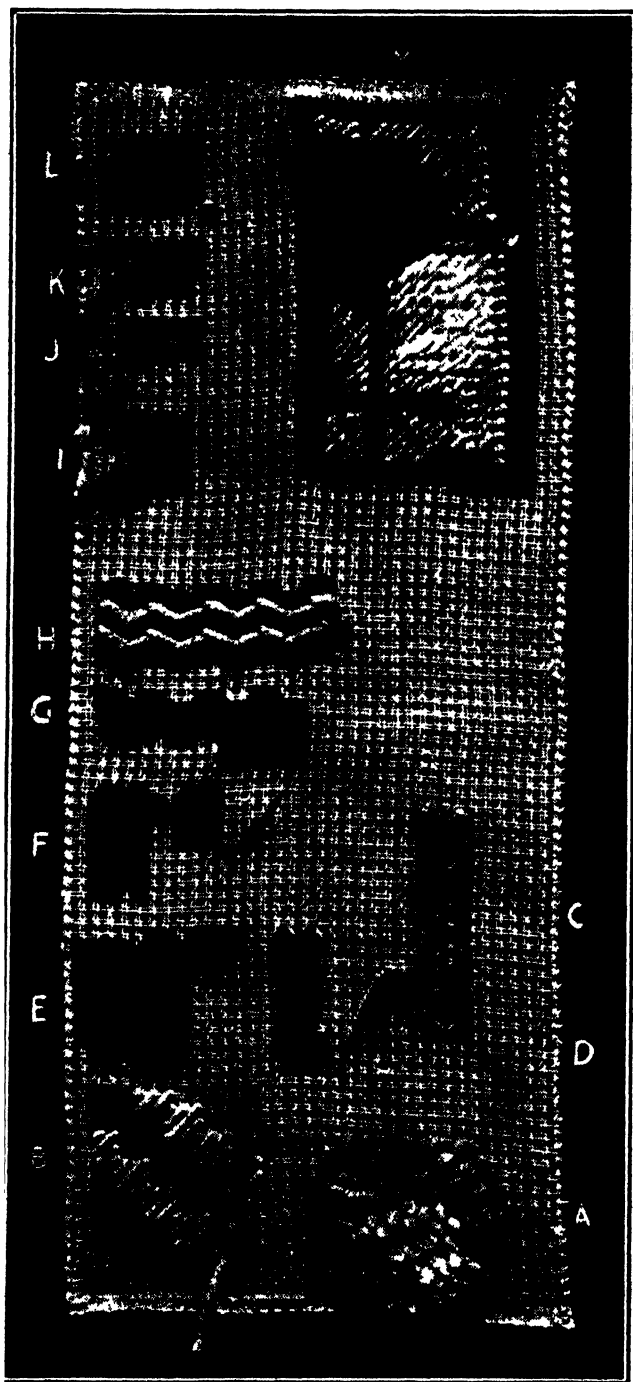


Plate VIII.



. Plate IX.



Fig. I.

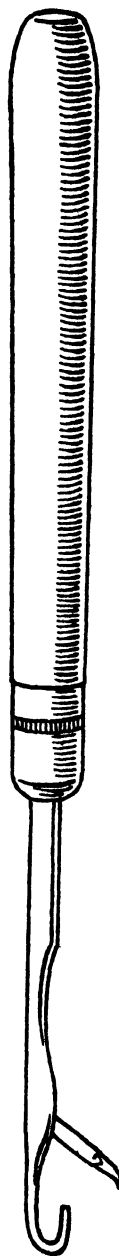


Fig. II.

Knee Caps (Plate VIII., Figure 5).—For those driving cars or for dear old granny, who feels the cold in the joints, there is great comfort in a pair of knee caps knitted in wool. They must be knitted in rib and sufficiently tight to grip the leg above and below the knee. If too tight they will be very uncomfortable, and might interfere with the circulation.

Baby's Frock (Plate VIII., Figure 6).—The little dress illustrated was knitted in two-ply wool, with a lacey stitch for the skirt, but plain for the yoke and sleeves.

A set-in sleeve sits and keeps its shape better than a sleeve knitted in one with the bodice.

It is best to have children's wear dainty and attractive, but in winter it must be warm and soft. A woollen garment will supply these necessities.

Gaiters (Plate VIII., Figure 7).—These woollen gaiters have been knitted with sufficient length to protect the leg from above the knee to the toes. It should be shaped to the leg in order to keep it up.

Mittens (Plate VIII., Figure 8), *Booties* (Plate VIII., Figure 9), *Slippers* (Plate VIII., Figure 11), and *Shoes* (Plate VIII., Figure 12), have all been knitted to complete the outfit in the simple stitches.

Bonnets (Plate VIII., Figure 10).—The bonnet shown was knitted to go with the jacket in "Feather and Fan" stitch. An extremely warm bonnet will be procured by lining the knitted bonnet before it is worn.

SUMMARY.

1. A great number of useful and comforting articles can be made from surplus wool and sheep skins.

2. Wool must be freed from all grease, dirt, and foreign matters.

3. Hot soap suds will clean the wool.

4. When cleaning the wool should not be tangled or matted together.

5. To store wool so that it is protected from moths it should be kept in fine calico bags.

6. Scoured wool is useful for stuffing mattresses, pillows, quilts, tea cosies, table mats, iron holders, inner-soles, and toys of various kinds.

7. To utilise sheep skins to best advantage they must be preserved by some method of tanning.

8. A useful method of tanning sheep skins is to use a mixture of alum, salt, and saltpetre dissolved in water containing bran.

9. If the wool is to be cleaned during tanning, soap is added.

10. To remove loose fibres and to soften the tanned skin it is rubbed with pumice stone or a piece of a brick.

11. Articles are cut from the skin by running a knife or razor blade along marks put on the leather side of the skin.

12. Tanned sheep skins can be used for making bedside mats, floor polishers, furniture dusters, boot polishers, inner-soles, powder puffs, and animal toys.

13. The most popular wool-work is the making of garments with woollen thread.

14. Garments can be knitted, crocheted, netted, or woven.

WOMEN'S BRANCHES.

PAPERS READ AT UPPER NORTH BRANCHES CONFERENCE.

[*Morchard, July 19th, 1933.*]

SESSION FOR WOMEN'S BRANCHES.

MAKING THE BEST USE OF SHEEP.

[By MRS. A. F. CUMMINGS, Belalie.]

On most farms sheep provide the main meat supply, and unless one can vary the cooking the family will get very tired of mutton every day. Some housewives serve the mutton generally as a roast with chops sometimes as a change. Then it is no wonder one hears the remark, "I am sick of mutton." There are quite a variety of ways of cooking this meat which can be made into a tasty meal besides making the most of the meat supply, a consideration in these times. Even when the farmer is his own butcher the sheep means money. The following are some of the ideas I adopt to use up the whole of the sheep whilst giving the family quite a variety of meat dishes.

The leg, shoulder, and loin are usually roasted in the oven, or braised in a boiler on the stove. If the mutton is roasted the potatoes are usually baked under the joint. The bone in a leg or shoulder may be removed and the cavity filled with seasoning. This is very nice eaten cold, and makes a nice Sunday dinner, when the "cook" should have a day's rest if possible. The leg or shoulder may be boiled with carrots or parsnips and served with either parsley or onion sauce.

The meat from neck and breast may be put through the mincer, add a little soaked bread, salt, pepper, and thyme and sausage meat will be provided for breakfast or rolls. For a small family mince one-half for sausage meat, and the rest will make a savoury stew, curry, meat or sea pie. The bones should not be thrown away but boiled to form stock for soup. The breast of mutton may be spread with seasoning, rolled and tied, then boiled or baked; it is best eaten cold. The meat from the neck makes nice Cornish pasties or small meat pies, as it is mostly lean.

The breast of mutton and knuckle end of leg or shoulder with the two kidneys will make a very nice meat pudding or pie. Allow the pudding plenty of time to cook so that the meat will be tender. The knuckle ends of a shoulder and leg and the meat from the head and the tongue will make potted meat, which is very suitable for hot days.

The sheep's head is often thrown away, but properly prepared it makes one or more nourishing meals. The head must be chopped or sawn in two; remove the eyes, tongue, and brains, then soak in salt and water for some hours. The head should be put into cold water and boiled or simmered until the meat will leave the bones. There are several ways of serving:—To make soup—Remove the head, strain, and allow to cool so that any fat may be removed, return to saucepan, add soup vegetables, and thicken with either pearl barley, macaroni, rice, or sago, serve very hot with croutons of toasted bread. The meat from the head may be cut into small pieces (also tongue and brains) and added to the soup which has been thickened with rice or pearl barley. This is sheep's head broth, and the vegetables, carrot, turnip, and onion may be put on to cook with the head, and the whole simmered for about three hours. Add a little parsley before serving.

Sheep's head fricassee may be made by cutting the meat, brains, and tongue into small pieces and adding it to white sauce; cook for a few minutes, add parsley, and serve very hot. The tongue may also be salted and boiled, and the brains fried and served on toast. Fricassee brains make a nourishing meal for an invalid.

The liver and heart should also be used. There are several ways of cooking liver; usually it is fried with rashers of bacon for breakfast. This is a favorite dish. Cut the liver into slices and place in a baking dish or casserole with rashers of bacon, then a thick layer of sliced onions, add pepper, salt, and a good dusting of flour, and nearly cover with water. Place in a hot oven and cook until tender. If a casserole is used, it may be left in the oven for the whole of the afternoon, and the long slow cooking is an improvement.

Another way is to mince the liver, bacon, and onion, put into piedish, adding a little salt, sage, and pepper. Sprinkle the top with breadcrumbs and dot with butter. Cook in a moderate oven for one hour. This is often called mock goose.

The heart should be stuffed with seasoning and roasted, and the kidneys roasted or cut in halves and fried.

Try some different ways of cooking chops; for instance, haricot chops are a change. For this take neck chops (as these are not so fat), chop in half and fry brown on both sides. Place in a saucepan. Peel and chop one onion, carrot, and turnip (grate the carrot and turnip if liked) and fry until brown. Add pepper and salt and enough flour to thicken, then add about 1 pt. of water. Stir well and pour over the chops. Allow it to stew for 1½ hours. Curried chops are also nice; these are cooked the same as the former recipe, only using an apple instead of carrot and turnip and adding curry powder with flour, pepper, salt, and sultanas. Serve with boiled rice. Chops are also nice cooked in the oven, and when partly done, pour over them a nice batter.

There are various ways of using up cold mutton left from a previous meal, which are tasty and economical. For this purpose a mincer is a boon to any housekeeper, and should be in every farm home. A very little cold mutton minced with some onion and mixed with breadcrumbs (or soaked stale bread), an egg to bind, will form rissoles for tea or breakfast, or the mince may be heated and served up on toast. The remains of a cold leg of mutton makes nice curry, which will be appreciated in cold weather.

A hash is another method of using up the remains of a leg of mutton. A casserole is nice for this, as the slow cooking in the oven does not make the meat tough. A hash or stew should never be boiled, only simmered.

Potato or shepherd's pie is always a favorite and is easily made from the left-overs of mutton. Mince some cold mutton, mix with it some chopped parsley and onion, pepper, salt, and a little flour and stock to moisten. Put into a piedish and cover with a thick layer of mashed potatoes. Brush over with beaten egg or milk and cook in the oven until it is thoroughly heated a nice brown, garnish with parsley.

This is another way for using cold meat:—1 cup of minced meat, 1 cup of bread and milk (fairly thin and previously boiled), 1 beaten egg, pepper and salt, 1 teaspoon curry powder and a little chopped onion. Mix together in a piedish. Sprinkle dry breadcrumbs on top and dot with butter. Bake from 30 to 35 minutes. Rice, breadcrumbs, potatoes, or batter may all be combined with cold mutton, making a very little into a savory and satisfying meal. The following are some recipes well worth trying:—

German Patties.—Cut thin slices of bread, and stamp out with a round cutter. Dip the rounds in melted butter. Make a mince of cold mutton, a tablespoon of grated cheese, a little curry powder, pepper and salt, and some good gravy. Thicken with a little flour. Put as much of the mixture as possible between two rounds of bread, press together, and dip in egg and breadcrumbs. Fry and serve very hot.

Mince Collops.—1½ lbs. mincemeat, 1 onion, 1 tablespoon of flour, salt, and pepper, 1 pt. water, 1 tablespoon fat. Divide the mince into small pieces and make into round balls, rolling in mixed flour, pepper and salt. Heat the fat in the saucepan and fry the balls until brown all over. When the meat is fried drain most of the fat out of the saucepan, then fry the chopped onion and add 1 dessertspoon of flour. Stir until brown, then add water; when boiling add meat balls and simmer one hour.

Meat, Macaroni and Tomatoes.—Cold meat, minced or chopped, 3ozs. macaroni, 3 large tomatoes, salt, pepper, sugar, and 1 gill of stock. Boil macaroni for 20 minutes in

salted water. Strain and place a layer of it in a greased piedish. Cover with half the meat, seasoned with pepper and salt, then a layer of sliced tomatoes sprinkled with sugar. Repeat these three layers, cover the top with breadcrumbs, and pour down the side 1 gill of stock. Bake in a moderate oven until the crumbs brown.

In summer it is advisable to put part of the sheep into pickle, as the mutton will not keep fresh in hot weather. Corned mutton is very nice boiled and served hot with carrots or cauliflower and white sauce or as a cold luncheon with lettuce salad.

The caulfat, suet, and any other scraps of fat or dripping should be rendered and put aside for soap or candles. Soap is quite simple to make at home. I generally use 12lbs. of fat at once, boiling it in the copper after the washing is done, but 6lbs. of fat can be made in a kerosene tin.

The skin of the sheep may also be used at home. Tanned or "cured" it will make a very nice mat, and odd pieces can be used to make polishers for floors, furniture, or boots. The wool, washed or "scoured," is used to make wool mattresses or wool-a-downs; it is also nice for stuffing cushions or toys for the little ones. In this way very little of this valuable animal is wasted, most of it being used up on the farm, with a small amount of labor and very little expense.

HANDMADE RUGS.

[By. MRS. E. L. ORCHARD, Belalie.]

Most of us, at one time or another, have encountered hard times, and it is then that we learn to economise. It is much better to practise economy with beauty, if possible. Patience and perseverance and a good sense of color schemes, with the use of well-worn, thoroughly clean woollen, and wool and cotton materials, can be an economy by which most of us may profit.

Wool keeps its warmth to the last thread and need not ever be wasted. Any article that can be cut into strips will make hooked or knitted rugs of almost everlasting wear.

Cotton and silk can be used, but it is not wise to mix the materials, because of their different wearing qualities. Making rugs for the floor is most fascinating work, and can be done by any member of the family—male or female—and all can help from the schoolchildren to the grandparents. Getting everyone interested is a great help, and they will love to remember that "the red in this doorslip was Norma's frock, the green was an old tablecloth the boys spilt ink on, and so spoiled for bridge; the grey was once dad's flannel trousers, that were patched at seat and knees and worn through again, &c." For this particular type of rug short ends of wool or wool and cotton goods (dressmakers' or tailors' scraps would be ideal) if knitted on a back ground of strong thread, they make wonderfully effective rugs; some authorities claim they wear longest of all home-made rugs. The idea is to knit in strips or squares, planned in striking designs and attractive colors, and they are very pleasing in effect. Twine about the thickness of knitting cotton, but of a firm twisted variety—I use macrame thread—No. 12 steel knitting needles, and a box of assorted materials arranged for convenience in separate compartments, is the necessary equipment. Cut material into pieces 2in. long by $\frac{1}{2}$ in. wide, and if the cloth is very thin, cut it wider, but same length, and fold as you work. Cashmere is cut very wide, flannel about $\frac{1}{2}$ in., and heavy cloth a little less than $\frac{1}{2}$ in.

The cutting of material into *regular* lengths is necessary for the finished appearance, and does away with any clipping afterwards. The clipping or shearing is the hardest part of your work.

The easiest way to work a rug is to knit in strips and top-sew together after knitting is finished; 13 or 15 stitches on the needle makes easy handling.

To begin: Cast on 13 stitches and knit one row, turn, knit first stitch, and lay on a piece of material a little more than half way across the thread with long end toward worker, knit second stitch, and place long end over and knit next stitch. Insert another

piece of cloth and repeat to end of row. Always work with pile of mat away from you. Knit the return row without putting in any cloth. Nine strips of this knitted fabric each as long as the rug required would make a hearthrug or bedside rug. After top-sewing the strips together, line with ticking or other firm material, and it will always keep a good shape.

Silk stockings, singlets, or any articles in Kayser or Celanese wear can be used after they are discarded by cutting into strips and crocheting into a rug.

Biscuit to brown shades make a good bedroom mat, and pink, blue, mauve, and green make a pretty bedroom cushion. When using stockings, cut off the worn feet, and beginning at the ankle, cut around the leg about $\frac{1}{2}$ in. wide, depending on the thickness each stocking will cut into a strip from 5 to 8 yards long. Wind each into a ball and arrange colors, then with a large crochet hook commence with enough chain to form centre of rug, work around with double crochet, increasing evenly at corners until size required; that makes a rectangular rug. To make an oval, increase irregularly at ends, and line with some firm material. These rugs can be cleaned by washing in Lux or soft soap, the same as if the material was still in its original form of stockings or singlets. As the feet and tops are cut off the stockings that are to be used, they can be pushed into one stockingtop and so make a soft, useful duster. I have used a rug constantly for nearly two years made from 118 stockings, 1 pair bloomers, and parts of 2 singlets, measuring $1\frac{1}{2}$ yds. by 26 in., and it is keeping the shape very well, and has not been hard to clean in spite of the northern dust. It has a flat appearance, but otherwise is showing no signs of wear.

The most fascinating of all handmade rugs is the hooked variety on canvas foundation. Many delightful designs and color schemes can be worked. Designs can be taken from the buckles on belt; patterns on linoleums are useful, and the pictures on the back of playing cards, &c.

For foundations, rug canvas or hessian can be used. Hessian is cheaper and can be used for the working of fine designs, such as flowers and for small geometrical patterns. Rug-canvas is very stiff, and open for a beginner, and the squares are easy to follow with any pattern that can be divided into corresponding squares, but it is very close work to follow the threads in hessian, though at first the canvas makes the worker's fingers tired and sore.

Hessian by the yard or cut from branbags should be washed before using for rugs to get rid of the natural unpleasant odour. All that is required to make a rug is a foundation, a No. 00 steel crochet hook, a pair of large broad-bladed scissors, and a suitable quantity of well-washed old clothes.

New materials may be used in conjunction with old, but it is best to wash and sometimes fade the materials before cutting or tearing into strips.

Generally speaking, a rug wears best if made entirely of woollen or entirely of cotton materials, though they can be mixed and a little silk or artificial silk introduced—but never in large patches—because silk tends to break away and cotton has to be treated differently to get the best results.

It is a good plan to design the rug first, and for a first attempt a simple design in lines and squares is best. When using hessian, very wide turnings must be taken or it will fray and spoil the appearance of the finished article.

When using dark material for border, it is wise to bind first of all the selvages with the same color bias binding. When the border is light, the edge is not noticed.

The next step is to cut or tear the materials into suitable widths; old material will not tear easily and goes all ways, but new is better if torn rather than cut. To test the width, hold it under the canvas, put the hook through the canvas from the top, and pull the end of the cloth through, leaving an end about 1 in. Insert the hook in the next space and draw a loop about $\frac{1}{2}$ in. to $\frac{3}{4}$ in. to the top, and if the loop fills the square comfortably without being dragged or slipped through, it is the correct width; that is all there is to learn in the stitch of hooked rugs made from cloth.

If using rug-wool, there are several ways of working a rug, all of them very beautiful. Always commence a strip with the end drawn up on to the right side and always finish a strip in the same way and commence the end of the next strip in the same space, all ends being sheared off in the final clipping of the rug. The back must be perfectly free from ends, and each loop—if the strip is of correct width—will help to keep its neighbor in place.

The last step in the making of hooked rugs is the shearing. All wool rugs are vastly improved by cutting off the surface of the loops, but cotton mats look best if left in the loops; if cut they go flat with wear, whereas the woollen materials remain soft and springy.

All clippings off rugs can be saved and used to stuff into a flock mattress or fill a cushion. They can be used in place of kapoc for filling golliwogs made from black stockings.

When shearing, only the tops of the loops need be cut, and if one occasionally is lower than others, the point of the scissors can be put in the loop and cut through. Scoured wool for rugs may be dyed with vegetable dyes.

If working a bold design, draw or stencil the pattern in colors on the canvas before commencing the hooking, and for a geometrical or conventional design it is most helpful to draw on graph paper or rule the paper into squares, to correspond with the canvas. Some of the fancywork stores in the city have designs stamped on canvas, and will stencil designs for customers, but their charges make the rug expensive. These rugs should not be lined, as they are fairly heavy and closely worked, and a lining will hold the dust. To clean them, beat against a wall and brush with a straw broom or vacuum cleaner, and if necessary sponge or wash in the usual Lux or soft-soap suds and dry in a not too strong wind.

In making the dollar rug, care must be taken to cut each piece exactly round, and if a cardboard gauge is used from which to cut each piece, the worker will find no difficulty in keeping them even.

Then there is the plaited floor rug made from cotton, silk, and artificial silk. Each color and variety of cloth is plaited separately and top sewn together and there is no need to line this type of rug, because it will wear a long time and keep flat on the floor without any backing.

If only a small quantity of material is available a good plan is to cut in $\frac{1}{2}$ in. strips, thread into a bag needle, and oversew into hessian. Mark a conventional design on the hessian in charcoal or chalk and then, taking long stitches on top and short ones underneath, sew the materials into the hessian to represent satin stitch or Indian filling in embroidery. It will make a very effective rug, and will wear satisfactorily.

[Mrs. Orchard gave a demonstration of the various methods of rug making and had on view samples of her work.]

Miss E. Campbell, Dip. Dom. Ec., Education Department, gave an address, "The Use of Wool and Sheepskins."

CONFERENCE AT COWELL.

Delegates from Women's Branches in the Eastern Eyre's Peninsula Branches met in Conference at Cowell on August 10th. Miss J. James (Mangalo), who read a paper on "Useful Hints in the Care of Sick Children," said for croup, a few drops of turpentine should be sprinkled on a piece of flannel and put around the neck. It should be left on for a few minutes according to the age of the child, and when taken off, replaced with a piece of flannel to keep the neck warm. For burns from boiling water, it was not advisable to remove the clothes, but to first pour on cold water, and after a few minutes some kerosene. If cold water was not available, use kerosene, afterwards carefully removing clothing. If done carefully no blister would appear. For other kinds of burns picric acid or lime water and olive oil was good. For centipede or scorpion bites, hot water and Condy's or washing soda was recommended. In all cases of sickness give a dose of castor oil first, or if the child cannot keep that down, a laxette. Even when a child is "teasy" and out of sorts a laxette—besides being tempting—is very useful.

In a paper in which she discussed the best way to mend men's socks, Mrs. F. Coles (Mangalo) said when a sock became much worn on the heel the best plan was to patch it. Not only was this method easier, but it was more comfortable than darns and more serviceable. First, make the hole even by trimming it with the scissors, then take from a sound yet old sock a patch just a fraction bigger than the hole in the sock. Set this in the hole and herringbone firmly all the way round. When finished, the sock looks neat and will wear like new. Toeing and heeling the socks can be done in the same way.

Miss Beryl Cleave (Mangalo) dealt with the subject of "Interesting Children in Farm Work." Children going to school, she said, thought their lessons were the worst problems in life, therefore on leaving school the children should have some object to occupy their minds because they were so free and active. A girl could be given a cow. The cow and her stock to be hers and the produce to be her mother's. She could learn quite a lot in managing a cow, milking, making butter, and rearing calves. Kindness and gentleness go a long way in handling a cow, either young or old. Regular hours for milking are most important, and as much as possible the same person should milk the same cows. The cow being the girl's very own, made her interested. Boys could be given a sheep. The first year he has its wool and the next its lamb and wool, and so on. He could eventually build up a small flock. They could also have a sow. The litters could be sold as weaners, or kept a few months and sold as baconers. There was much to learn about cows, sheep, and pigs, which made it interesting and kept the children well occupied. If they had nothing to do, there was much truth in the old saying 'Satan finds work for idle hands to do.'"

COONAWARRA.

May 24th.—Attendance, 21.

CAKEMAKING.—Paper presented by Mrs. R. Childs:—"Most housewives have found that a cake mixed in a hurry often turns out a good one and when we want a special cake and take the most pains it will most likely be an absolute failure. But taking a general rule one must be very careful weighing and measuring the ingredients for a cake. A good pair of scales is a household necessity, and weighing is more satisfactory than measuring. Before starting to bake make sure that the fire is right; have the wood cut rather on the fine side, so that if wood has to be added while the cake is in the oven it catches quickly. It does not chill the temperature of the oven so much as heavy pieces

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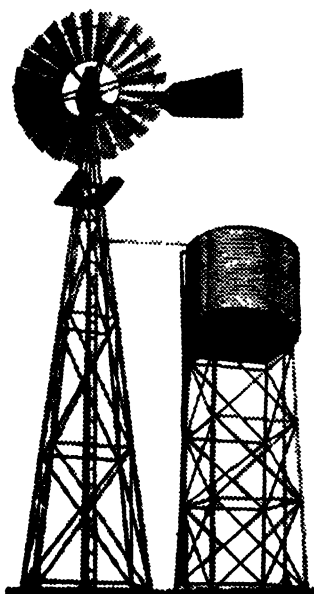
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of wood. Cakes are divided into three classes—those made by beating the sugar and eggs together; sponges; those made by creaming the butter and sugar—coffee, ribbon, sultana, pound cakes, &c.; and those made by rubbing the butter into the flour until it is like fine breadcrumbs. This method is used for rock buns, gingerbreads, &c.; but the first two methods are the most used in cakemaking. *Making a Sponge Sandwich.*—A sponge should be beaten 20 minutes until not a grain of sugar can be felt. I always use a spiral eggbeater. A sponge needs to be beaten briskly; the one beaten in the open air is lighter than the one beaten inside. Some sponge recipes have milk in and some have boiling water. Skim milk is lighter than new milk. After beating the eggs and sugar, sift and mix lightly the dry ingredients and add lastly the water or milk. Pour the mixture into prepared tins, place carefully in the oven—preferably just a moderate oven—and do not open oven until the sponge is cooked—about 20 minutes. If the oven is opened before it will often cause sponge to flatten. There are more sponges spoilt in the baking than in the mixing. Some recipes for sponges have arrowroot or cornflour instead of plain flour with rising sifted with it, or self-raising flour. These sponges are lighter but they are not so moist nor as economical as the other sponges for general household use. A chocolate sponge is made by adding from 5 to 6 teaspoonfuls of powdered chocolate or cocoa and sifting with the dry ingredients. A spiced sandwich is made by adding 1 teaspoonful of ground ginger or cinnamon and 1 of cocoa. In testing a sponge to see if it is cooked, open the oven door carefully and touch lightly with a finger; if the sponge feels elastic to the touch and it has not left a dent on the sponge it is cooked. Remove carefully from the oven, wipe the bottom of the sandwich tin with a damp cloth, and turn carefully on to the cake cooler or a clean teatowel. The second method of making cakes is the one most used. In winter the butter is rather hard for creaming, but I find it is a good plan to place the sugar in the oven for a few minutes until it is just warm; be careful not to allow it to get too hot or it will make the butter oily. Beat together until it is a light creamy consistency, then add eggs gradually, either well beaten or separately according to recipe and beat until not a grain of sugar can be felt and the mixture is light and creamy. If making a coffee cake, sift dry ingredients gradually and mix lightly; lastly adding the milk. If making a fruit cake, have all fruit washed and cleaned and thoroughly dry. Always cut sultanas in halves—it gives the cake a finer appearance and a nicer flavor. Add fruit and flour gradually to creamed butter, sugar, and eggs, and be careful to have the mixture not too thin—this is sometimes the cause of fruit going to the bottom. Always cook fruit cakes in well papered tins, placing them in a hot oven and gradually decreasing the heat. A good way to test a fruit cake or any butter cake is to use a clean straw or hatpin, pierce the thickest part of the cake, and test if the hatpin is dry and clean. For a chocolate cake add the dry cocoa or powdered chocolate to the dry ingredients and sift twice before adding to the cake. Make three mixtures for a ribbon cake, cooking 2 pink sandwiches, 2 white, and 2 chocolate. The following recipes may be helpful:—*White Sponge.*—1 cup each sugar and flour, 1 teaspoonful tartar, $\frac{1}{2}$ teaspoonful soda, 4 eggs, 4 tablespoonfuls of warm milk. Beat sugar and eggs for 20 minutes, add flour and rising which have been sifted twice, stir in very lightly, and lastly add milk. *Rich Dark Cake.*—1½ lbs. flour, 1½ lb. butter, ½ lb. brown sugar, 1½ lb. each raisins, dates, sultanas, and currants, ½ lb. mixed peel, $\frac{1}{2}$ teaspoonful ground ginger, cinnamon, and nutmeg, 8 eggs well beaten, 1 dessertspoonful soda, ½ lb. almond kernels, and pinch of salt—a nice recipe for Christmas or wedding cake. *Ginger Fluff.*—Beat 4 eggs for a few minutes, add $\frac{1}{2}$ cup sugar and beat for quarter of an hour. Sift together three times the following ingredients:— $\frac{1}{2}$ cup arrowroot, 2 teaspoonfuls ginger, a teaspoonful cinnamon, 2 teaspoonfuls cocoa, 2 dessertspoonfuls plain flour, 1 teaspoonful tartar, and $\frac{1}{2}$ teaspoonful soda; add gently to eggs and sugar, lastly add 1 dessertspoonful golden syrup, and bake 20 minutes in two large sandwich tins. A cream filling is nice for this sandwich. *Cream Cake.*—A nice plain cake, handy to make if short of butter:—4 eggs, 1 cup each sugar and cream, 1½ cups flour, 2 teaspoonfuls tartar and $\frac{1}{2}$ teaspoonful soda. Beat eggs and sugar well together, add cream, then flour and rising which have been well sifted. Cook in moderate oven about one hour. *Walnut Cake.*—1 cup butter, 1½ cups sugar, 3 eggs, 1 teaspoonful vanilla, $\frac{1}{2}$ cup milk, 1 cup chopped walnuts, 2 cups self-raising flour. Cream butter and sugar, add well beaten eggs, then chopped nuts and flour and milk gradually. Bake 1½ hours in moderate oven. *Sultana Cake.*—8 ozs. each butter and sugar, 5 eggs well beaten, 1 small glass of sweet milk, ½ lb. of self-raising flour, ½ lb. plain flour, ½ lb. sultanas. Cream butter and sugar, add eggs, then flour and milk gradually, lastly sultanas (chopped in pieces). Bake about two hours.

RECIPES.—*Delicious Fudge Cake* (Mrs. R. Redman).—Cream $\frac{1}{2}$ cup butter and 1 cup sugar; add 1 egg and pinch of salt. Beat well, then mix in 1½ cups self-raising flour

and 1 tablespoon cocoa alternately with $\frac{1}{2}$ teaspoon soda dissolved in $\frac{1}{2}$ cup milk. Lastly add $\frac{1}{2}$ cup boiling water flavored with vanilla. Bake in moderate oven three-quarters of an hour. When cool, split in halves and join with filling:—Put into saucepan $\frac{1}{2}$ cup hot water, $\frac{1}{2}$ cup sugar, 1 dessertspoon butter. Bring to boil and thicken with 1 tablespoon cornflour and 1 dessertspoon cocoa mixed with water; can be iced if liked. *Dolly Varden Cake* (Miss O. Lear).— $\frac{1}{2}$ lb. butter, $\frac{1}{2}$ lb. sugar, 3 eggs, $\frac{1}{2}$ cup milk, $\frac{1}{2}$ lb. flour, 2 small teaspoons cream of tartar, 1 teaspoon carbonate of soda, some peel, currants, sultanas, and spice. Divide into parts; make two layers of plain mixture with fruit and spice added to the third; then bake. Place layers together with icing or jam—dark layer in the centre. *Cinnamon or Jam Roll Biscuits* (Mrs. Reschke).—2 cups flour, $\frac{1}{2}$ cup sugar, 2 eggs, $\frac{1}{2}$ cup butter, 2 teaspoons cream of tartar, 1 teaspoon soda. Cream butter and sugar, add eggs, then other ingredients. Roll out and sprinkle with cinnamon or spread with jam, then roll. Cut in pieces $\frac{1}{2}$ in. thick, dip in sugar (if preferred), and bake 15-20 minutes. *Cream Puffs* (Miss M. Reschke).—Put on to boil $\frac{1}{2}$ pint water and 2ozs. butter. When boiling quickly throw in 4ozs. flour. Stir until smooth, then take off the fire. When cool beat into the dough 4 eggs one at a time. Bake $\frac{1}{2}$ hour. *Coffee Kisses* (Mesdames Mitchell and Hoffman).— $\frac{1}{2}$ lb. self-raising flour, 4ozs. butter, 3ozs. castor sugar, 1 egg, pinch of salt, one tablespoon coffee essence. Beat butter and sugar to a cream, add beaten egg. Add essence alternately with flour-salt to make stiff dough. Place small teaspoon at a time on well-greased baking sheet. Bake 5-7 minutes in hot oven. When cool join together with 3ozs. sieved icing sugar, $1\frac{1}{2}$ ozs. butter, 1 teaspoon coffee essence. *Nut Bread* (Miss R. Hinton).—2 cups of self-raising flour, 1 cup sugar, 1 egg, 1 cup nuts, milk to mix. Beat together and half fill well-buttered tins. Bake three-quarters of an hour. *Lord Baltimore Cake* (Mrs. F. I. Skinner).—Cream $\frac{1}{2}$ cup butter and 2 cups sugar, add 5ozs. chocolate (shredded). Add 1 cup mashed potatoes, and beat well. Add 2 beaten egg yolks, $\frac{3}{4}$ cup fresh milk, $2\frac{1}{2}$ cups flour sifted with 4 teaspoons baking powder. Beat well, then add 1 cup chopped walnuts and 1 teaspoon vanilla. Fold in two stiffly beaten whites. Bake in shallow tin in moderate oven 30 minutes. Cover with thick marshmallow icing heavily tinted with saffron (gold). Mask this with thin chocolate icing (black). *Bakette Buffs* (Mrs. Modistach).—1 egg, 5 cups bakettes or crispies, $\frac{1}{2}$ cup chopped nuts, $\frac{1}{2}$ cup butter, $\frac{1}{2}$ cup sugar, $\frac{1}{2}$ cup cocoanut. Cream butter and sugar, add egg, then nuts and

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cocoanut, and lastly bakettes. Put in teaspoons on greased slide. Bake until golden brown (30 minutes). Leave on tray to cool. *Raisin Shorts* (Mrs. Modistach).—6ozs. self-raising flour, 2ozs. plain flour, 2ozs. sugar, 4ozs. butter, 1 egg beaten with 1 tablespoon cold water. Rub butter into flour and sugar. Mix to light dough with liquid. Knead a little, roll out thin, and cover half with raisins or currants. Place other half on top, making a sandwich. Roll slightly in order to press together, and cut into fingers. Brush over with milk, and sprinkle with sugar and cocoanut. Bake golden brown (10 minutes). *Caramel Cake Squares* (Mrs. Len. Redman).—½lb. brown sugar, ½lb. butter, 1 egg, 1 cup self-raising flour, ½ teaspoon salt, ½ cup chopped nuts, ½ cup shredded dates, ½ teaspoon vanilla essence. Melt butter and sugar, add unbeaten egg, beat until light. Stir in flour, and beat again thoroughly. Fold in nuts, dates, and essence. Spread ½in. thick. Cook in slow oven. Cut into squares while hot, and leave in tin until cool. *Eggless Cake*.—4 cups flour, 1 cup butter, 2 cups sugar, 2 teaspoons soda, 2 teaspoons cinnamon, 1 teaspoon mixed spice, 1 cup currants, 2 cups buttermilk. Bake 1 hour. (Dripping and sour milk can be used instead of butter and buttermilk). *Christmas Cake*.—4lbs. flour, 1lb. currants, 2lbs. butter, 4lbs. sultanas, 2½lbs. sugar, 1lb. mixed peel, 2 teaspoons cream of tartar, 24 eggs, 1 teaspoon soda. Mix in ordinary way. This will make two large and two small cakes. Bake slowly from 2½-3 hours. *Delicious Cake for Tea or Dessert* (Mrs. E. Alder).—½lb. flour, ½lb. butter, ½ teaspoon baking powder, ½lb. sugar, white of 2 eggs and yolk of 1, jam. Sift flour and baking powder, rub in butter add sugar, make into stiff paste with egg yolk. Roll out to size of dinner plate. Bake a light brown. Beat whites stiff, adding sugar and essence to taste. Pile roughly on jam. Return to oven to harden. *Lamington Cake* (Miss E. Skinner).—2 cups (small) flour, 2 eggs, 1 cup sugar, 1 heaped teaspoon cream of tartar, ½ cup milk, 1 level teaspoon carbonate of soda, ½lb. butter. Beat butter and sugar to a cream. Add eggs, then flour and cream of tartar. Put soda in milk and stir in. (Secretary, Mrs. F. S. Skinner.)

KYBYBOLITE (Average annual rainfall, 22in.).

May 14th.

HOME NURSING.—Miss Kealy read the following paper:—"At some time or other sickness comes into everybody's life. It is the one legacy, unfortunately, which all will most surely inherit, therefore it is wise to be prepared. Always have a supply of bed linen and garments, well boiled old linen, and a well equipped medicine chest, containing castor oil, mag. sulph., brandy, iodine, boracic acid, and carron oil, &c. *The Selection, Preparation, and Cleaning of a Sick Room.*—It is not always convenient to choose the most fitting room for the sick person to inhabit. However, if possible, the room should be as bright and well lighted as possible, it should be well ventilated, and have a fireplace in it. Fresh flowers arranged in the room each day help to make it more cheerful.

Bed and Bedding.—Try, if possible, to avoid nursing a patient in a double bed. Feather beds are not only unhealthy, but are most uncomfortable for sick persons to lie upon on account of the great difficulty they have in preventing themselves from sinking into hollows. A good horsehair mattress is the best for a sickroom bed. With regard to pillows, suit them to each individual case; the patient will soon say how the pillows are best placed to make him comfortable. Some persons have a most happy knack of being able to place pillows very quickly and very comfortably, and one of the best pillows is so placed that the patient lies on as it were an inclined plane, and thus having plenty of support to the back of the neck and shoulders. The upper clothing should consist of a sheet, one or more blankets, according to the weather or the doctor's orders, and a thin counterpane. A draw sheet, and, in certain cases, a waterproof sheet is a necessity, more particularly in long illnesses.

Bedsore.—In all cases of long illness, a nurse will find that one great difficulty presents itself in her many duties, and that is the preventing of bedsore. Often in spite of every effort on her part a bedsore will come, and then it will be her duty to carry out every detail of treatment ordered by the doctor, because she has to prevent the nasty complication of a case from becoming worse. **Prevention.**—Always keep the parts of the body that are exposed to pressure scrupulously clean, be careful that the sheet on which the patient lies is kept smooth and free from wrinkles and bread-crumbs; remove the sheet from under the patient directly it is soiled; vary the position of patient as much as possible, and each time the patient is washed, rub well with methylated spirits, and then apply a good talc powder. If, however, a sore be established in spite of all care, the doctor should be told of it, and he will give all directions with regard to treatment.

Temperature.—Most people understand taking a temperature, the normal reading being 98.4 degrees. The armpit is the usual and best part of the body to apply the thermometer, and in doing so be careful to apply the ball next to the patient's skin, seeing that no part of the clothing intervenes.

Pulse.—It takes a great amount of experience and practice for one to understand the condition of a pulse; 70 to 76 beats a minute is the average pulse of a person lying in a horizontal position and unexcited.

Respiration.—The different kinds of respiration are of the greatest importance, about 18 to 20 respirations a minute is the average rate of breathing.

Washing a Patient.—There is nothing so refreshing to a patient as a thorough washing, and a comfortable sleep is often the result of it after restless hours have been passed.

Administration of Medicine, &c.—It is a wise rule, that instead of trusting to a spoon to measure the dose always use a marked measure glass and give the exact quantity ordered by the doctor. Fomentations are applications of hot water, and these may be simple or medicated by the addition of any drug. Always wring fomentations as dry as possible; they are more comfortable and are not likely to blister the skin.

Coughs and Colds.—How often does it happen that severe colds are caught and the seeds of life—long illnesses sown through carelessness, such as sitting about in wet clothing, or changing from woollen garments to cotton ones, &c. By taking aspirin and hot lemon drinks, and plenty of rest, a cold is sometimes checked; however, remember a cold should never be neglected. Regarding the doctor's instructions. Many persons have good memories, and many exceedingly bad ones, but even those who pride themselves upon their ability to retain what is told them so often forget; therefore, it is a good rule to have a pencil and paper at hand and make a note of all directions given by the medical man. Be loyal to the doctor under whose care you have placed the patient, and try always to carry out his orders faithfully and accurately."

BREAD MAKING.—Paper read by Mrs. John Hefferman; meeting held June 20th, 1933.—Good yeast is the first essential. Compressed yeast is very good and only takes a few hours to bake bread with it, but is rather expensive. All things being considered hop yeast is the best. **Yeast.**—Boil 1oz. hops in nine cups of water for 20 minutes, strain and add one cup each sugar and flour and mix hot. When cool, add 1½ lbs. cooked potatoes finely mashed; beat in and let rise until next morning, then add one handful salt and it is ready for use in a day. It should be put in a wide mouth jar and will not require a cover, only a clean cloth to keep out dust, &c. This yeast will keep five or six weeks and only has to be stirred before using; half a cup makes a large bake of bread. To make the bread, take five sifters of flour and add one tablespoon sugar, one handful salt, half cup yeast, and enough potato water to make into a nice dough, knead well. Cover up warmly in cold weather and leave to rise all night. Mix after the evening meal, and first thing in the morning turn it out on a floured board and work it up, taking care not to mix much flour into it, just enough to keep it from sticking to the hands; put back into the dish and let it rise again. When risen sufficiently, it rises much quicker in hot weather and does not need to be kept near the fire, take and roll into loaves. A much nicer loaf is to use 4 lb. tins and put 2 lb. loaves in them and have them greased well and again set to rise. When it is up to the top of the tins, put in a fairly hot oven and bake 1½ hours. It is a great improvement, when taking the bread from the oven, to brush over the tops of the loaves with hot water. It makes the crust nice and soft. Always stand the loaves on end, otherwise there may be a hard ridge all through the loaf. If short of bread, bake some bread rolls before the loaves are ready to put in the oven. Cut off some dough and roll into small rolls and put in a small dish; these usually rise sufficiently in half an hour, then bake about quarter of an hour. **Troubles in Bread Making.**—Once-kneaded dough is sticky and will not rise, under-kneaded dough is streaky and the bread will contain lumps of dough that have not been crushed out, too much flour gives too stiff a dough, it rises very slowly and the flavor will be poor. Too long a rising gives a porous loaf with poor flavor. If the rising continues too long, the bread settles over the side of the tin and becomes sour. Too cool an oven will make the bread rise too long and it will be porous. When putting the salt in the bread, never put it in the yeast, always put it in the flour.

RECIPES.—**Yeast or German Cake.**—Take about the same quantity of dough as for the buns and add one cup sugar, ½ lb. butter, or half butter and dripping, a little nutmeg and cinnamon, also a few currants or sultanas and three eggs. More eggs may be used if a richer cake is desired. Test well and add enough flour to make a nice soft dough; let rise for one hour and then put into a well greased meat dish or the oven slide and let rise again. Top for the cake, half cup each flour and sugar, one tablespoon butter, and a little cinnamon, crumble together, brush over the top of the cake with melted butter and then sprinkle it over. Another recipe is to brush over the top of the cake with cream or melted butter and sprinkle sugar and cinnamon over it. This is much easier; it also requires a fairly hot oven. **Buns.**—Take a piece of dough, say, 2 lbs.; after it has well risen, melt one tablespoon butter

or dripping and add one cup sugar, one egg, a few currants or sultanas, and a little nutmeg. Mix well and put in a dish to rise until the bread is put in the oven. Then turn out and work it into small buns, put on a greased slide and set to rise until the bread is baked. Bake quickly and brush over the tops with one tablespoon sugar mixed in a little boiling water and put back in the oven for a minute until the glaze dries. Caraway seeds may also be used for those that prefer them. *Raisin Bread*.—Take about 2lbs. of dough, one cup each seeded raisins and sugar, and one tablespoon dripping. Mix well, add enough flour to make into a nice dough, let rise for an hour, roll into loaves and leave to rise until ready to bake. Glaze the top with a little sugar and boiling water. (Secretary, Mrs. W. Kekwick.)

MANGALO (Average annual rainfall, 14in. to 15in.).

June 15th.—Attendance, 16.

GARDENING.—Mrs. O. Hannemann read the following paper:—"To make gardening a success a good fence, which is fowl proof, and an adequate supply of water is most necessary. If on an open spot, a breakwind should be erected. All vacant ground should be dug up, limed, and left for some weeks. Then apply a good dressing of stable manure and dig fork deep. This should again be left for some days before planting. To get early cabbage and cauliflower, sow in January and February. Sow the seeds thinly in a seed box and cover with very fine earth and a light mulch of well rotted stable manure, which should be kept moist. Once up the plants should be kept moving, giving a weak application of liquid manure once a week. Do not pour the solution on the leaves, because it will burn them. Plants do not need to be large, but strong. They should be planted 2ft. or more apart. Do not overcrowd. Choose a dull day for transplanting, and, if possible, protect them from the sun until rooted. When cauliflower heads begin to form, tie the outside leaves to protect the flower from the sun and dust. These vegetables require an abundance of water and manure. Always hoe after watering to conserve moisture. Lettuce must be grown quickly, they require very rich soil. Carrots, turnips, and all root vegetables do best on soil that has had a previous crop well manured. Seed should be sown in February or March. I prefer the Manchester Table carrot and White Stone turnip. Onions do well on sandy soil. Tomatoes need well worked ground. Never grow two crops in succession on same soil, this also applies to beans. The longer period between growing the better the results. Tomatoes do better if staked and pruned. The fruit is much larger and keeps clean. Sow the seed at the beginning of July for an early crop. Early Red Dwarf is the best variety. Epicure is a good bean. A small corner of the garden should be set aside for flowers. Roses need very little attention and flower for practically eight to nine months of the year if mulched with stable manure during hot weather and by removing all dead flowers—the cut being made to an outgrowing bud, which will very soon shoot and produce another flower. Fruit should be grown also, the value of fresh fruit cannot be over-estimated. Almond trees are profitable; they give shade and shelter, and the nuts are useful for making sweets and cakes. To eat several after each meal is very wholesome." (Secretary, Mrs. B. Coles.)

MORCHARD (Average annual rainfall, 13.59in.).

June 9th.—Attendance, 16.

INAUGURAL MEETING.—Mr. H. C. Pritchard (General Secretary) delivered an address, and the meeting then took the form of a "Question Box." Cure for turkeys with swollen heads? *Answer*.—Rub with sulphur and oil, or kerosene and oil. Put a little kerosene in drinking water, failing that pierce the head alongside the eye with sharp instrument. Tomato sauce corks "popping off"? *Answer*.—This may be caused by either the use of inferior vinegar, insufficient boiling, or because the bottles were not dry when the sauce was put into them. Which are the most profitable, spring or autumn chicks? *Answer*.—Spring chickens were favored because they would be laying at Easter, when eggs are dear. Autumn chicks do not lay until summer, when eggs are cheap. What causes home-made soap to shrink? *Answer*.—This was thought to be due to cutting up too soon. Mrs. F. Twigden always used 12lbs. fat, and when boiled it was poured into two half kerosene tins, left for three days, then turned out, and cut up after leaving in a block for three weeks.

Recipe for Furniture Polish.—Use equal parts boiled oil, kerosene, vinegar, and turpentine. Put in bottle, shake well, sprinkle on woollen cloth and rub briskly on furniture. (Secretary, Mrs. C. Schulz.)

PARILLA (Average annual rainfall, 13.90in.).

ANNUAL COOKING COMPETITION HELD ON APRIL 19TH.—The competition was opened by Mrs. H. Billing, of the Wilkswatt Branch, and was judged by Mesdames H. Fewings, F. Reze, and W. B. Davis, of the Pinnaroo Branch. The following are the sections and

prizewinners:—(1) One plain and one brown sponge, Mrs. G. Belling first, Miss Phillis second; (2) plain and brown sponge roll, Mrs. R. C. Kerley first, Miss Phillis second; (3) one sultana cake and currant cake, Mrs. Bailey first, Mrs. Welden second; (4) one seed cake and one coffee cake, Miss Heinicke first, Mrs. Smitham second; (5) ribbon cake and napoleon cake, Miss Phillis first, Mrs. Phillis second; (6) scones, plain and wholemeal, and coffee rolls, Mrs. Colwill first, Mrs. Bailey second; (7) nut loaves, Mrs. Johnston first, Mrs. Phillis second; (8) cream puffs, Mrs. Dabinett first, Mrs. Wright second; (9) puff pastry, Mrs. Brown first, Mrs. Colwill second; (10) collection of biscuits, Mrs. Howie first and special, Mrs. R. C. Kerley second; (11) plate of small cakes, Mrs. R. C. Kerley first, Mrs. Phillis second; (12) bread (white and wholemeal and bread rolls), Miss Phillis first and special, Mrs. Phillis second; (13) yeast cake, Miss Phillis first, Mrs. Phillis second; (14) rich dark cake, Miss Colwill first and special, Mrs. Welden second; (15) six jars jam, Mrs. Foale first and special, Mrs. Colwill second; (16) three jars jelly, Mrs. Foale first, Mrs. Pearce second; (17) one lemon marmalade and one orange marmalade, Mrs. Foale first, Miss Colwill second; (18) three bottles preserved fruit, Miss Colwill first, Mrs. R. C. Kerley second; (19) tomato sauce, Mrs. F. Kerley first, Mrs. Foale second; (20) cucumber pickle, Mrs. F. Kerley first, Mrs. Foale second. The competition was held in the afternoon, and in the evening a dance was held, when the hall was crowded, showing the popularity of the Women's Branch of the Agricultural Bureau. (Secretary, Mrs. R. Welden).

PARRAKIE (Average annual rainfall, 14.49in.).

June 27th.—Attendance, 15.

KNITTING.—Mrs. M. Cabot read the following paper:—"Knitting has many advantages over other 'fancy work,' in that it is quickly done, easy to do, very little eye-strain, and it can be done anywhere at any time when one has a spare moment. During the War many people learned to knit, principally to make garments and comforts for the soldiers, but after the War was over the knitting needles were put away, only a few mothers retaining them to knit socks for husband or sons. A few years ago when the price of wool became so low, everyone was urged to 'use more wool' to assist the wool-growers. Knitting wools were manufactured in numberless shades and sizes, and then it became fashionable to wear knitted garments. The result was that nearly every person learned to knit. The colorings of the wool are dainty and the patterns of garments interesting and varied. The knitting craze has been a great boon to sheep farmers, and the price of wool at the present moment is higher than it has been for some time. In knitting there are only two stitches—plain and purl—and it is just a matter of how they are put in order that makes the pattern. Anyone who has achieved the art of knitting by following any instructions given should be able to accomplish any garment. A few of the best known stitches are garter stitch, stocking stitch, moss stitch, pineapple stitch, and cable stitch. *Knitting Hints.*—When pressing woollens, always press on wrong side over a damp cloth with a hot iron. When knitting socks, shrink the wool before knitting. Take the skein, soak it in lukewarm water for a few minutes, squeeze out the water, and lay out on paper to dry. When dry, wind loosely. To join the edges of a knitted garment, lay the two portions of the work to be joined on a flat surface so that the edges just touch and catch the corresponding edges together, taking a stitch first from one side and then from the other, on the side nearest to you; point the needle towards you when taking the stitch and on the far side of the work, point the needle away from you. From one side always lift the lower stitch of the ridge, while on the other side lift the top stitch. Do not draw the thread tight. When joined in this way, the seam is almost invisible. When joining wool, never make a knot; always splice the two ends. Persons who suffer from rheumatism should always use bone knitting needles; steel needles are very cold. When washing woollens, never rub—squeeze the article to be washed in lukewarm water to which Lux has been added. Rinse in water of the same temperature, and squeeze out the water. Spread out on paper to dry after having pulled the article into shape."

KNITTING.—Paper read by Miss I. Coleman:—"When rolling a skein of wool, a good plan is to roll it around a block of camphor and there will be no danger of damage by moths. Do not roll tightly; this stretches the wool. Do not knit tightly, as this spoils the appearance of the work. When casting off the back of a jumper to shape it, knit row until five stitches remain on each end, then knit back until 10 stitches are on both ends, and so on until there are about 3in. left, then knit to end of row and cast off. Always cast off in purl; this allows the work to stretch. Always knit into back of all cast-on stitches, to form a neat and strong edge. To make a stitch, bring wool forward between needles and over the right hand needle. Some jumpers are shown to better advantage if not ironed. To iron a jumper, press carefully under a damp cloth and use a hot iron." (Secretary, Miss J. Halliday.)

PENOLA (Average annual rainfall, 26.06in.).

June 7th.—Present: 29 members.

RECIPES FOR CAKES AND BISCUITS.—The following were supplied:—*Dark Rich Cake* (Mrs. Carne).—1lb. flour, ½lb. self-raising flour, ½ grated nutmeg, ½ teaspoon salt, 1 teaspoon cinnamon, ½ teaspoon spice, 8 eggs, 1lb. each butter and castor or soft sugar, 1½lbs. sultanas, 1lb. currants, ½lb. raisins, ½lb. each dates and candied peel, 2 table-spoons brandy, 1 saltspoon soda stirred in 1 dessertspoon boiling water. Divide into two tins and bake 2½ to 3 hours. Test with dry straw. *Soone Loaf*.—Sift 3 cups flour with 2 teaspoons cream of tartar and 1 teaspoon carbonate of soda, pinch salt, 1 teaspoon cinnamon or mixed spice, 1 cup mixed fruit, ½ cup sugar, stir in 1 table-spoon melted butter, sufficient milk as for fruit cake. Turn into buttered tin, and cook in a moderate oven for 1½ hours. Slice and butter for use. Improves a few days old. *Melting Moments*.—½lb. butter, 3 tablespoons each icing sugar and cornflour, 9 tablespoons flour; beat butter, add icing sugar, beat these well, add the cornflour and lastly flour; take small pieces and roll between the hands. If inclined to stick, corn-flour hands. Place on cold slide and mark with a fork or force through a biscuit forcer. *Jewish Cake* (Mrs. Levick).—½lb. butter, ½lb. sugar, 1 dessertspoon cinnamon, 3 eggs, ½lb. S.R. flour, ½ cup milk and water. Method.—Beat butter and sugar to a cream, add eggs, well beaten, then flour and cinnamon sifted together; lastly milk and water. Bake in sandwich tins about 20 minutes. *Caramel Icing*.—2 cups light brown sugar, 1 dessertspoon butter, ½ cup milk, pinch of c. tartar; boil together 12 minutes; when cold beat to a cream and add vanilla essence. If too thick, add a little milk. *Cocoanut Square* (Mrs. Provis).—3ozs. each sugar and butter, 6ozs. S.R. flour, 1 beaten egg. Rub sugar, butter, and flour together, add egg. Press out on baking dish and spread lightly with jam, put in moderate oven. Mix 1 cup each sugar and cocoanut and 1 beaten egg; sprinkle lightly on top of cake and bake until golden brown. *Savory Chops* (Mrs. C. Reilly).—Trim as many chops as required of all fat, and roll them in plenty of flour. Lay in a casserole or pie dish and sprinkle with salt and sugar. Mix in a basin 3 tablespoons tomato sauce, 2 tablespoons each Worcestershire sauce and vinegar and sufficient water to cover chops. Cover dish and cook slowly for 2 hours. *Savory Pudding* (Mrs. Thos. Kidman).—½ cup flour, 1 cup suet or dripping, 1 onion, carrot, parsnip, turnip, and potato, 2 teaspoons c. tartar, 1carb. soda, pepper and salt to taste, a little mixed herbs and 1lb. minced meat. Mix as for plum pudding and put in cloth and cook 4 hours. If fresh meat is used, keep water boiling well. *Ginger Cake* (Mrs. J. Neilson).—2 cups flour, 1 small cup sugar, 2 tablespoons treacle, ½ cup milk, ½lb. butter, 1 teaspoon each mixed spice, cinnamon, 2 of ginger, 3 eggs. Beat butter and sugar together, add treacle, then eggs, beat short time. Mix dry ingredients. Dissolve 1 teaspoon carb. soda in milk and add lastly. Put a few pieces of butter on top and sprinkle with cocoanut and sugar. *Useful Cake* (Mrs. W. Balnaves).—½lb. butter, 1 cup sugar, 2 eggs, 1 small cup milk, 2 teaspoons c. tartar, 1 carb. soda. Cream butter and sugar, add egg (beaten), then milk, with soda and c. tartar. Add currants or cocoanut. *Caramel Rhubarb Pudding* (Mrs. W. L. Redman).—Mix together 2ozs. each butter and sugar, spread inside a basin. Make a crust with ½lb. flour and 3ozs. dripping, 1 teaspoon baking powder, and pinch salt, mix with cold water to make a stiff dough. Line basin carefully with paste, reserving enough for lid. Fill mould with cut-up rhubarb and 4 tablespoons sugar, wet edges well, put on lid. Tie greased paper on top and steam 2 hours. *Cinnamon Cakes* (Mrs. J. Doman).—1 cup sugar, 3½ cups flour, 1 cup golden syrup or honey, ½lb. dripping, 2 teaspoons c. tartar and 1 of carb. soda, ½ cup milk. Mix dripping and sugar with 2 tablespoons boiling water, then add golden syrup, then flour, with c. tartar and soda added, lastly milk. Roll into balls with hand and dip into cinnamon and sugar. Bake on greased tray. These cakes improve with keeping. *Dark Fruit Cake* (Miss K. Sharam).—½lb. butter, 1 cup each sugar, S.R. and plain flour, 1 cup milk, 2 eggs, ½lb. each currants and sultanas, 1 tea-spoon soda, lemon peel, ½ nutmeg, ½ teaspoon spice, 2 tablespoons jam. Mix butter and sugar, add eggs, milk, and flour, jam last. *Cornflake Dainties* (Mrs. Mitchell).—Beat whites of 2 eggs with ½ cup sugar, add 1 teaspoon vanilla, ½ cup cocoanut, 2 cups cornflakes, mix all together. Melt 3ozs. butter and mix. Drop teaspoonful on slide. Bake in cool oven about ¼ hour. If liked, an almond on top. *Teddy Bear Cake* (Mrs. J. McCalman).—2 tablespoonfuls butter, 1 cup sugar, ½ cup milk, 5 eggs, 2 cups flour, essence of lemon or vanilla. Beat butter and sugar to a cream, add eggs and beat well. Then add milk and essence. Lastly, add S.R. flour and beat for 10 minutes. Bake for ¼ hour in a hot oven. *Rough Cake*.—4 cups flour, 2 cups sugar, 2 eggs, 1 cup dripping, 1½ cups milk and a few currants or other fruits, 2 teaspoonfuls cream of tartar, 1 of soda. Warm, but do not oil the dripping, and beat it with the sugar. Add eggs and then milk. Finally put in the other ingredients. *Cocoanut Crispies* (Mrs. T. Oswald).—2 cups rolled oats, 2 tablespoonfuls golden syrup, 1 cup flour, 6ozs. butter, 1 cup each sugar and cocoanuts, 1 small teaspoonful vanilla essence, 1 tea-

spoonful soda dissolved in three tablespoonfuls hot water. Mix butter and sugar, add syrup, then soda in hot water, rolled oats, cocoanut, and flour. Take about a teaspoonful of mixture, drop on tray; bake in a very slow oven. *Date and Nut Slices* (Mrs. R. Milway).— $\frac{1}{2}$ cup butter (equal $\frac{1}{2}$ lb.), 1 cup sugar, 1 egg, 2 cups each chopped dates and flour, 2 teaspoonfuls baking powder, $\frac{1}{2}$ teaspoonful vanilla, $\frac{1}{2}$ cup chopped walnuts, $\frac{1}{2}$ cup milk. If possible buy stoned dates—they are more economical. Sift flour, baking powder, and salt, add sugar, and rub in butter. Mix stiffly with beaten egg and milk. Turn on to a floured board and roll out into a large square $\frac{1}{4}$ in. thick. Mix dates and walnuts together; add tablespoonful boiling water and beat until soft. Spread over half mixture and fold other piece over the top; press down edges. Put on greased slide or oven tray and glaze top with milk or beaten egg. Bake in quick oven until golden brown. Cut off into squares or strips while hot; suggested size is 1 in. x 2 in. Raisins, sultanas, or figs may be used. Omit boiling water if using these fruits. *Butter Cake* (Mrs. W. Mitchell).— $\frac{1}{2}$ lb. butter, 6ozs. sugar, 9ozs. flour, 1 teaspoonful soda, 2 cream of tartar, 3 eggs, 3 tablespoonfuls milk. Beat butter and sugar, add eggs, and then flour. I sometimes use cocoa (2 small teaspoonfuls) or 2 tablespoonfuls coffee essence, with walnuts added. Bake about $\frac{1}{2}$ hour. *Jubilee Cake*.— $\frac{1}{2}$ cups S.R. flour, 1 tablespoonful castor sugar, 1 dessertspoonful butter, 1 cup each sultanas, currants, and peel, 1 egg, $\frac{1}{2}$ cup milk, pinch of salt. Mix dry ingredients together, add eggs and milk; while still hot pour over 2 tablespoonfuls icing sugar mixed with milk, sprinkle with cocoanut; bake $\frac{1}{2}$ hour. *Cream Puffs* (Mrs. Beschke).—Put $\frac{1}{2}$ pint water and 2ozs. butter on to boil. When boiling, throw in quickly 4ozs. flour. Stir until smooth, then take off fire. When cool, beat into the dough 4 eggs (one at a time). Bake for $\frac{1}{2}$ hour. (Secretary, Mrs. E. Kidman.)

PINNAROO (Average annual rainfall, 14.54 in.).

May 5th.—Attendance, 28.

The meeting was held at the residence of Miss K. O'Loughlin, who gave a demonstration of wholemeal cookery and read the following recipes:—*Wholemeal Bread*.—2 qts. wholemeal, 2 qts. plain flour, pinch of salt, $\frac{1}{2}$ cup treacle, 3 cups yeast, enough warm water to make a fairly moist dough, and allow to rise in the usual way. *Wholemeal Scones*.—3 cups each S.R. flour and wholemeal, pinch of salt, 1 dessert-

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spoonful treacle. Add treacle to buttermilk or milk and mix fairly moist. *Marmalade Pudding*.—1½ cups wholemeal, ¼ cup marmalade, 1 tablespoonful butter, 1 teaspoonful soda in ¼ pt. of milk. Boil 4 hours; fill basin three-quarters full. *Fruit Cake*.—½lb. wholemeal, ½lb. each sugar and butter, 5 eggs, ½ cup each treacle and strong black coffee, 1 teaspoonful each carbonate soda and mixed spice, ½lb. each currants and raisins (stoned), 2ozs. each dates and lemon peel, juice and rind of ½ lemon. *Wholemeal Biscuits*.—½lb. each wholemeal, flour, butter, and sugar, 3 eggs, 1 teaspoonful carbonate soda and 2 teaspoonfuls cream of tartar, ½ cup milk or buttermilk. *Cream Biscuits*.—1 cup cream, ½ cup sugar, 3 eggs, 3 cups wholemeal, 1 teaspoonful carbonate soda and 2 of cream of tartar. *Wholemeal Buns*.—½ cup each wholemeal and flour, ½ cup each treacle, sugar, and milk, 1 teaspoonful each ginger, cinnamon, and ½ teaspoonful soda dissolved in little boiling water. Bake in moderate oven in papers. When cold, fill centres with whipped cream. *Ginger Nuts*.—½lb. wholemeal, ½lb. each treacle and butter, ½oz. ginger, spice to taste, 1 teaspoonful carbonate soda, ½ teaspoonful salt, 3ozs. dark sugar, 2 tablespoonfuls milk. *Cream Cakes*.—1 cup cream, ½ cup sugar, 3 eggs, 2 cups wholemeal, 1 teaspoonful soda and 2 of cream of tartar. Bake in patty papers; when cold, lift a centre and fill with whipped cream. *Ginger Pudding*.—2 cups wholemeal, ½ cup each treacle and butter, 1 teaspoonful each ginger and cinnamon, ½ cup of milk, 1 teaspoonful soda, pinch salt. Boil 4 hours; serve with sauce. *Parkin*.—½lb. wholemeal, ½lb. plain flour, ½lb. butter, ½lb. brown sugar, ½oz. ground ginger, ½ teaspoonful carbonate soda, ½lb. golden syrup, 1 egg, and enough warm milk to mix. Bake in flat dish. Wholemeal cooking requires to be mixed fairly moist, otherwise it is inclined to be dry when cooked and crumble. Recipes with treacle or honey are generally good for wholemeal. It also makes an excellent porridge. Boil for ½ hour and when cooked whisk with eggbeater. (Secretary, Mrs. F. Atze.)

June 2nd.—Present: 20 members.

HOME NURSING.—Mrs. J. Fisk read the following paper:—"When time and circumstances permit choose a bright, sunny room, and remove all unnecessary furniture, carpets, &c. This will prove a great help in keeping the room clean and tidy, especially if it is necessary to disinfect afterwards. A single bed will be found to be most convenient. Arrange the bed so that it is in such a position that it is not in a draught and the occupant can see out of the window. This will be much appreciated when the patient is convalescent. A horsehair mattress will be found the easiest on which to nurse the sufferer, and may be protected by layers of newspaper if no mackintoshes are procurable. After the long sheet has been placed over the mattress a draw sheet arranged across the bed, under which the mackintosh or protective newspaper is put, will save linen and prevent unnecessary moving if the patient is unconscious. A long sheet folded in halves will serve as a draw sheet. If the patient is helpless always secure aid when lifting or moving him, as if this is attempted single handed the patient is forced to exert himself, which will probably be very harmful. He should be sponged once a day at least, particular attention being paid to the back. If the illness is prolonged methylated spirits applied to the back and the presence of a soft pillow will greatly alleviate this complication. Any crumbs should be removed from the bed after each meal, and the sheet kept straight and free from creases. If the patient has long hair, keep it in two plaits. Remember that little things irritate sick people, so do not burden him with long conversation, wear slippers or shoes with rubber heels, and keep the rest of the household as quiet as possible. Any flowers should be removed from the sick room at night. Reassure the patient and keep his spirits bright, and refrain from discussing depressing subjects with him. Provide him with some means of attracting attention when required, such as a bell. Ventilation to be thorough must be systematic. It is the frequent changes of temperature which do harm, the sudden alteration between hot and cold which must be carefully guarded against and prevented. Always keep window open at top day and night; the stale used-up air rises and goes out of the top of the window, fresh air comes in through the opening at the bottom. Always close window and door when the patient is being sponged or examined by doctor. If the patient is too weak to clean his teeth put a piece of lint around the handle of the toothbrush and clean teeth and gums. A good mouth wash is made with glycerine and lemon juice. *Burns*.—Always keep a bottle of carron oil or picric acid in the house. Soak the lint or soft rag, apply to burns, and cover affected part up as soon as possible. Carbonate of soda may be used in the same way. If burns are severe it is advisable to call in the doctor. *Infectious Diseases*.—Keep patient isolated. All bed and body linen of patient should be placed in a bucket containing disinfectant before leaving the room. The food which has been in an infected room must be destroyed, the crockery boiled, and all bedding boiled and bed disinfected. Always use a damp disinfected duster in infectious cases, and wash the floor each day with

disinfectant. Do not sweep with a broom. Never delay in calling in the doctor where there is a persistent temperature. Many a life has been lost through this neglect. Food is essential to keep the body in good health. It is needed to keep up heat as well as to maintain muscular and brain power. If a person is starved he loses not only weight but vitality, the capability of doing physical or mental work, and the temperature falls. When people are ill food is even more essential. It must be both digestible and nutritious. Punctuality in giving nourishment and medicine is always important. Never ask a patient what he would like to eat. Serve food in a dainty manner and a little at a time. Remember—"Prevention is better than cure'."—(Secretary, Mrs. Atze).

RENDELSHAM.

June 7th.—Attendance, 12.

BISCUIT MAKING.—Mrs. Bignell read the following paper:—"It is a good plan to give one whole day to biscuit making. It is rather tiring work, so if several different kinds are made that day and stored in airtight tins it will only be necessary to make biscuits every few weeks. Biscuits put away in tins for a few days before using are much nicer than newly made ones. A moderately hot oven is needed. Clean slides and grease before using with dripping—butter creates moisture. When biscuits are cooked tilt on to flat trays or boards until first heat is gone. Wash bowls, beaters, spoons, &c., after each mixture is completed. Flavored icings improve plain biscuits; while rich biscuits are nice with a sharp jam put between, or on top, then dipped in cocoanut. *Anzac Biscuits.*—1 cup each of S.R. flour, flaked oats, cocoanut, and sugar. Melt in a saucepan $\frac{1}{2}$ cup butter 2 tablespoons water, 1 tablespoon treacle, 1 teaspoon soda. When thoroughly heated add the dry ingredients and drop in small spoonfuls on greased tray; bake 15 to 20 minutes in medium oven. *Oaties.*— $\frac{1}{2}$ cup sugar, $\frac{1}{2}$ cup butter, beat together and add 1 cup flaked oats, $\frac{1}{2}$ cup plain flour, $\frac{1}{2}$ teaspoon carb. soda dissolved in tablespoon boiling water. Mix well and drop small spoonfuls on greased tray; bake in cool oven; stand on tray a few minutes when cooked. *Nut Biscuits.*—Rub $\frac{1}{2}$ lb. butter into $\frac{1}{2}$ lb. flour with which has been sifted 2ozs. castor sugar and 1 teaspoon baking powder. Mix into stiff dough with the yolk of 1 egg and 1 tablespoon cold water. Roll out thin. Mix 5 tablespoons icing sugar (rolled) with the lightly beaten white of 1 egg, spread on dough, sprinkle with chopped nuts, and cut into fingers. Bake in oven moderate at first then somewhat cooler. *Raspberry Sandwich Biscuits.*—4 cups flour, $1\frac{1}{2}$ cups sugar, $\frac{1}{2}$ lb. butter, 3 eggs, 2 teaspoons c. tartar, 1 teaspoon soda. Roll out thinly, cut, and bake in quick oven. Spread jam between while hot. Bake 5 to 10 minutes. *Macaroons.*— $\frac{1}{2}$ lb. butter, $\frac{1}{2}$ lb. flour, $\frac{1}{2}$ lb. sugar, 1 teaspoon each baking powder and essence of vanilla, 2 eggs. Beat butter and sugar, add other ingredients. Make into small balls and put an almond on top of each. Bake 10 to 15 minutes in moderate oven. *A Light Biscuit.*—1 lb. flour, $\frac{1}{2}$ lb. butter, $\frac{1}{2}$ lb. sugar, 2 eggs, 1 teaspoon baking powder. From this recipe one can make a variety of biscuits by different fillings, icings, &c. *Honey Biscuits.*—1 lb. flour, $1\frac{1}{2}$ lbs. honey, 4 eggs, 4 teaspoons soda, 2 teaspoons mixed spice, $1\frac{1}{2}$ nutmegs, flour enough to roll out, a few drops of essence of lemon and a little ginger if liked. *Hunting Nuts.*—1 sifter of flour, put into flour 1 teaspoon each ginger, cinnamon, and soda. Sift these into bowl, add 1 cup brown sugar and $\frac{1}{2}$ lb. dripping, rub dripping into dry ingredients, then add 2 eggs. Have 1 lb. treacle warmed and add a little at a time. If desired cakey put white sugar, and let stand 4 hours; roll into round balls and bake in moderate oven. *Poor Man's Biscuits.*—8 cups flour, 4 level cups sugar, $1\frac{1}{2}$ cups milk, 3 teaspoons soda, 2 teaspoons c. tartar, 3 cups dripping, pinch salt, flavoring to taste, and boil milk and sugar, sift in soda; pour over flour, &c.; when cool roll out thin and bake. These biscuits will keep fresh any length of time if kept in air-tight tins." (Secretary, Mrs. G. Andrews.)

TANTANOOLA.

June 7th.—Attendance, 13.

DRY SALTING A PIG.—Mrs. E. Telfer (Hon. Secretary) read the following paper:—"The best months for curing a pig are May, June, July, August. After the pig has been cut in suitable pieces, remove the ham bone, insert a few holes in the thick part of the hams with a steel, and work some salt and saltpetre into the hole with the steel. Then rub the pieces well with coarse salt and stack them, flesh side up. After two days change the position, putting the bottom pieces at the top after rubbing with a mixture made up of the following: 3lbs. brown sugar, 7lbs. salt, 2ozs. saltpetre, 1oz. allspice, 1 dessertspoon of carb. soda. This mixture will cure 1cwt. of meat. Rub the pieces twice a week, each time changing the position. Leave the sides in a fortnight and the hams 3 weeks. Wash in luke-warm water and hang to dry, then smoke. Afterwards rub over with olive oil."

BRINE FOR CURING PORK OR BEEF.—Recipe supplied by Mrs. Altschwager:—"1 gall. water, 1½ lbs. salt, ½ lb. brown sugar, ½ oz. potash. *Method.*—Boil and skim, then cool, when cold pour over the meat. The meat must be thoroughly cold and well sprinkled with crushed saltpetre to remove the surface blood. The above proportion to be used in making any quantity. Float a raw potato or an egg to test the strength of the brine." (Secretary, E. Telfer.)

WARCOWIE (Average annual rainfall, 11.42 in.).

June 6th.—Attendance, 8.

JAM MAKING.—Paper read by Miss G. Sanders:—"Select fruit that is firm and sound, fruit that is over-ripe is more likely to ferment or develop mould. Jam should be boiled in a shallow enamelled preserving pan, using a large wooden spoon for stirring. If boiled quickly it gives the jam a better flavor and a brighter color, while insufficient cooking causes fermentation. ½ lb. sugar to every 1 lb. of fruit is quite sufficient if the jam is to be used right away, should the fruit contain acid, 1 lb. sugar to every 1 lb. of fruit may be used. If a tablespoon of butter is added to jam when cooled it brings all stones to the surface, makes it clearer, and does not injure the jam in any way. *Recipes.*—*Apricot Jam:* 12 lbs. apricots, 12 lbs. sugar, 4 cups water, 1 teaspoon tartaric acid. Boil sugar and water a few minutes, remove scum, then add apricots, which have been halved and stoned. Add a few kernels and boil quickly for 1 hour, add acid just before the jam is cooked. *Melon and Lemon:* Cut 7½ lbs. melon into pieces, sprinkle 7½ lbs. of sugar and stand all night. Cut 6 lemons in slices, cover with boiling water and stand all night. In morning, boil all together." (Secretary, Mrs. A. Crossman.)

YURGO.

June 14th.—Attendance, 9.

PRESERVING FRUIT.—Paper read by Mrs. Sanders:—"Syrup for fruit preserving is prepared by making a solution of ½ lb. of sugar dissolved in 1 pint of water. Boil and set aside to cool. Select only sound and firm fruits. Have all fruit as near one size as possible and pack very closely in jars without bruising. Pour over syrup to cover fruit, and place in steriliser with water reaching to within 1 in. of top of bottles. The best kind of bottles are those sealed by vacuum and are very strong. I have had no trouble with those, and they are not very expensive. The rubber rings with care will last two or three seasons. Different kinds of fruit need different temperatures. The harder fruits need longer cooking with higher temperatures. My steriliser was made at home from a 5-gall. oil drum which holds 8 large bottles, leaving the lid to fit down over the bottom half. It is rather cumbersome, but answers the purpose. A kerosene tin cut in halves lengthways can also be used, but does not hold so many jars." (Secretary, Mrs. R. Sanders.)

[**ERRATUM.**—The recipe for polish for stained floors on page 1314, June issue, should read—1 bottle of methylated spirits, instead of kerosene.—Ed.]

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Kangarilla	15/6/33	16	Annual Meeting	Mrs. M. Steer
Kangarilla	20/7/33	12	Formal	Mrs. M. Steer
Tantanoola	5/7/33	15	Discussion	Mrs. S. Telfer
Warrambooboo ...	26/5/33	10	Annual Meeting	Mrs. A. Steer
Parilla	17/5/33	22	Annual Meeting	Mrs. R. Welden
Parilla	21/6/33	30	"Hook Rug Making," Mrs. R. Kerley	Mrs. R. Welden
Clare	1/7/33	34	Annual Meeting	Mrs. W. McKendrick
Kybybolite	4/7/33	24	"The Education System," Mrs. J. Parroisiers	Mrs. W. Kekwick
Gladstone	14/7/33	20	Annual Meeting	Miss M. Sargent
Williamstown ..	4/7/33	13	Address—Miss E. Campbell	Mrs. A. Cundy
Wasleys	6/7/33	48	Address—Miss E. Campbell	Miss G. George
Belalie	13/7/33	—	Annual Social	Mrs. A. Cummings
Parrakie	18/7/33	27	Demonstration—E. Leishman	Miss J. Halliday

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All communications to be addressed:

“The Editor, Journal of Agriculture, Education Building, Adelaide.”

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A. P. BLESING,
Minister of Agriculture.

AGRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Agricultural Bureau Conferences.

Branches of the Agricultural Bureau have been advised that District Conferences will be held as follows:—

Eyre's Peninsula (Southern), at Cummins, Wednesday, October 4th. (Secretary, Mr. H. M. Roberts.)

Eyre's Peninsula (Central), at Minnipa, Friday, October 6th. (Secretary, Mr. D. V. Kitto.)

Each Conference will commence at 10.30 a.m.

Retirement of Mr. C. H. Beaumont.

Orchardists in the Southern districts regret to learn of the recent retirement of Mr. C. H. Beaumont, who for many years so ably filled the position of District Horticultural Instructor, and who was a constant contributor to this *Journal*. He was born in Ballarat, Victoria, and was educated as a mining engineer, taking chemistry and botany as part of the course. His first appointment was that of an analyst at Broken Hill, and later he went to Western Australia as a mine manager; he returned to Broken Hill as general manager of the Junction Mine, but he was compelled to retire owing to the effect of gases from a fire which had broken out there. He established a home at Penwortham, where he planted an extensive orchard and conducted experiments for the Department of Agriculture on the control of codlin moth. After disposing of his orchard he came to Adelaide and joined the horticultural branch as an inspector, and for a while was attached to the staff at the Blackwood Orchard.

In 1914 Mr. Beaumont travelled to South Africa and England, and presented a report on the marketing of South Australian fruits. Some 10 years later he went to Canada and California in order to obtain information on the export of fresh fruits and on methods of drying and handling grapes and prunes. The introduction of insecticides in dust form is to Mr. Beaumont's credit, and he was the first to point out the importance of chlorate of soda as a weedicide. Dehydration has been a pet subject of Mr. Beaumont, and the establishment of many plants now in use is largely due to his advocacy. Zealous attention to his duties as District Horticultural Instructor has been highly appreciated by fruit and vegetable growers and by Branches of the Agricultural Bureau in the district which was under his supervision. Besides a special vote of appreciation carried at the recent Southern Conference, Mr. Beaumont has received many letters from Branches and others expressing the high esteem in which orchardists of his district regard the services which he has rendered to them.

Feeding Value of Malt Coombs.

Farrell's Flat asks, "What is the feeding value of malt coombs?" Replying to the question, Mr. W. J. Spafford, Deputy Director of Agriculture, says South Australian malt coombs have been analysed fairly recently with the following results, and they are presented alongside of those of wheat bran, to which foodstuff the coombs are comparable:—

	Malt Coombs.		Wheat Bran.	
	Composition. Per Cent.	Digestible Nutrients. Per Cent.	Composition. Per Cent.	Digestible. Nutrients. Per Cent.
Moisture	12.2	—	12.2	—
Ash	5.6	—	3.6	—
Crude protein	21.0	16.8	16.4	13.0
Fat	1.2	0.9	2.6	1.8
Nitrogen-free extracts	42.3	30.9	56.8	40.3
Fibre	17.7	9.8	8.4	2.2
Starch equivalent	43.8		45.1	
Nutrient ratio	1 to 2.5		1 to 3.6	



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These figures show that bran with a starch equivalent of 45.1 per cent. is a little better fattening foodstuff than is malt coombs with 43.8 per cent. of starch equivalent, but on the other hand the high digestible protein content of 16.8 per cent. for the coombs and the narrow nutrient ratio of 1 to 2.5 makes it a better foodstuff for the production of milk and the growth of young animals than is bran with a digestible protein content of 13.0 per cent. and a nutrient ratio of 1 to 3.6.

Because of its mechanical condition, as well as because of its concentrated nature as a foodstuff, malt coombs can be fed to sheep or cows to best advantage if mixed with hay chaff. If for any special reason sheep were to be kept off pastures and were wholly artificially fed with hay chaff and malt coombs they would need to receive from 1½ lbs. to 1¾ lbs. chaff and from ½ lb. to ¾ lb. malt coombs. Such a happening, however, would be of rare occurrence, and when ordinary sheep are hand fed it is usually done to supplement failing pastures, and for the purpose a mixture consisting of ¾ lb. to 1 lb. of chaff and 4 ozs. to 6 ozs. of malt coombs should prove useful. For milking cows, where malt coombs is the only concentrated foodstuff available, it should be given in hay chaff at the rate of about 1 lb. for every 4 lbs. of milk being produced by the animals. Better results, however, are likely to be secured if malt coombs is given in a fifty-fifty admixture with bran or oats rather than as a single concentrate.

Publications Received.

"Cultivation of Vegetables in Frames." Bulletin 65. Price, 1s. net. Ministry of Agriculture, England.

"Turkeys." Bulletin 67. Price, 6d. Ministry of Agriculture, England.

VETERINARY INQUIRIES.

[Replies supplied by Veterinary Officers, Stock and Brands Department.]

Southern Conference: "Is information available of the health of pure-bred stock as compared with grade cows, under the same conditions, or can any evidence be given as, for instance, are pure-bred stock more susceptible to mammitis, abortion, milk fever, or hoven than herd cows?"

Reply—Pure-bred stock are no more susceptible to any of these diseases than grade or ordinary herd cows. Milk fever only occurs in high producing animals, but will affect them irrespective of their breeding. Again, with mammitis, contagious abortion, and hoven if you expose your animals to the causes that give rise to these troubles they will contract them with equal facility, no matter what their breeding may be.

Southern Conference: "Is contagious abortion more prevalent in dairy herds in South Australia than is generally thought?"

Reply—This disease is undoubtedly more prevalent in dairy cattle in this State than is commonly thought. In the first place, when a case of abortion occurs in their herd, many owners are prone to think that the trouble is merely due to some "accidental" cause. It is only if they get a succession of cases perhaps that they begin to realise that the contagious form of the disease is present. While it is true that abortion in cows can occur as the result of accident, rough handling, &c., such cases are ever so much less common than is generally thought. It can safely be said that over 90 per cent. of cases of abortion that occur in cows are due to infection with the contagious disease, and the wisest policy to adopt is to treat every case as contagious until definite proof to the contrary can be obtained. Then, again, abortions not infrequently occur in the early stages of pregnancy (and this is especially the case in heifers) and pass unnoticed. The first sign of anything being wrong is the animal "coming in season" again after she was thought to be safely in calf. This is usually considered to be merely a "failure to breed," and so the animal is put

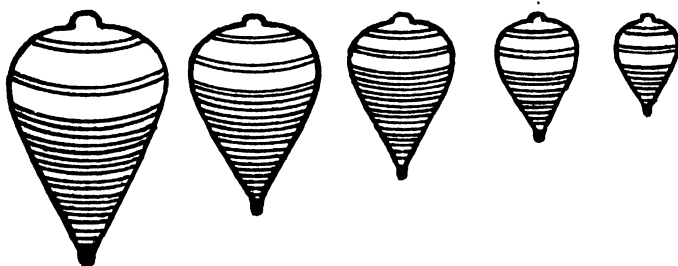
straight back to the bull again. No suspicion is raised that she might be affected with contagious abortion, as is often the case. It would be wise for owners to "check up" more thoroughly on such cases of apparent failure to breed.

Southern Conference: "Does contagious abortion take different forms with cattle?"

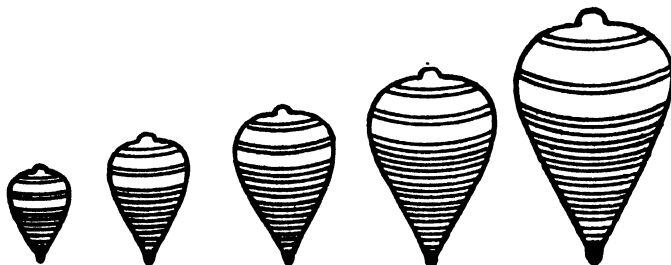
Reply—There is only one actual form of the disease, though the clinical manifestations may vary somewhat in different animals. The usual evidence of infection is the occurrence of abortion, especially if the infection is recent. Some few animals, however, never abort at any time, and so are never suspected of being infected. Yet they can spread the disease to other animals. After a cow has aborted once or perhaps twice, she will subsequently carry most if not all of her calves to full term and calve apparently normally, although she is still an infected animal. In the majority of cases, however, the membranes or "afterbirth" will be retained, and an evil-smelling, dirty discharge from the uterus persists for some weeks.

Southern Conference: "Are other animals on the farm, or humans, subject to infection by the same germ of abortion?"

Reply—Swine have been experimentally infected with the specific contagium of contagious abortion of cattle, but it is doubtful if a natural infection of them with it takes place to any extent. These animals do suffer from a contagious form of abortion, but the causal organism is a different strain to the one responsible for the disease in cattle. A number of cases have been recorded from different parts of the world of an indefinite and intermittent fever being set up in human beings through association with or handling cattle infected with contagious abortion, or through drinking raw infected milk, but it is not yet known just what are the factors necessary for the transmission of this trouble to man. However, as these cases so far recorded are comparatively rare and mild, and yet contagious abortion of cattle is extremely prevalent in all countries throughout the world, there appears to be no real occasion for alarm.



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ORANGE SURVEY ON IRRIGATION AREAS.

REPORT ON AN INVESTIGATION INTO THE NATURE AND CONDITION OF WASHINGTON NAVAL ORANGE TREES GROWING IN VARIOUS ORANGE GROVES OF THE BERRI IRRIGATION AREA.

[By F. R. ARNDT, Horticultural Instructor of the Upper Murray Irrigation Areas.]

(Paper read at the 44th Congress of the Agricultural Bureau, September, 1933.)

In the year 1927 the Chief Horticultural Instructor (Mr. Geo. Quinn) initiated the idea of conducting an investigation into the nature and condition of Washington Navel orange trees as grown in the orange groves of the Murray Irrigation Areas and in collecting data in connection therewith, the main object of such research being to ascertain the type, productiveness, or other features of the individual trees, so that these could be classified into a number of grades according to their various characteristics. The chief outlines for conducting such a survey were submitted by Mr. Quinn to Mr. H. Beriman (Horticultural Instructor of the Mid-Murray Irrigation Areas) and to the writer, and in collaboration with each other a scheme was evolved for carrying out this work and for putting it into execution.

OBJECTS OF THE INVESTIGATION.

The main objects of the investigation were briefly as follows:—

Firstly.—To ascertain the nature or type of the individual trees, and to find out if these were of the true Washington navel type, or of the “off type” navel strain.

Secondly.—To discover the relative productiveness of the individual trees of the grove so that the profitable trees as well as the unprofitable ones could be indicated.

Thirdly.—To endeavor to discover the reason for variations in the health and productiveness of individual trees, and to ascertain if these differences were due to hereditary or environmental factors.

Fourthly.—To take note of trees of high productivity producing fruit of first-class quality, the bud wood of which would be suitable to use for propagating purposes.

METHODS OF INVESTIGATION.

Seven typical orange groves were selected for the carrying out of the investigation the individual trees of which were annually examined during the months of May & June before much harvesting of fruit had taken place, and their records were taken during the six consecutive years of 1927 to 1932, inclusive. The data collected in connection with the survey was entered on the spot into field books in which the position and number of the tree rows, as well as those of the individual trees, were kept. The subjects upon which information was taken were as follows:—

1. *Habit of Trees.*—Whether high, spreading, or symmetrical.
2. *Condition of Growth.*—Whether vigorous, moderate, stunted, or yellow.
3. *Cause of Condition of Growth.*—Whether due to various soil conditions, such as seepage, salt, &c., or other causes.
4. *Quality of Fruit.*—Whether good, inferior, &c.
5. *Size of Fruit.*—Whether large, medium, or small.
6. *Approximate crop* of tree in bushel cases.

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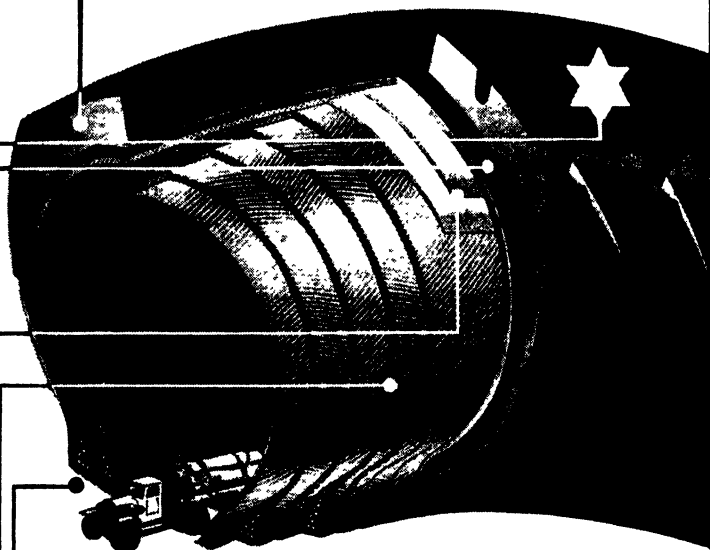
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NUMBER OF TREES EXAMINED.

The number of Washington Navel orange trees that in this investigation I had under observation and of which I took records was somewhat over 5,000, and were situated on Blocks 1, 5, 7, 8, 9, 17, and 97 of the Berri Irrigation Area.

ESTIMATING THE CROPS.

The most important, as well as the most difficult, part of the orange survey was in trying to ascertain the quantity of fruit produced by the individual trees, as this was the chief means of discovering their commercial value. To obtain exact figures in regard to this matter it would, of course, have been necessary to weigh the fruit from each tree separately, but as there were over 5,000 trees to examine, and the time that could be spared for this work was narrowed down to five or six weeks each season, it was quite beyond the means of a single investigator to do this.

The method that was adopted was to carefully go around each tree and to make an estimate of what it was thought that the crop as measured in packed bushel cases was likely to be. Of course, such an estimate could be approximate only, as a considerable proportion of the fruit was often partly or wholly obscured by foliage or by other fruit which, coupled with variations in the size of the individual fruits, at times made calculations difficult and militated against the accuracy of the observations. However, as the estimates of the various trees were all conducted along the same lines the standard thus set up was thereby kept fairly constant, so that the calculations made, although only approximate, gave a fairly correct indication of the relative production of the trees.

Crop estimates made at the beginning of the season were at times checked with the grower's figures of the total amount of fruit harvested, which at times showed a considerable degree of accuracy. Thus, in the year 1931, the total orange crop of Block 17 was estimated to be 1,947 bushel cases, and later in the season the proprietor of this orange grove informed me that the total crop from his trees for the season had been 2,047 packed bushel cases, while in 1932 the estimated crop of this block was 1,751 cases and the actual crop 1,657 packed bushel cases.

THE "OFF-TYPE" NAVEL.

The investigation revealed the existence of a considerable number of trees in most of the orangeries of an inferior strain, usually known as the "off-type" navel. Compared with those of the true Washington Navel variety trees of this type are usually more upright in growth and sparser in foliage, while their fruit generally has a rougher and thicker skin, and is more acid in flavor.

The proportion of trees of this type to the total number of trees in the grove varied considerably in the various orangeries. Thus, on Block 8, out of a total of 503 navel trees no trees of the "off-type" strain were found, while on Block 1 they numbered 193 out of 635 navel trees, and on Block 17, 145 out of 336 navel trees. The total number of "off-type" trees discovered was 713 out of a total of 5,131 navel trees, or about 13.89 per cent. of the whole.

ORIGIN OF THE "OFF-TYPE" NAVEL.

In regard to the origin of the "off-type" navel there are two main theories in the field—one of which holds that it is a separate variety, and the other that it is due to "sporting" buds of Washington Navel trees "throwing back" to a more primitive strain.

On one plantation most of the "off-type" trees were found to be situated in a section by themselves separated from those of the true type. In this case the two classes of trees had apparently been budded in quantity from parent trees of two distinct types, probably by different nurserymen, and had been but little mixed when planted out in the orchard.

In another instance where the great majority of the trees were of the true Washington Navel strain several "off-type" trees were found amongst them, although all of the trees had come from the same nursery, which fact could perhaps be explained by the theory that the trees of inferior strain were "throw backs" from "sporting" buds accidentally taken from trees of the Washington navel variety.

That such variation at times occur was found to be the case in the orangery just mentioned (Block 5), in which a limb of an otherwise perfectly normal good type Washington Navel tree was discovered to be carrying a crop of very inferior "off-type" fruit, although the fruit on the other portions of the tree was of first-class quality. Had bud wood from this tree been used for propagating purposes during the spring or early summer months before the fruit had developed sufficiently to show its character, it is easily seen, as the two classes of growth differed but little from each other in appearance, how a considerable number of trees of the "off-type" strain could have been propagated in this way together with a greater number of trees of normal type.

VARIATIONS IN THE "OFF-TYPE" NAVEL.

Quality of Fruit.—The fruit of the "off-type" navel often varies considerably in character on different trees. As previously mentioned, the fruit is generally coarse and thick in the skin, and the juice is rather acid to the taste. There is, however, often a considerable difference in the size of the fruit of different trees, as well as in the thickness of their skins, but how much of these variations are due to the influence of either heredity or environment is difficult to tell, but probably both of these factors are at work. The fruit generally hangs fairly well on the trees, and is usually marketed when the Washington Navel Crop has been harvested, by which time it has usually increased considerably in sweetness.

Hardiness.—The "off-type" navel is not a hardy tree. During the investigation it was noticed in practically every instance that where the soil was affected by either salt or seepage the "off-type" trees showed the ill effects of these conditions much more quickly, and often sickened and died before adjacent trees of the true Washington Navel strain become adversely affected from such causes.

Productiveness.—"Off-type" trees are usually not nearly as productive in the matter of fruiting as are those of the true Washington Navel strain, and in many instances are very shy bearing, producing but a few dozen fruits per tree. The practice of cincturing the stems of these trees by means of a single cut made with a sharp knife in the spring when the flowers are falling has, where employed, generally increased their productiveness considerably, in many cases so much so as to make trees that previously were comparatively unproductive quite profitable after this method had been applied. Cincturing also often has the effect, on account of the greater amount of fruit thus produced, of absorbing much of the surplus vigor of the trees, in making the individual fruits much smoother and thinner in the skin, and thereby giving them a better appearance.

COMPARATIVE PRODUCTIVITY OF "OFF-TYPE" AND TRUE-TYPE NAVEL TREES.

With the exception of the trees of two orange groves, those of Blocks 1 and 17, time has not permitted a complete analysis being made in regard to the comparative productivity of all the "off-type" trees compared with all of those of the true Washington Navel strain of which records were taken during this investigation.

For the six years covered by the investigation the 193 "off-type" trees of Block 1 produced an estimated average of 2.03 bushel cases per tree per year, while the 442 true Washington Navel trees on this holding produced an estimated average of 3.16 bushel cases per tree per year, this being an increase of over 50 per cent. in favor of the latter variety.

On Block 17, which orchard has the largest grown "off-type" trees in the district, the difference in the production of the two classes of trees was not very great, the estimated average being 3.45 bushel cases per tree per year for the 145 "off-type" trees on the plantation and 4 bushel cases per tree per year for the 191 Washington Navel trees. On each of these orangeries both classes of trees were cinctured annually.

THE THOMPSON'S IMPROVED NAVEL.

A number of trees of the Thompson's Improved Navel variety were found in several orangeries. These trees were generally found to be good croppers, and appeared to be rather better bearers than those of the Washington Navel variety, although no data was collected in regard to this matter. In appearance the fruit of this variety when of normal type is generally fairly large, rather oval in shape, with a fine, smooth skin. The fruit ripens early—often at the end of May or early in June—but in quality is below that of the Washington Navel, and is often lacking in juice content and in flavor. In addition, the fruit at times is very variable, often differing in shape, appearance of skin, and in juice content on the same as well as on different trees.

THE WASHINGTON NAVEL.

This variety was found to be the best of the various strains of the navel orange met with during the investigation. The fruit of this variety also at times varied in size, shape, and flavor, but most of such variations could in the great majority of cases be traced to the influence of environment, of which the nature and condition of the soil appeared to be the most important. Other factors that also influenced the quality of the fruit were cultural operations and such climatic conditions as frost, heat, wind, &c.

No well-defined difference in the character of the individual trees of this variety and in the quality of their fruit that could readily be ascribed as being due to hereditary factors alone were met with, although it is probable that a number of slight natural variations existed that were not readily discernible and so escaped notice. Indeed, it was rather surprising to observe how small were the variations in the quality of the individual fruits where the trees were growing under good conditions, and among thousands of trees it was impossible to discover any that showed marked superiority over the others in regard to quality of fruit that could not be explained as being due to the influence of environment. The true Washington Navel appears to be a well-defined, staple variety with well-marked hereditary characteristics, being by nature less variable in character than either the Thompson's Improved or "off-type" navel strains, and only very occasionally gives rise to any definite bud mutations, as in the case of the limb of the tree previously mentioned.

ENVIRONMENTAL FACTORS GOVERNING CONDITION OF TREES.

The chief environmental factors that appeared to govern the condition of the trees, as observed during the period the investigation was in progress, were as follows:—

1. *Nature of Soil.*—The nature of the soil of the orangeries under observation was in most instances a fairly deep sandy loam which, however, varied in places, both in texture and in depth. The trees generally grew well where the land was fairly loose and of a depth of 2ft. to 3ft. or more before a subsoil of loose calcareous marl was reached.

2. *Injury to Trees Due to Washing of Soil.*—On several orangeries a number of trees were found to be injured where there were steep irrigation runs on account of a considerable portion of the surface soil having been washed away. This had left the trees standing on mounds with very little surface soil around their main roots, with the result that the trees had become stunted in growth.

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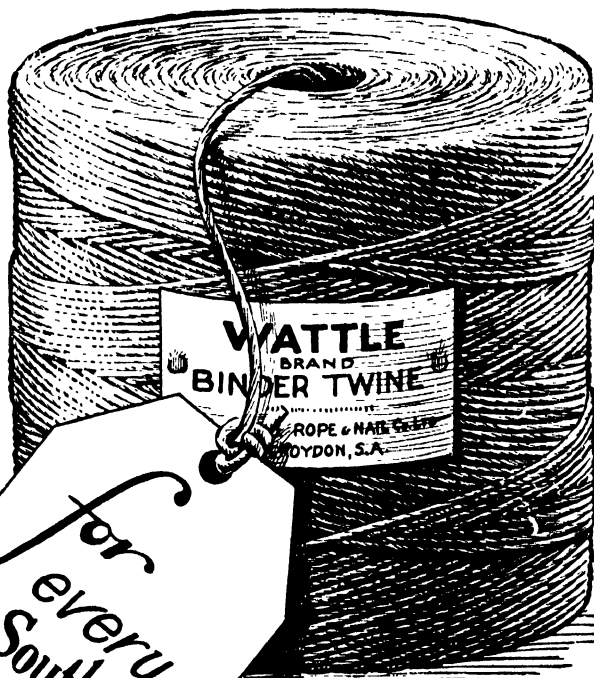
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Culture.—On the various orange groves under review the trees had been well cared for in regard to routine tillage operations, and the growers concerned were alive to the fact that orange trees required liberal supplies of nitrogenous fertilisers annually, which were generally applied either in the form of sulphate of ammonia, blood manure, or nitrate of soda, the rate of application varying with the different growers, but probably being on an average equivalent to about 5cwts. of sulphate of ammonia per acre.

Injury to Trees Due to Salt or Seepage.—Observation revealed the fact that where the trees were not thriving—with the exception of a comparatively small number growing on naturally unsuitable soil—that the cause of their inferior condition was also invariably due to adverse soil conditions brought about by salt or seepage troubles, or by the washing of the soil away from their roots on steep irrigation runs.

To cope with the seepage and alkali menace lines of underground tile drains had been put down in most of the seepage areas by the growers concerned with the object of removing the surplus underground water so that the water-table of the affected land would thereby be lowered. Where the drains had been put down before these adverse soil conditions had developed sufficiently to do much damage the trouble was usually checked or overcome, but where drainage operations were delayed until the soil had become bodily affected the injury done to the trees was often so great that these obtained but little relief therefrom—and at times even died—after the land had been drained.

CLASSIFICATION OF TREES.

To determine the relative value of the individual trees these were classified into five different grades according to their health and vigor, habit, quality of fruit, and estimated crop production during the six consecutive years that they were under observation. The following is a description of the various grades:—

Grade No. 1 was represented by vigorous growing trees of good habit that had produced good quality fruit of an estimated average of two or more bushel cases per tree per year.

Grade No. 2 was represented by moderate to vigorous growing trees of good habit that had produced fruit of good quality of an estimated average of one or two bushel cases per tree per year.

Grade No. 3 was represented by “off-type” navel trees of moderate to vigorous growth that had produced fruit of an inferior quality of an estimated average of one or more bushel cases per tree per year.

Grade No. 4 was represented by weak to moderate growing trees that had produced fruit of good quality of an estimated average of less than one bushel case per tree per year.

Grade No. 5 was represented by “off-type” navel trees of weak to moderate growth that had produced fruit of an inferior quality of an estimated average of less than one case per tree per year.

TREE CLASSIFICATION CHARTS.

For the purpose of readily showing the position and relative grades of the trees in the plantations, tree classification charts were made of the various orangeries with the grades of the individual trees marked in numbers.

In making the plans these were, with one exception where dots were used instead, divided into small sections, each section having the form of either a square or a rhombus, according to the angles that the trees were situated to each other in the orchard, and each of these spaces was used to represent one orange tree. Numbers ranging from 1 to 5 were then placed in the centre of the squares or spaces to indicate the grade of the trees.

Trees of Grades Nos. 1 and 2, representing the most profitable trees, were indicated on the plan by the numbers 1 and 2 placed in the centre of the squares and marked in blue.

Trees of Grades Nos. 3 and 5, representing the "off-type" navel strain were indicated on the plan by the numbers 3 and 5 placed in the centre of the squares and marked in red.

Trees of Grade No. 4, representing trees of the Washington Navel type that were lacking in vigor and productiveness were indicated on the plan by the number 4 placed in the centre of the squares and marked in yellow.

GROUPING OF GRADES.

The most noticeable feature revealed by the examination of these plans was the fact that the trees were generally found to be grouped together according to their grades, and as the numbers used to indicate the grades were marked in different colors this relationship was often apparent at a glance.

With the best type of trees—those classed as No. 1—these were generally found to be situated in groups by themselves, although at times No. 2 trees were found to be in close proximity to them. Again, No. 4 trees were generally found grouped together, often with No. 2 trees near them, but only seldom having No. 1 trees in their vicinity. This relationship of the trees of these three grades, which were all of the true Washington Navel type, was in most instances due to variations in the nature and condition of the soil, as the investigation revealed the fact that the No. 1 trees were generally found growing where the best soil conditions existed, the No. 2 trees where the soil conditions were of a somewhat less favorable nature, and the No. 4 trees where the soil conditions were adverse, such as on land affected with salt or seepage.

It was therefore apparent that the differences in health, vigor, and productiveness of the trees represented by Grades Nos. 1, 2, and 4 could in the great majority of cases be ascribed to the influence of environmental factors, and only slightly if at all to variations in type.

The "off-type" trees, represented by Grades Nos. 3 and 5, were also in several instances found to be grouped together, but as previously stated in such cases these had probably been budded in quantity in the nursery and had been planted together when being set out in the orchard. In other cases again, trees of this type were found scattered among those of the true type.

Although the investigation revealed the fact that the "off-type" trees in certain directions were often highly sensitive to the influence of environment, as under adverse soil conditions a No. 3 tree would often degenerate into one of the No. 5 type, yet under good conditions of soil and culture these trees, although often becoming more productive, seldom showed much improvement in their habit of growth and in the quality of their fruit, which remained distinctly "off-type," showing that these characteristics were due to hereditary and not to environmental factors.

TREES OF HIGH PRODUCTIVITY.

As mentioned at the beginning of this paper, one of the chief objects of the investigation was to ascertain if any trees of outstanding merit in the matter of productiveness combined with high quality of fruit existed in any of the orchards.

In regard to the quality of the fruit from trees of the true Washington Navel strain the remark has already been made that such natural variations as were found to exist were only slight. The chief differences were mostly confined to the size of the fruit, thickness of rind, and flavor of juice, and although in some

instances these properties may to some slight extent have been due to variations in the type, in the great majority of cases it was plainly apparent that they were due to environmental factors, such as the nature and condition of the soil and to methods of irrigation, fertilisation, and cultivation.

In the quest for trees of high productivity it was rather surprising to find that after examining thousands of trees of the true Washington Navel type that only a few showed any marked superiority in this direction over the others. The fact that the good bearing trees—those classed as Grade No. 1—were in practically all instances found to be growing in first-class citrus soil, and had, moreover, received good attention in the matter of watering, manuring, and cultivation, clearly indicated that here also environment was again the chief controlling factor.

Trees that had produced an estimated average of six cases per tree per year for the six-year period covered by the investigation were found in all of the orangeries. Those having averaged seven cases per tree per year were much less common, while only three trees—situated on Block 5—were credited with having averaged eight cases per tree per year.

These figures may not indicate a very high average yield for the very best trees, but to obtain a true perspective of individual tree production the distance that the trees are situated from each other in the orchard must be taken into consideration. The great majority of the trees were situated 20ft. apart from each other—including the three most productive trees—and thus numbered about 100 to the acre, and it is reasonable to suppose that had they been planted further apart that on account of their roots having more ground to feed in their individual yields would have been greater.

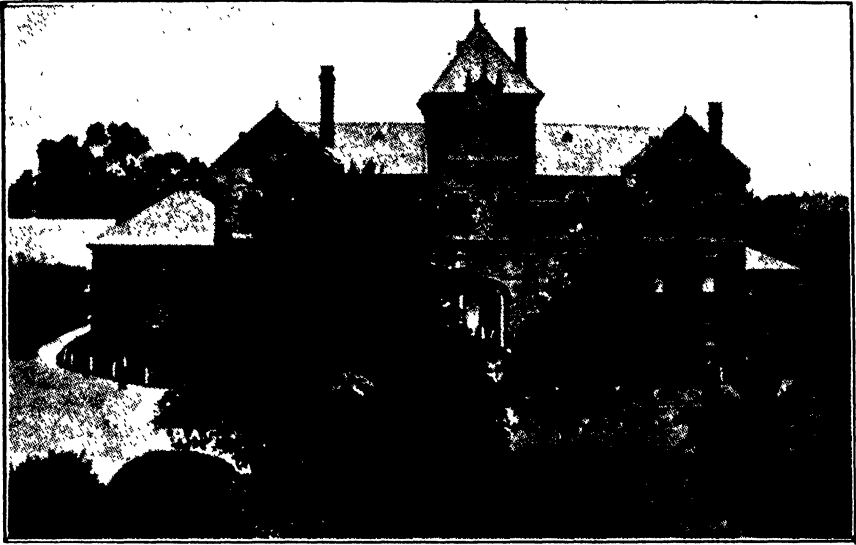
These highly-productive trees would, of course, make good parent trees for propagating purposes if only for the quality of their fruit, but as the beneficial influence of good environmental conditions was plainly apparent with them all, it was impossible to discover how much of their productiveness was due to hereditary factors that could be transmitted through their buds when worked on to the stocks of other citrus trees.

VALUE OF AN ORCHARD SURVEY.

The chief practical value of an orchard survey by means of a thorough examination of the individual trees lies in the fact that by this means it is possible to assign a definite value for each tree in the orchard, which may serve as a guide when attempts at improvement or reconstruction are made.

The easiest way to effect such an improvement would be to raise the grades, wherever possible, from a lower to a higher level. Thus, in the orange survey under review, the trees of Grades Nos. 1, 2, and 4, which were all of good type but owed their condition to differences in their environment, attempts at improvement would consist of the laying down of a better drainage system, or in using improved methods of irrigation, cultivation, or manuring, as the case might be, so as to raise the trees of No. 4 Grade to those of No. 2 Grade, and the trees of No. 2 Grade to those of No. 1 Grade. In regard to the "off-type" trees—those represented by Grades Nos. 3 and 5—these could be worked over to trees of good type so as to produce a better class of fruit.

If made use of in this way an orchard plan is of considerable value to the orchardist in enabling him to increase both the quality and quantity of the fruit from his trees, and thus be an aid to him in his efforts to make his plantation a more profitable one.



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CARE OF MILK AND CREAM ON THE FARM.

[By W. N. RULE, Butter Grader and Factory Inspector.]

(Paper read at the 44th Congress of the Agricultural Bureau, September, 1933.)

The quality of nearly every crop on the farm is to some extent influenced by the climatic conditions of each season, over which the farmer has no control.

When it comes to the quality of dairy products, however, the weather is not a ruling factor, because the sweetness, and to a large extent the flavor, of milk or cream are not entirely dependent on climatic conditions, but are under the control of the farmer.

The farmer, if he chooses to do so, can easily protect milk and cream from climatic or weather influences throughout the year. Everyone who understands farm conditions will undoubtedly agree that quality in the milk and cream sold from the farm has at least this one advantage over the quality in other products and crops sold from the farm. The responsibility of the milk producer is the first point to be considered in our efforts to improve the quality of all dairy products. If we start with that statement as an accepted fact, the next question is: Why is so much inferior milk and cream produced on the farm?

IMPROVEMENT OF FARM DAIRY PRODUCE.

To give some idea of the average quality of milk and cream sent to cheese and butter factories, a review of the export gradings of cheese and butter will help you to realise that there is a great need for improvement in the quality of milk and cream that is produced in this State. If the market overseas is to be held against our competitors, then it is essential that the quality of local produce be kept up to that of other exporting countries.

The following are the export gradings of cheese for the season July 1st, 1932, to June 30th, 1933:—

Choice grade	626 crates = 5.12 per cent.
First grade	11,024 crates = 90.17 per cent.
Second grade	575 crates = 4.70 per cent.
Total crates	12,225 = 1,510,000lbs. approximately

The small percentage of cheese grading choice indicates that there is something wrong with the supply of milk to the cheese factories, and the general faults in the quality of the cheese commented on by the grader point largely to defects in the quality of the milk supplied by farmers.

To produce butter and cheese of good flavor and keeping-quality, strict attention must be paid to the treatment of milk from the moment it is drawn from the cow.

CARE OF DAIRY UTENSILS.

Most of the defects in dairy produce are due to dirty methods in the milking shed and neglect of cooling the milk or cream. Some people have the idea that a strainer will remove any dirt which enters the milk. This is quite wrong, because much of the dirt is dissolved, and the finest strainer cannot catch the bacteria which are responsible for most of the defects in butter and cheese. The only satisfactory method is to prevent dirt from entering the milk. This can be done by taking proper care of the dairy utensils.

Every dairy should be supplied with proper conveniences for cleaning the various utensils. Brushes are much better than cloths. They remove dirt from the corners, and can themselves be kept clean more easily than cloths.

Nothing provides a better breeding place for germs than a dirty cloth. Cans should be washed in tepid water before they are scalded, this is because hot water causes the albumen to coagulate and form a scum, which is difficult to remove. After washing in tepid water, scrub the cans in hot water containing soda; then scald in clean boiling water; if possible dip them into a large open copper. Place the cans and utensils in the oven to dry.

They should not be dried with a cloth, the water will be evaporated quickly by the heat of the metal, if they have been properly scalded. This method of cleaning keeps tinware bright, free from germs and rust, and does not injure the coating of tin. It is also important that the cows should be kept clean; do not drive them through mud if it can be avoided. Many cow-yards are allowed to get very dirty indeed, and in wet weather are covered with liquid filth, this sticks to the cows, dries, and probably falls into the milk. The yard should be covered with concrete and should slope slightly towards a drain at one side; it can then be easily cleaned.

The cow's udder should always be washed before milking, otherwise small pieces of dried mud are almost certain to fall into the milk pail.

Two other points to remember are to throw away the fore-milk and to strip clean. The fore-milk consists of the first two or three squeezes of milk from each teat.

This milk is liable to contamination by germs entering through the teat, and as it usually contains only 1 per cent. of butterfat little is lost by always rejecting the fore-milk. Thorough stripping is important for several reasons:—

1. The "strippings" are the part of the milk richest in butterfat.
2. Clean stripping develops the udder.
3. It helps to keep up the milk yield.

MILKING.

Before commencing to milk, the milkers should always wash their hands; they should not wear the oldest and dirtiest clothes obtainable, but clean overalls, which should be kept especially for the purpose and regularly washed.

Sometimes when there is difficulty in milking through soreness of the cow's teats, a little vaseline may be rubbed over the teats after they have been washed. Milkers should never use fore-milk for moistening the teats; moistening the hands with milk at any time is a filthy practice. Remove the milk immediately from the milking shed where it is liable to be contaminated by bad odors and particles of dirt.

As soon as it leaves the milking shed the milk should be strained. This is done by pouring it through a fine metal strainer which removes any solid particles of dirt. Bacteria and dissolved dirt, however, the strainer cannot catch; a fine cloth strainer should be used to remove the very minute particles; it must always be sterilised by boiling before it is used, because a dirty strainer is worse than none at all. Having strained the milk, the next thing to do is to aerate and cool it to as low a temperature as possible.

Aerating is very beneficial, if it is done in a clean atmosphere away from smells and dust. It allows the food flavor to escape, and by quickly cooling, the growth of germs is retarded. Generally the aerating is done during cooling, and as the milk runs over the surface of the cooler it receives a thorough airing.

Aerating in a hot or impure atmosphere does nothing but harm.

When the milk is drawn from the cow it is at an ideal temperature for the growth of bacteria; it should therefore be cooled immediately if intended for sale. If it is to be used for butter making it is separated while warm, and the cream should be cooled at once.

It is remarkable how very few farmers cool their milk or cream. Cooling can be done by placing the cans of milk or cream in cold water, but better results can be obtained by using a cooler. There are various types on the market, and they are to be obtained at very reasonable prices.

MILKING MACHINES.

I am of the opinion that a great many defects in milk and cream are caused by milking machines that are not kept in a clean condition. Unless machines are kept clean the milk will be of inferior quality to that obtained by hand-milking, and I advise the following method to clean them:—

Before commencing milking, cold water should be drawn through the pipes to prevent milk from adhering to them. The solids become very adhesive if allowed to dry; cleaning must therefore be regular, and immediate and special attention paid to the following:—

1. Wash dirt from outside of teat-cups.
2. Draw through cups and releaser plenty of tepid water, then boiling water and caustic soda (1½ tablespoons of caustic soda to 4galls. of water), and finally pure boiling water.
3. Clean the releaser-pipe by drawing through it a ball of horsehair at the same time as the water from the farthest set of cups.
4. Remove teat-cups and rubber parts and protect them from dust.
5. Wash vacuum pipes and tank, leave parts open to air.
6. Disconnect and wash releaser.

Each week immerse all rubber parts in cold water with a little soda added, and heat to boiling point, then place them in pure cold water. If these instructions are carried out when washing milking machines there will be no trouble with defects in milk and cream that arise from careless cleaning of machines.

The cheesemaker cannot make good cheese unless he has good, clean, raw material to start with, therefore, the responsibility lies with the producer to see that milk is produced under the best conditions possible, so that the milk will not contain bacterial infection from such causes as unclean condition of the cows, bails, milker and dairy utensils, especially milk buckets, strainers, milk cans, and parts of the milking machines.

Milk, particularly when warm, possesses remarkable ability to absorb and retain odors, present in the surrounding air, so that every care should be taken to keep the bails and dairy clean and sweet smelling. Another most important factor is the aeration and cooling of milk, this should be done immediately after milking, and must only be done where the air is clean and sweet smelling. Unless performed under proper conditions, aeration may be the means of contaminating the milk with undesirable bacteria.

Cleanliness and prompt cooling of the milk are two of the most important factors that enter into the successful manufacture of good cheese and butter.

QUALITY OF CREAM.

From personal experience I say definitely that the average quality of the cream received by the factories leaves very much to be desired.

The percentage of choice cream is very small indeed, the bulk of the cream received is just an ordinary first grade, and presents a very difficult task for the buttermaker to produce choice butter, and he has to rely on skilful grading and an

expensive plant to help him to get the results that he does. The following figures show the percentages of choice, first, and second grade butters that were graded for export for the season July 1st, 1932, to June 30th, 1933:—

Choice grade	50,770 boxes = 29.16 per cent.
First grade	101,331 boxes = 58.20 per cent.
Second grade	16,790 boxes = 9.63 per cent.
Pastry grade	5,214 boxes = 2.99 per cent.
Total number of boxes . .	181,105 = 9,749,880lbs.

When these grades are compared it will be realised that the production of choice grade is by no means as great as it should be, the reason for it is poor quality cream that is produced on farms. Most of the defects in cream can be traced back to the careless production of milk in the first instance, careless cleaning of the separator, neglecting to cool the cream, keeping it in an impure atmosphere, using petrol tins with open seams, and old, dented, and rusty cans.

I have seen cream in cans that had holes in them stopped up with soap and rag, cans that were dented and badly rusted, cans that have been painted inside and out with silver frost to try and hide their defects.

The fact that a can is rusty indicates that the tin coating has become defective in spots and that the iron is exposed. The exposed iron is acted upon by the acid and other constituents of the cream, causing the formation of metallic salts which hasten decomposition of the cream, either through chemical action or by accelerating the action of bacteria.

Such action may lead to diverse flavor defects in butter, such as metallic, tallowy, and fishy flavors. Rusty cans are objectionable also for sanitary reasons. Rust spots present a rough surface on which remnants of milk and cream lodge and from which they are difficult to remove.

Rusty cans also retain moisture in such a way that they are difficult to dry; they cannot be kept perfectly clean; they become foul-smelling and pollute the cream that is put into them.

All these points are controlling factors that determine the quality of the cream that reaches the factory. Contact of cream with anything that is unclean, be it the cow, the milker, the stable air, or the separator and utensils, is a detriment to quality.

The damage may result from absorption of objectionable flavors and odors or from contamination with undesirable bacteria. It is, therefore, of the greatest importance to produce cream with due regard to cleanliness and sanitation.

THE SEPARATOR.

One of the main sources of contamination is the separator, it is a collector of many impurities that are found in the slime which is deposited on the wall and internal contrivances of the bowl.

This slime consists of a large portion of the dust, dirt, and bacteria which may have reached the milk during its production.

It is most essential that strict attention be given to the cleaning and sterilising of this most important piece of machinery. It should be dismantled and washed immediately after each separation. The cream should always be cooled as soon as it comes from the separator and not stored in a musty or badly ventilated cellar.

Warm cream is in ideal condition for bacterial growth and decomposition. The only practical way to cool cream promptly and to successfully control the temperature under average farm conditions is to permit it to flow over a water-cooled surface cooler, or to set the cream cans in a properly insulated tank filled with cold water. The heat conductivity of water is 21 times as great as that of air. This means that by setting the cans in water, the cream will be cooled 21 times quicker than by letting them stand in the air at the same temperature.

COMMON DEFECTS IN CREAM.

Over-ripe Cream.—Caused by excessive acidity which develops when cream is not cooled off after separating. This may be prevented by separating the cream at a test not less than 45 per cent., then cool the cream immediately after separating, keep it in a cool place and deliver to the factory frequently.

Fermented Cream.—Caused by the growth of germs which produce gas in the cream. These germs come from cow manure and get into the milk during the process of milking. Fermented cream is an indication that the milk has been produced under dirty conditions. Manure should be removed promptly some distance from the cow shed. Pay strict attention to cleaning plant and premises; use boiling water for scalding utensils morning and evening. Wash the cow's udder clean, and milk with clean hands; cool the cream after separating.

Stale Cream.—Caused by holding the cream too long at the dairy, or putting a small amount of cream left over into the next can, and held over for the next delivery. This can be avoided by sending all the cream in the dairy to the factory. A little stale cream very quickly spoils a lot of good cream.

Rancid and Cheesey Cream.—Caused by infrequent delivery to the factory. It is due to over-staleness, uncleanness, and germ infection. This class of cream is liable to be condemned as unfit for making into butter. A thorough cleaning of buckets, separators, milking machines, &c., is recommended, and more frequent delivery to the factory.

Unclean Flavor in Cream.—This is caused by faulty cleaning of milking machines, separators, and other utensils; old, broken, and rusty utensils; using cloths for washing up. Unclean methods in the dairy generally; these may be prevented by thoroughly washing all dairy utensils and scalding them well with boiling water. This must be done immediately after each time they are used. Use clean, sound brushes instead of rags, and adopt cleanliness throughout. Do not mix hot and cold cream; wait until all is thoroughly cooled.

Feed Flavors.—These are brought about by the cows grazing on the rank growth of some weeds, clover, lucerne, and other feeds. If it is possible to do so, keep the cows from weed growths; feed clover, lucerne, &c., for a short interval after milking, and then remove to ordinary pastures. Cool and aerate the cream immediately after separating.

Curdy Cream.—This generally occurs when the cream is separated too thin—below 38 per cent. test—and not keeping too cool. Cream should be skimmed to contain not less than 42 per cent. butterfat, be cooled immediately after separating, stirred frequently with a clean, tinned metal stirrer, and kept cool.

Ropy Cream.—Caused by germ infection, which comes from swamps, dams, and low-lying paddocks, and is carried from there by the cows to the dairies and utensils. Cows should be prevented from wading in swamps and waterholes, and the udders washed thoroughly before milking. Whitewash dairy and bails, and scald utensils with boiling water to remove infection.

Tallowy Flavor in Cream.—This defect is due to sunlight shining on the cream, which sets up a chemical change—oxidisation—particularly is this so with very high testing cream, 50 per cent. and over; it may also be caused by undesirable germ infection. Keep the sunlight from the cream. Do not expose excessive surfaces of cream to the air for any length of time, and keep all utensils and surroundings clean.

Metallic Flavor.—This is the result of using rusty cans and dairy utensils, and may be caused by unclean tinware. Discard all rusty cans and dairy utensils. Rusty cans and buckets and dented cans are too expensive to use. Use only well-tinned seamless cans and buckets.

Absorbed Flavor.—Milk and cream quickly absorb flavors, and should not be left in a room where the exhaust fumes from the oil engine or odors of the engine are prevalent. It should be kept away from oil smells, such as oil on the floor or separator block, smoke from the fire, any strong-smelling materials, chemicals, and disinfectants. Cream should be kept in a room that has a clean, pure atmosphere. Do not wash dirty utensils with the hot water from the engine jacket.

Cowry Flavor.—This is caused by unclean condition of the bails, floors, yard, etc., not washing the udder of the cow, milking with dirty hands, milking unhealthy cows, or using the milk too soon after calving. The udders and teats should be washed, and milking done with clean hands. Bails should have concrete floors, and the yards be kept clean. Never separate milk from sick cows that have just calved.

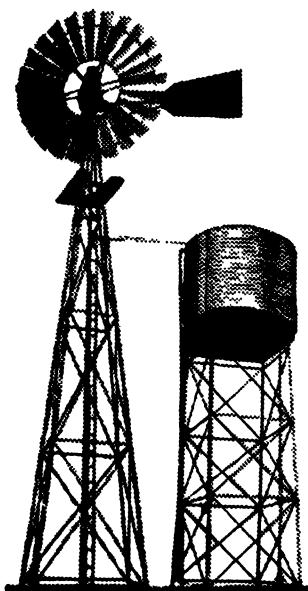
Choice grade cream must score 42 points or over, and must be sweet and perfectly clean in aroma and flavor.

First grade cream must score at least 39 per cent. = 41 points, and must only be slightly affected by feed flavors, absorbed odors, or taints. It may be high in acid, but must be free from staleness.

Second grade cream must score at least 36 per cent. = 39 points out of 50 for flavor, and is a cream with strong feed or weedy flavors, unclean taints and flavors, absorbed flavors, and metallic, and produced amidst unclean surroundings.

Third grade or pastry cream is a cream scoring 35 points or lower for flavor, and consists of badly fermented cream, dirty, strong metallic, stale cheesy, and very pungent weed flavors, such as wild turnip, garlic, &c. Anything below this standard should be rejected as unfit for human consumption.

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EXPERIMENTAL ORCHARD, BERRI—EXPERIMENTS ON THE STEAMING OF FIGS.

[N. S. FOTHERINGHAM, R.D.A., Manager Berri Experimental Orchard.]

(Paper read at the 44th Congress of the Agricultural Bureau, September, 1933.)

The figs harvested at this orchard during 1931 and packed from June onwards showed, when opened up in Melbourne, much mould. The mouldy figs in question, so far as we know, were the ones held in store for some considerable time. As this was the first occasion on which reports of this nature had been received, we were naturally anxious about the position; not only this perturbed us, but in addition the various fig growers, including ourselves, having decided to hand over the packing and marketing of the figs to the Berri Co-operative Packing Union, who, with certain modifications for convenience, were to pack on lines of procedure more or less formulated at his orchard. We, therefore, deemed it necessary to carry out tests to try to determine the cause of this mould growth. As the figs that went mouldy showed much moisture when opened, it was naturally thought that the steaming and packing had something to do with this.

Figs can be harvested:—

- (a) Either by picking when they reach a wilted condition.
- (b) The boughs may be shaken and figs gathered from the ground.

With (a) the figs are definitely of a fresh nature and have a green or yellowish-green appearance. We term these figs for descriptive purposes "green."

With (b) the figs shaken from the tree are mostly well wilted and partly dried and have a certain proportion of "green" figs in them, which are picked out and treated separately. The bulk of the (b) method of harvesting are termed for descriptive purposes "partly dried."

The general method employed in packing the dried figs is to pack and press them steaming hot into 1lb. cellophane wrapped and labelled packs and to pack these in turn into boxes holding 36lbs. of packed figs, consisting of six layers each containing six packets of figs.

As previously mentioned, it was considered possible that the process of steaming and packing had something to do with the after development of mould, and as figs classed as "green" and "partly dried" were both used in our commercial packs in which mould had occurred, it was considered necessary to consider this phase in any experiments to be carried out. Experiments were therefore designed to test:—

- (a) Time of steaming on—
 - (1) Partly dried, and
 - (2) Green figs.
- (b) Packing into separate boxes packets of "partly dried" and of "green" figs hot from the steam bath.

Packing into separate boxes "partly dried" and "green" figs after being allowed to cool.

The times of steaming tried out were 8, 10, 12, 15, and 20 minutes. It was set out that "partly dried" and "green" figs should be steamed for these various times and that one box of each would be packed into boxes when hot and another after they had been allowed to cool. Unfortunately there were insufficient "green" figs to carry this out in its entirety.

The undermentioned shows the tests carried out:—

Time of Steaming.	"Green" Figs Packed into Boxes when Cool.	"Green" Figs Packed into Boxes when Hot.	"Partly Dried" Figs Packed into Boxes when Hot.	"Partly Dried" Figs Packed into Boxes when Cool.
8 minutes	Packed 13.5.32	Packed 11.5.32	Packed 27.4.32	Packed 28.4.32
10 minutes	—	—	Packed 13.5.32	Packed 13.5.32
12 minutes	Packed 16.5.32	Packed 13.5.32	Packed 12.5.32	Packed 12.5.32
15 minutes	Packed 11.5.32	Packed 11.5.32	Packed 12.5.32	Packed 12.5.32
20 minutes	Packed 2.5.32	Packed 6.5.32	Packed 2.5.32	Packed 6.5.32

The figs were packed from April 27th, 1932, to May 16th, 1932, and were opened and inspected by Mr. F. McGlasson (manager of Berri Co-operative Packing Shed) and myself on December 3rd, 1932. They had, therefore, been packed and stacked in a block for well over six months and much in excess of the period of holding the figs of the previous year that moulded.

A description of each of the packs opened up is as follows:—

STEAMED 8 MINUTES.

(1) *Green figs* packed into boxes when *cool*.—Fruit soft and pliable, packets free but sweating freely, very little white efflorescence showing on cellophanes. Labels stained badly. No mould.

(2) *Green figs* packed into boxes when *hot*.—Fruit soft and pliable, packets free but sweating freely, very little white efflorescence showing on cellophane. Labels stained badly. No mould.

(3) *Partly dried figs* packed into boxes when *hot*.—Fruit pliable but not as plastic as green figs, packets free, very little white powder present. Labels not stained too badly, and packets not sweating nearly as much as those containing green figs. No mould.

(4) *Partly dried figs* packed into boxes when *cold*.—Condition about the same for pliability as those packed hot. Packets free. Very little white efflorescence, practically no stain on labels. No mould.

STEAMED 10 MINUTES.

(1) *Partly dried figs* packed into boxes when *cool*.—Fruit pliable and free, not stained as much as 12 min. green cool test. Not much white "sugaring" on cellophane wrapper. No mould.

(2) *Partly dried figs* packed into boxes when *hot*.—Fruit soft and pliable, more so than previous test. Very little of the white powder showing on cellophane wrapper. Labels badly stained. No mould.

STEAMED 12 MINUTES.

(1) *Green figs* packed into boxes when *cool*.—Figs pliable, but packets stuck to one another. White efflorescence showing on cellophane wrappers and stain on the labels. No mould.

(2) *Green figs* packed into boxes when *hot*.—Nice and pliable fruit, sweating fairly freely. Packets sticking badly, very little white sugariness showing on cellophane wrappers, but labels badly stained. No mould.

(3) *Partly dried figs* packed into boxes when *cool*.—Pliable texture, packets free in case, but more white efflorescence showing on cellophane wrappers, labels not so stained as green figs. No mould.

(4) *Partly dried figs* packed into boxes when *hot*.—Nice and pliable fruit, packets not free in case, very little white powder on cellophane wrappers. Labels badly stained. No mould.

STEAMED 15 MINUTES.

(1) *Green figs* packed into boxes when *hot*.—Fruit nice and pliable and free, very little white "sugar" showing on cellophane wrappers, sweating freely. Labels very badly stained. No mould.

(2) *Green figs* packed into boxes when *cool*.—Nice and pliable in texture, packets free in case, packets very white and powdery on side. Labels badly stained. No mould.

(3) *Partly dried figs* packed into boxes when *hot*.—Figs nice and pliable, packets free in case. Labels stained fairly badly. No mould.

(4) *Partly dried figs* packed into boxes when *cool*.—Nice and pliable texture, fairly free in case. A little whiteness showing on cellophane wrappers. Labels stained fairly badly. No mould.

STEAMED 20 MINUTES.

(1) *Green figs* packed into boxes when *hot*.—Nice and pliable fruit, packets free in case, sweating freely, very little white sugariness on cellophane wrappers. Labels badly stained. No mould.

(2) *Green figs* packed into boxes when *cool*.—Fruit nice and pliable, packets free in case, sweating freely, very little white efflorescence on cellophane wrappers. Labels stained fairly badly. No mould.

(3) *Partly dried figs* packed into boxes when *cool*.—Nice and pliable condition, packets free in cases, not a great deal of stain, a little white powderiness on cellophane wrappers. No mould.

(4) *Partly dried figs* packed into boxes when *hot*.—Figs nice and pliable, packets free in cases, very little white powder on cellophane wrappers. Labels stained slightly. No mould.

It was noted in examining the boxes that the smell of the figs was good in all cases and there was no sign of sourness.

It was hoped that the experiments carried out would have given some indication of the mould cause, but as there was not a mouldy packet in the 18 boxes little information has been gained on that point.

The tests, however, have disclosed that the "green" fig sweats more freely than the "partly dried," even when steamed for eight minutes only. The "green" fig is also more pliable and softer to the touch than the "partly dried."

It is noted that practically in the whole of the figs under test that the staining of the labels increases with each lower layer of figs, although it is certainly worse under a longer steaming and with "green" figs. The effect of this staining of labels is that when figs have been kept for any length of time and are opened up the attractiveness of the product is spoilt. It may be possible to limit this staining considerably by using shallower boxes, packing the boxes so that each pound of figs does not press directly on the other beneath it, putting division papers between the layers, and stacking the fruit in well ventilated rooms so that air currents can get between the boxes.

In addition to the above, it may be wise to under-steam the figs rather than over-steam. The condition of the figs opened shows that figs with 10-12 minutes steaming are soft and pliable.

A REVIEW OF THE SOUTH AUSTRALIA VINTAGE, 1932-33.

[By J. L. WILLIAMS, R.D.A., Lecturer in Viticulture, Roseworthy College.]

The 1932-33 season can be regarded with very mixed feelings. The chaotic state of affairs which prevailed among wine-grape growers and the winemaking fraternity is still fresh in our minds. Although most winemakers have been cognizant of the imminence of such a catastrophe for the past 24 months, the average grapegrower little expected the blow to be as near or as severe.

The condition of the winemaking industry was, and still is, so serious as to have occasioned the recent visit to this State of a prominent Commonwealth Customs official.

A visit was recently made by State members to the Barossa district, this visit being organised by the Grapegrowers' Association. The members present expressed their sympathy with the grapegrowers, and departed feeling that the grower had just cause for feeling dissatisfied with his lot.

At the moment it appears that certain of the poorer types of vineyard soils in this State will go out of cultivation for vine growing, owing to the low yields and because of the prices received for the produce. It would appear that for the next few years it will only be produce possessing quality for winemaking purposes that will be in demand by makers of wine, and that the present position will only adjust itself according to the dictates of supply and demand. It is mainly red varieties—"Matara," "Grenache," and "Shiraz"—that are being over-

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produced at the present time, and it would appear that growers of red wine varieties would be well advised to graft over portion of such vineyards to white varieties suitable for the manufacture of sweet white wine, for which there appears to be a good demand at the present time.

The season ending with the 1933 vintage opened very satisfactorily, good rains being received during the months of May to September, 1932, inclusive; the falls during these months varying from $\frac{1}{2}$ in. to 4 in. less than for the corresponding period of the 1931 season. In certain districts, however—*e.g.*, Barossa and the Southern wine districts—September was much drier than in the previous season, and growers who had left the ploughing of their vineyards until then found the soil rather dry for effective working. To obtain satisfactory vine growth it is imperative in most seasons to finish ploughing by the end of August, and to have the soil free from weeds and in good tilth prior to the commencement of warm weather towards the middle of September, otherwise an enormous loss of valuable soil moisture is the result.

The rainfall during the growing period was generally a trifle better throughout the non-irrigated districts than in the previous season. The Barossa district in particular received good rains in October (2.25 in.), this being fortunate in that it followed a comparatively dry September.

During early October, frosts were experienced in some districts and locations—in the Barossa district principally, subject to late spring frosts, suffered considerable damage. Later in the growing season a severe hailstorm passed over portions of this district, and practically removed or spoiled the whole of the crop on the vines, as well as damaging the fruiting wood for this season.

The rainfall received during the ripening period, January to April inclusive, was considerably lower (with the exception of the Barossa district) than during the same period of 1932. In all but the Barossa district better Beaumes were obtained than in 1932. Beaumes of more than 14 were difficult to obtain in this district.

Growers of dried vine fruits in the Clare and Watervale and Southern Districts, and River Murray Irrigation Settlements were favored with ideal drying weather, and in most cases the quality of the product was superior to that produced in the 1931-32 season. On the River the principal drying months, February, March, and April, were drier than usual; February being rainless, and during March and April only about $\frac{1}{2}$ in. was recorded. During the corresponding period of 1932, 3.24 in. of rain fell.

These favorable conditions were reflected in the quality of the dried product of the vines along the River; cold dipped fruits particularly were of a very high quality.

Despite the fact that a small portion of the grape harvest remained on the vines in certain localities, and that a large portion of the crop in the Barossa district was harvested very late, owing to the above-mentioned marketing difficulties, the State Government Statist, Mr. W. L. Johnston, estimates the production of wine for the 1932-33 vintage at 12,000,000 galls., an increase of 1,335,454 galls. (or $12\frac{1}{2}$ per cent.) over the 1931-32 vintage, based on figures obtained from vigneron's representing 96 per cent. of the previous season's total production.

Table IV. is taken from Mr. Johnston's forecast of the 1932-33 vintage, and is sufficiently explanatory.

In these tables Clare figures are taken to represent the Clare and Watervale districts; Tanunda, the Barossa district; Morphett Vale, the Southern wine districts; and Waikerie, the River Irrigation Settlements, respectively.

TABLE I.—*Showing Useful Autumn and Winter Rains for Season 1931-32.*

Month.	Clare.		Tanunda.		Morphett Vale.		Waikerie.	
	1931.	1932.	1931.	1932.	1931.	1932.	1931.	1932.
	In.	In.	In.	In.	In.	In.	In.	In.
May	3.00	1.30	2.68	1.62	3.30	1.44	1.32	1.27
June	4.10	5.89	3.33	4.71	6.51	4.20	1.77	1.35
July	3.39	3.44	3.24	3.21	3.74	3.92	0.91	0.51
August	3.10	3.02	3.70	3.38	2.32	3.35	0.57	1.75
September	2.85	2.21	3.87	1.50	3.22	1.85	1.44	0.83
Totals	16.44	15.86	16.82	14.42	19.09	14.76	6.01	5.71

TABLE II.—*Showing Rain Received During the Growing Period, 1931-32.*

Month.	Clare.		Tanunda.		Morphett Vale.		Waikerie.	
	1931.	1932.	1931.	1932.	1931.	1932.	1931.	1932.
	In.	In.	In.	In.	In.	In.	In.	In.
October	0.78	1.95	0.58	2.25	0.88	2.06	0.47	0.46
November	1.13	0.26	0.34	0.36	1.07	0.36	0.37	0.05
December	0.74	0.62	0.69	0.59	0.28	0.50	0.12	0.59
Totals	2.65	2.83	1.61	3.20	2.23	2.92	0.96	1.10

TABLE III.—*Showing Rain Received During the Ripening Period, 1932-33.*

Month.	Clare.		Tanunda.		Morphett Vale.		Waikerie.	
	1932.	1933.	1932.	1933.	1932.	1933.	1932.	1933.
January	0.24	1.90	0.41	2.88	0.10	1.29	0.12	1.43
February	1.94	0.06	1.25	0.05	1.45	0.10	1.32	0.00
March	1.72	0.87	0.76	0.59	1.24	1.16	1.10	0.47
April	4.37	0.77	2.26	0.94	3.96	0.14	0.82	0.14
Totals	8.27	3.60	4.68	4.46	6.75	2.69	3.36	2.04

TABLE IV.—*Five Years' Wine Statistics.*

Year.	Wine Made.		Per-cent.	Wine Exported.	
	Total.	Distillation.		Overseas.	Interstate.
	Galls.	Galls.		Galls.	Galls.
1927-28	12,820,733	6,849,284	53	2,866,806	2,216,875
1928-29	14,828,968	9,414,691	63	1,423,799	1,940,065
1929-30	12,406,017	6,954,436	56	1,840,539	1,910,965
1930-31	10,131,034	4,966,422	49	1,837,986	1,462,554
1931-32	10,664,546	3,035,127	48	5,111,133	1,318,224
Five years' Mean	12,170,260	6,659,193	55	2,198,851	1,769,737
1932-33, estimated	12,000,000	*8,600,000	55	†2,458,927	Not yet available

* On average proportion, five previous years.

† Eleven months.

PAPERS READ AT CONFERENCES.

SOUTHERN BRANCHES, GOOLWA, AUGUST 17th.

THE FUTURE OF THE RIVER MURRAY.

[J. P. COLEBATCH, Port Elliot.]

In 1902 Senator Glynn, in an address on the "River Murray" before the Australian Natives Association, said that "Water transport is universally acknowledged to be the cheapest form of transport, the average per mile being about one-tenth that of land carriage." A glance at the map shows a vast area of land within a short distance of the Murray and its tributaries, and it is a well-known fact that where Nature has provided land, water, and a congenial climate, man by the application of industry, seed, and super, and the introduction of live stock, can provide all that is required for food, clothing, and shelter."

Not infrequently Australia is referred to as a "dry" country. The length of the Murray in South Australia is about 400 miles, and this, at an average width of 1,000ft., with a depth of 10ft., there would be no less than 22 thousand million gallons for every man, woman, and child in the whole of Australia, or a total of one hundred and thirty-two thousand million gallons. How much of this is used?

The locking of the river—so far as the South Australian border—is proceeding, and in a few years will be completed. Lake Victoria—an immense storage basin—is already filled. Work is in progress for the Hume Reservoir, which when completed is to hold more water than Sydney Harbor, and will be the second largest in the world. The cost of these works will be wasted unless the country adjoining the river is put to better use than at present and can support a much larger population.

Mr. Colebatch then visualized the Murray and its activities 200 years hence.

ESSENTIALS IN THE PERSONALITY OF THE FARMER.

[W. E. HARGREAVES, Port Elliot; read by H. L. SMITH.]

To-day no class of business man is receiving more attention than the farmer. Agriculture is now considered of sufficient importance to attract the attention of men of affairs, and while it is true that the farmer is slow and conservative, the average farmer is capable of great things, and agriculture is the most healthful, the most useful, and most noble employment of man.

The agricultural population of this State has been raised to the level of that of any other profession, and it feels the responsibility of the affairs of the State, for they rest as largely upon the farmer as any other class. In past history there was a sharp distinction between farmers and the "professions." Efforts were made to develop the brain worker mentally, and the farmer physically, believing that neither required development along the lines of the other. To-day people begin to understand that it requires brains as well as brawn to make a successful farmer. There is no business to-day that requires so much knowledge or closer attention to details. Indeed, a man on the land to be successful must be a man with brains. No man in any trade has so many irons in the fire at the same time; he must look after the fertilising and tilling of the soil, the proper time to sow, the right time to reap. He must study the best kind of stock best suited to his special locality, and a hundred and one other things.

[Papers Read at Conferences.]

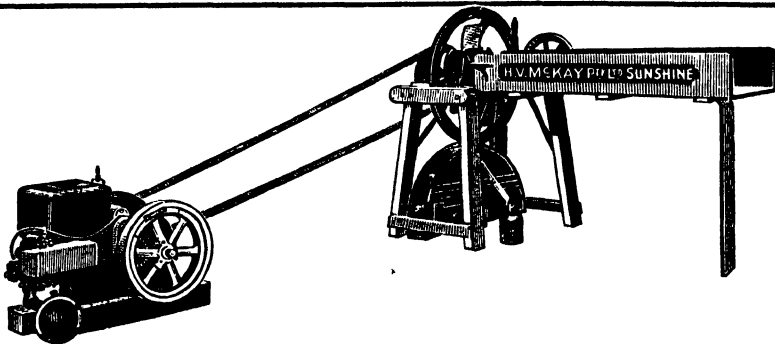
All those require training of the reasoning faculties of the mind. There is an unwritten law that makes every vocation a part of every other vocation, each in turn must help or hinder others. To make and save money is honorable; it is a necessity, but this should not be the final object. Every effort should not be marked with £ s. d. signs.

At meetings of the Bureau subjects relating to dairying, sheep, pigs, horses and crops and their care and culture as having the most money value to the farmer are discussed. Is that the only object in trying to improve our conditions? We dwell so much on the commercial side of things that we forget there is another side to the question. It is interesting to see the care a farmer will take of a favored cow or horse. They must be kept clean and comfortable, have pure water to drink, and food must be of good quality and quantity. One cannot over-estimate the value of kindness to livestock. Experience goes to prove that kindness has a marked effect on the market value of the product. Thus the characteristics of the man will surely be reproduced in the stock he breeds.

The horses and cattle in their real worth to the Commonwealth are but a drop in the bucket as compared with the man who cares for them. Often there is more care given them, and they are better groomed, especially when they are on exhibition, than their master. The part of the farm most neglected is the farmer himself. "A diamond in the rough is a diamond sure enough," but that diamond is far more attractive after it has been polished. Why is there so little value placed upon the small things that make for the pleasant things of life? Are we not inclined to belittle ourselves and our occupation by so doing? The highest point of breeding is to show a very nice regard to your own dignity, to express your value to the man above you. More care should be given to our personal appearance, to dressing, speaking, &c. Manners may be considered small things, but if neglected are large enough to decide for or against

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[Papers Read at Conferences.]

us. A little more attention given to the details of our personal appearance would prevent much criticism—criticism which you and I care nothing about, but which you and I have no moral right to entail upon our children whom we expect to keep on the farm.

Why should there be one code of manners necessary for the merchant, doctors, &c., and another for the farmer? Conservative as the producers are, we would lift our eyebrows in surprise to see them come to business with unshaven faces. Nor is there any reason why the farmer should go to town looking like a tramp. Such things are the result of habit.

There appears to be a wave of discontent among rural boys and girls; their ideals have been raised by education to a standard which their surroundings do not satisfy. What is the remedy—seeking to lower their ideals? By no means; elevate their home surroundings to meet their ideals. Let there be a constant incentive to make the very best of themselves. Parents have no moral right to damp the best side of the natures of those around them by always dwelling upon the profit and loss side of things. Do not commercialise every impulse. A happy, cheerful mind, and a well fed, well-groomed and well-clothed body are among the essentials in the personality of the man of the soil. It is not that more economy is wanted, but a better brand of it. The different departments of trade and professions are demanding specialists, and a majority of them have been, and continue to be, products of the farm.

THE MODERN CLYDESDALE.

[A. M. FULLER, Inman Valley.]

The Clydesdale is a breed of heavy draught horse indigenous to Scotland, and deriving its name from the district in which it was founded, and its type and characteristics were fixed and determined. Clydesdale is the old name for Lanarkshire, through which the River Clyde flows. The origin of the Clydesdale breed, according to Mr. William Aiton's writing in the year 1810, is the result of a cross between the native Scotch mares and some Flemish stallions imported into the country by one of the Dukes of Hamilton about the middle of the 17th century. These are said to have greatly improved the breed in the county of Lanark.

There are various strains of the Clydesdale breed which may be traced back through the medium of the Clydesdale Stud Book, such as those named in Lanark; the Gallo-way Clydesdales, the Kintore strain, the Old Stitcher line, the Banffshire Comets, and the old Clyde strain. In the west of Scotland the modern type owes much to the horse *Broomfield Champion* (95).

The outstanding characteristics of the Clydesdale horse are the combination of weight, size, and activity, with exceptional wearing qualities in respect to the feet and limbs. The head of a typical Clydesdale has a broad jaw, ending as a rule in a well-tapered muzzle with large, open nostrils; eyes full and vigorous, yet mild; forehead broad and full between the eyes; while from the eyes, the forehead tapers gradually up to the ears, which are long and active. Breeders of Clydesdales should attach much importance to these points, for a horse of such a description will generally be found to be of excellent temper, easily trained, docile, and very wise in harness.

Experience alone can teach one when the head is well set on the neck, but the latter should be strong, massive, and of medium height; while the shoulder should be more oblique than in the English draught horse. This, indeed, is one of the distinctive features of the Clydesdale, as is his long, quick step for which he is so justly admired. Quite as essential as the slightly oblique shoulder is a strong forearm. This part from a side view should be broad, loaded with long strong muscles to give full power to bring forward the part below, and in length should be proportionate to the length of the shoulder; a flat and broad knee is also essential. The shank bone should be flat from a side view, thick and gently rounded from a front view, and tapering to an edge as it goes back.

[Papers Read at Conferences.]

The back, from the knee down, should possess a nice flowing fringe of silken hair, which should spring from the very edge of the bone; good judges will not have a horse the feather of which has a coarse matted appearance. The sinews of the leg should be thick, strong, thrown well back from the bone, and capable of being felt by the hand; if not, the leg is not a good one, however thick, as a soft round leg in which the sinews are not very well defined will not stand work. The lower end of the shank bone or fetlock should also be large, to give full play to the tendons. Clydesdale judges are also very particular as to this; also to the pasterns. An upright pastern will not do in a Clydesdale, which requires a pastern to suit the formation of the shoulder, and to confer the necessary elasticity to counteract the concussion caused by his quick, firm step.

Without a sound, well-shaped, healthy foot a horse is of no use, however symmetrical and strong; the foot must be open and round to be healthy. The hoof heads must be wide and springy, with no suspicion of hardness, such as may lead to the formation of side bone or ring bone. The back should be short, ribs well sprung from the backbone like the hoops of a barrel, broad, low-set hindquarters, with muscular thighs, descending into broad and proportionally developed hocks.

To sum up the good points of the hind end of a Clydesdale, from the hock to the ground, the leg should be broad, short, flat, clean, even and straight, or slightly inclined forward. The sinews standing out from the bone, and having a similar fringe of hair to that of the foreleg and rising as high as the bottom of the hock joint.

The average height of a Clydesdale horse is about 16 hands 2 inches, though there are several stallions to be found as high as 17 hands, but very few over that height.

The fashionable color is brown: that of a deep, dark shade preferred, with more or less defined white mark on the face, while black is also common. White markings are now very common, and have come to be regarded as a sign of purity of blood. Greys are not very favored, being simply disliked, and Clydesdale breeders are decidedly adverse to chestnuts.

In examining a Clydesdale when standing, a good judge, in addition to running his eyes over the various points mentioned, will see that the animal stands even and firm on his feet, which in some horses are inclined slightly inwards; to be the least inclined outward is a bad fault, and one which gets worse with age. In walking, the horse should, if approaching you, come with his head well carried, and with an apparently measured stride, lifting his feet well off the ground and placing them down again regularly, evenly, and with apparent deliberation. On a side view one can notice if his action be even, if his fore and hind action be in unison, for in a horse with long back and weak loins the two ends seem to be under different control, and the hind legs being in a manner dragged with the toes along the ground an unpleasant effect is produced.

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In going away at a walk, a horse should plant his hind feet forward as deliberately as his fore ones, at the same time raising and bending the leg at the hock, which should be evenly carried forward. If the hocks are turned out when moving them forward, the action is not good, and a Clydesdale breeder considers this an exceedingly bad fault in either horse or mare. In trotting, the horse should bend his legs at the knees and hocks, and from a hind view the inside of the fore hoofs should almost be seen at every step.

If the animal be inclined to move wide behind, this fault will be easily discovered at the trotting pace.

PIG BREEDING AND MANAGEMENT.

[M. B. CASELEY, Milang.]

It is only within the last half-century or so that any particular care has been devoted to pig breeding. In England in 1884 there was formed "The National Pig Breeders' Association," and prior to that date there were no herd books, and few breeds—in the modern sense—can be said to have existed. In the case of the Berkshire—so frequently mentioned by old writers—it is clear that the old type was rather variable, and was in the main unlike the type of to-day.

During the past 30 years a few breeds have become extinct, whilst during the same period the number of recognised breeds has steadily increased. Thus the Large Black Breed Society dates only from 1899, the Gloucester Old Spots 1914, Wessex Saddleback 1918, and the National Long White Lop-eared 1922, to mention but a few. It is questionable whether this tendency to multiply breeds has not gone too far, for it is difficult to see that more than half-a-dozen breeds are necessary to meet all the requirements of the farmer, as well as those of the consumers. In fact, in the final analysis, from a business point of view, the wants of the consumer should be studied more than the fancy of the farmer.

The type of animal marketed depends not entirely on the breed, but largely on the system of rearing and feeding that is adopted in particular cases. Broadly speaking, however, the bacon-curer desires an animal which will dress at 120lbs., with long and deep sides, full ham, thick loin, light shoulders and jowl, and with a high proportion of lean meat in the carcass; an excessive tendency towards early maturity and rapid fattening is to be avoided, otherwise the pigs at the normal age and weight for bacon are liable to be too fat for market.

The type of pig wanted for the pork trade is smaller and younger than for bacon, shorter in body, wider backed, shorter legged, and with a pronounced tendency towards early and rapid fattening.

The four prominent breeds to-day are Large White, Middle White, Berkshire, and Tamworth.

The Large White Yorkshire is one of the largest English breeds whose pedigree records trace back to 1884. The breed is a bacon one, with great length of body, light and neat shoulder, full ham. It stands high on the leg and is of a narrow build. The head is long, the face slightly dished, medium-sized ears inclined forward, but do not hang down over the face. The breed is prolific, hardy, and active, but not remarkably docile. It is late maturing, and crossed with a Middle White or Berkshire-Tamworth sow makes excellent bacon.

The Middle White originated from a cross between the Large White and the now extinct Small White. It breeds true to type; the head is short and wide, the face dished, and snout turned up, ears short and erect. The body is short, wide of back, deep, and on short legs; shoulders prominent and jowl heavy. The breed is very early maturing, sows prolific, and good mothers. Either pure or crossed with Berkshires the Middle White produces good type porkers, and when crossed with Large White or Tamworth makes excellent small bacon.

[Papers Read at Conferences.]

The Berkshire is one of the smaller breeds, but is compactly built and weighs well for its size. The face is short, forehead dished but snout not turned up, ears short and erect, body medium length, wide, deep, and carried on short legs. Loin is thick and ham heavily fleshed and fine of bone. The color is black, with feet and tail tipped with white and white on the face. Berkshires are largely used for crossing. The Mid-White for pork and Large White or Tamworth for bacon.

The Tamworth is red on a flesh-colored skin, snout long and straight, ears are large, rigid, and incline forward. The body is long, fair depth of side, moderate width on long legs. The Tamworth is hardy and prolific. It is late maturing, but the proportion of lean in the carcass is very high.

The crosses are excellent for bacon. Skill and care in the selection of breeding stock are essential to success in pig-breeding, because there are certain qualities and characteristics to which close attention should be directed, whatever the breed and object in view. Of these, one of the chief is temperament. Breeding animals should be active, so that they may have the natural inclination to take sufficient exercise to keep themselves in healthy, but without being restless. They should be docile; nervous and excited sows often occasion great losses among their young at farrowing time. Milking qualities are also important, although too often neglected by the pedigree breeder with his eye on showyard success.

There is a vast difference in the commercial value of litters at weaning time, according to the quantity of milk yielded by the sow.

The number of teats is important; a breeding sow should have 12. Animals with less should not be retained unless they are specially meritorious in other respects. Prolificity is a quality that should always be bred for. If the average litter can be maintained at nine or ten, a good profit can be anticipated, whereas with five or six no measure of success in other directions will make for profit.

The earliest age when a gilt should be put to the boar is eight months, but it is a distinct advantage to wait until 12 months, because the gilt is then grown and may be expected to produce and rear a better litter. Boars may be used sparingly at nine months old.

The period of gestation is about 16 weeks, nursing period 10 weeks, and oestrus generally recurs about the fourth day after the litter is weaned. Thus the whole breeding cycle is completed in about 26 weeks, making it possible for a sow to produce two litters a year throughout her breeding life—normally six years—although longer is not unknown.

The farrowing pen should be one compartment 12ft. square, and if possible, away from the fattening pens, because the squealing often upsets a young sow, causing her to kill her young. A strong rail should run round it at about 1ft. from the wall and 8in. from the floor. The trough should be movable.

During pregnancy the sow does best on free range and ample exercise, receiving only a light ration; about three weeks from farrowing she should be quietly removed to the farrowing pen, which should have been, prior to that, thoroughly cleaned and disinfected, and a good straw litter provided. The ration now should be increased and made more nutritious in order to ensure a full flow of milk. Pollard with 5 per cent. ground peas and skim milk is ideal.

As soon as signs of approaching parturition are observed (*i.e.*, the gathering of litter to make a nest) all long litter should be removed and substituted by chaffed straw, care being taken to disturb her as little as possible. Should the sow show an unnatural desire to devour her young, remove them for several hours.

The sow's rations for the first few days should be light and easily digested, increasing gradually up to 12lbs. or 14lbs. meal per day; restrict green feed. The ration should be so adjusted as to supply fully 80lbs. of starch equivalent and about 15lbs. of digestible protein per 100lbs. dry matter, not forgetting a supply of lime, bonemeal, and charcoal, &c.

[Papers Read at Conferences.]

At three or four weeks the young pigs will seek other food than the dam's milk, and a thin slop should be provided—to which the sow has no access—increasing the ration with growing appetites up to what they will clean up at three or more feeds per day. At six weeks the male piglets should be castrated, opening the scrotum in two places up and down. It is advantageous to starve them 12 hours prior to the operation, as bleeding is then always less.

Where a man is alone an earthenware pipe in the ground one end end, or a hollow log, is very convenient for holding the youngster. The age for weaning depends upon circumstances. The weaners must not be allowed to go back or lose bloom, especially where pork is the objective. These few weeks are important, and frequent feeding and comfortable quarters should be the rule, the ratio of protein to energy value should not be wider than 1 to 5, widening gradually with age to 1 to 10.

Many unsatisfactory results are directly attributable to badly balanced rations; meat meal, peas, linseed, &c., are rich in protein, whilst tares, clover, kales, &c., contain lime and vitamins. Breeders would do well to get tables showing different food values of various foods.

The digestive system of the pig is not adapted for dealing with fibrous and bulky foods, and a large part of the ration must consist of materials with a low fibre content.

At 12 weeks bacon pigs should be grazed and the pasture supplemented according to circumstances, the aim being to keep the pigs in a good, thrifty condition, topping up in the fattening pens prior to sale for three weeks, avoiding such foods as maize or linseed, which produces a soft, oily, and sometimes a discolored fat, also excessive quantities of whey, wet distillery by-products, &c., which tend to make the flesh soft and watery. Soaked barley with limited skim milk produces a fine carcass.

The aim of this paper is to awaken amongst breeders the desire for a general uplifting of the industry, and in this respect it is well to observe the possibilities of exporting surpluses to England. This raises a very pertinent question: What is the use of sending the English consumer a type of carcass he does not like?

MARKETING OF WHEAT.

[S. E. SKEWES, Currency Creek.]

Due to a record wheat production in 1930 the world aggregate for that year being approximately five thousand million bushels, at a time when there was a large carry-over in North America, prices for wheat fell rapidly, until in a space of 18 months values had reduced by more than half.

During this period wheat reached the lowest level of values ever recorded on a world's parity basis, but in Australia the exchange rate rose rapidly in the early part of 1930, and prices here were about on a par with 1893-94, which was the lowest year previously experienced in Australia—the average for that season being 2s. 3d. per bushel at chief shipping ports.

Since wheat is one of the staple commodities of the world, this created a very serious situation, particularly in those countries, such as Australia, in which wheat-growing is one of the principal industries. On account of this unfortunate position having arisen, consideration has been given to the methods adopted for marketing wheat in an effort to evolve a scheme which would be the means of returning a higher price to the grower.

The methods used for the disposal of wheat are practically the same right throughout the world, and the Australian farmer is as well catered for in that respect as those of any other country.

The practice of selling wheat to merchants in the "open" market is the most popular method here, but in four States of the Commonwealth the farmer has facilities available for disposing of wheat through an organisation under the direct control of the wheat-growers, whilst in Queensland wheat is marketed through the agency of a Wheat Board operating on a compulsory basis.

[Papers Read at Conferences.]

Selling wheat on the open market provides the farmer with ready cash, and when the merchant takes delivery of the grain his responsibility ceases, and if a drop occurs in the price of wheat during the remainder of the year the farmer finds himself on the winning side. But it might be that the farmer prefers to hold his wheat until later in the year in the hope of obtaining the benefit of a possible rise in wheat values. Towards this end, the merchant is prepared to help him and will store his grain for him subject to certain conditions. On account of the huge quantity of wheat that has to be stored each year, it is quite impossible for all farmers desiring storage to have their grain stacked separately, so, therefore, the conditions of storage necessarily have to allow the merchant the right of ownership in the wheat so that he can deal in it and dispose of it at his or their discretion. Thus the farmer's wheat loses its identity, but he is still entitled to its equivalent quantity of similar quality grain up to the time that he decides to sell his interest in it.

Under the pooling system the grower is advanced approximately 80 per cent. of the marketable value of his wheat at the time of delivery, and is paid the balance during the year, as the grain is disposed of by the Pool. That Wheat Pools function satisfactorily has been proved on several occasions in Australia, and each of the Pools have on different occasions paid the equivalent or more during a season than the average price paid by merchants. It must also be remembered that the pooling organisation is out to watch the interests of farmers in more ways than that of merely selling his wheat. Being representative of a considerable number of farmers, the board of directors is in a position to approach the Government and other authorities and use its influence on matters affecting the welfare of wheat-growers.

The method adopted by Queensland—and which has been operating for the past 12 years—has proved satisfactory so far as the Queensland wheat-grower is concerned, and it has been suggested that a similar scheme should be introduced for the whole of the Commonwealth. But it must be remembered that Queensland is not a wheat-exporting State like the other States of Australia, excluding Tasmania, and that the production of wheat in Queensland, which in a good season is from 4 to 5 million bushels, is barely sufficient for local requirements. As a matter of fact, something like 3 million bushels have been imported into Queensland during this year, on account of last year's crop being more or less a failure. This being so, the Queensland wheat-grower through the Wheat Board, which consists of five farmers' representatives and one Government nominee, is able to fix a price for wheat supplied to the millers much in excess of world's parity, and the mills work under an arrangement that makes it obligatory on them not to purchase wheat outside of Queensland. Under these conditions the Queensland wheat-grower is a good deal better off than the wheat-growers in the rest of Australia, so much so that for the 1930-31 season he received almost 2s. per bushel more than the average for the remainder of the Commonwealth and in 1931-32 1s. per bushel more. In years previous to 1930-31 the difference was only a few pence in his favor.

To extend such a system to the whole of the Commonwealth would be quite a different proposition, and the ultimate result would be similar to a flour tax, which has been suggested as another means of assisting the wheat-growers.

For the Queensland wheat-grower to benefit to the extent referred to, the consumer of flour in Queensland is compelled to submit to a higher cost of living as the extra price paid to the grower for his wheat is passed on by the miller to the baker and from the baker to the consumer, so that as a State Queensland is really no better off, as it simply amounts to one section of the community benefiting at the expense of the whole.

Now, were this applied to the whole of the Commonwealth with an average annual marketable crop of about 165,000,000 bush., against a local consumption capacity of 35,000,000 bush., cost of flour would be more than doubled if it was desired to obtain

[Papers Read at Conferences.]

for the farmers of Australia the same consideration as the Queensland grower now enjoys, that is, on the basis of 1s. per bushel above world's parity. This is because only about 25 per cent. of the wheat sold would be subject to the fixed price. The other 75 per cent.—which would be exported—would have to be sold at world's parity and the price of wheat sold locally would have to be fixed high enough to allow of the growers of the 75 per cent. exported being paid the same rate per bushel as those growing the other 25 per cent.

Suggestions have been made from time to time that for the Australian farmer to obtain the best results from the marketing of his wheat, the marketing should be in the hands of one organisation operating on a compulsory basis. It has been argued that considerable savings might be effected in administrative costs, and in other ways, were this system adopted. On investigation, however, it will be found that the possible field in which any savings such as this may be effected is very limited indeed. Even with the reduced overseas freight operating as at present, practically 75 per cent. of the cost of shifting wheat from farmers' waggons in Australia to Liverpool is made up of rail and shipping freights, and no reduction could be made on those items even if all the wheat was handled by one organisation. Slight savings may be made in overhead expenses and receiving charges in the country, but it is not likely that these would aggregate more than a fraction of a penny per bushel. Against this possible saving there would be certain disadvantages, which, in the long run, may cost the grower a good deal more. Under the present system of marketing wheat, the merchants are in competition not only with each other, but also with the Pool, and this means that every effort is made by each party to cut all expenses to the absolute minimum, and is also an incentive to obtaining the highest price possible for the grower, for the merchant knows that if he does not pay as high an average price as the Pool he will lose the support of the farmers, and the Pool, on the other hand, knows that if it cannot satisfy its members, it will very soon be forced out of business. Competition is in the very best interests of the wheat-grower. Were compulsory Pools established, this competition would be entirely eliminated and the compulsory Pool would have a 100 per cent. monopoly, which would be most undesirable and even dangerous. Competition is provocative of efficiency in the marketing of wheat as in any other business.

It has been stated that the Australian farmer is at a very great disadvantage due to the distance he is from the principal markets of the world—those of Europe. This is so to a certain extent, but with the possibilities existing in the East and Asia for extended wheat and flour trade, this disadvantage will not be felt so keenly. Wheat-growers in Canada have very high charges to meet on their export wheat, and the cost of shifting wheat from an average railway station in Western Canada to Liverpool is even more than it is from an average station in South Australia to Liverpool. The higher charges from Canada are mainly due to longer rail transit, Lake freight from Fort William to Montreal, and consequent extra handling.

Where the Australian farmer is at an unfair disadvantage is in the matter of loading charges, &c., at the various ports. The loading charges and port dues for wheat at Australian ports are higher than those in any other wheat-exporting country of importance, and in 1930 were double those existing in Canada, United States of America, South America, and India. In addition to these charges, wheat exported from South Australia is subject to an export wharfage charge of 1½d. per bag.

It would appear that for the Australian farmer to seek an improvement in his present unsatisfactory position he will not only have to look at the marketing of his wheat, but more so to the other side—that of the cost of production. Australia is dependent on the outside world for the disposal of her wheat crop, and since no one country is in such a position that it can fix prices of its own making for the export sale of its wheat, it follows that the most the Australian farmer can expect for his grain—without taxing his own community by means of local fixed prices, flour tax, bounties, &c.—is world's parity.

[Papers Read at Conferences.]

Had the costs of producing wheat fallen in proportion to the reduced price offering for wheat, the farmer would have had no real cause for complaint, but this did not occur, and since Australia is dependent—more now than ever before—on her primary producers, this section of our people has a very definite right to expect reasonable consideration, at least from those who at present are prospering at their expense. If our protected industries, and our Governments are not prepared to step into line and do their part towards reducing the costs of production, the wheat-grower will have to be supported artificially, and be paid bounties in some way or other to make up the deficiency between what the world is prepared to pay for his produce and what it costs him to produce it.

HILLS BRANCHES, McLAREN FLAT, AUGUST 24th, 1933.

TOBACCO CULTURE.

[R. G. MORPHETT, Kangarilla.]

After selecting the block for tobacco it should be ploughed deeply, the ploughing being done in autumn, exposing the soil to sweeten it. The second ploughing need not be so deep as the first (about 4in.). The ground must be kept well worked to produce a fine tilth and conserve moisture, right up to planting the seedlings.

SEED BEDS.

It is most essential in the production of a good crop of tobacco to have a good supply of early plants. It is better to have a few thousand more than too few. In making the seed bed, select a piece of rich well-drained land where it receives the most sun, and as near to water as possible. The bed should be 30ft. long by 3ft. wide, and 3ft. between each bed. A bed this size will produce enough plants for 1 acre. The beds should be raised 6ins. by putting the earth between the beds that form the pathway, on to bed in which it is intended to sow the seed. Place boards around about 6ins. high. After the soil has been worked to a very fine tilth, a manure of 9lbs. 45 per cent. super and 3lbs. of blood manure to each bed is a very good mixture. The bed should then be sown. One 12-gauge cartridge shell full of tobacco seed is enough to plant one bed. It should be mixed with about a 2lb. jam tin of finely sifted ashes and shaken lightly over the bed. After the seed is sown, cover the beds with a covering of 8oz. hessian. For early seedlings, start sowing beds the second week in August.

When young seedlings have produced the fourth leaf, they can be forced on by giving a dressing of a handful of nitrate of soda to a kerosene tin full of water. It is most essential not to let the seed bed become dry. A light watering three times a day is necessary in hot weather.

TRANSPLANTING.

Now that the ground is ready, sow the manure and cultivate it into the soil. It is now necessary to sow a cutworm bait of 1lb. of paris green to 30lbs. of bran made into a mash, sweetened by mixing a little sugar or treacle in the water. This should be sown about three or four days before transplanting the seedlings and after sowing the manure.

When planting the seedlings, place them in rows about 3ft. by 3ft. This will give about 5,000 to the acre. The plants should be as uniform in size as possible, the aim being to have an even growth and an even maturity. After being drawn from the bed, the plants should not be exposed to the sun before planting, but placed in boxes and kept well shaded. After making a hole with a dibber into which the roots are inserted, the soil must be pressed tightly around the roots of the young plant.

[Papers Read at Conferences.]

This is very necessary in order that the roots can obtain moisture needed to sustain the plant until it re-establishes itself. After planting—if the weather is hot—the plants should be covered, the latter being removed after the plants have established themselves. Bracken fern makes a good covering.

For good growth it is necessary to keep the field free from weeds and keep the soil in good condition. As soon as the young plants are established, the earth around them should be loosened by hoeing, care being taken not to injure the roots. Cultivation should be done frequently, both around the plants and in the rows, especially after a shower of rain. This will help to conserve moisture and also help the growth of the plants. During the season, insects become a pest and "worming" must be carried out regularly. Small caterpillars do an enormous amount of damage to the leaves. The plants should be dusted with arsenate powder to keep them in check. So far as possible, the caterpillars should be removed by hand picking.

TOPPING AND PRIMING.

When the plant shows its flower head it should be removed with three or four of the smaller leaves. If, on the other hand, the plant is allowed to go to seed, the leaves will be papery and will not develop into such good leaves. Fourteen to sixteen good leaves should be left, not counting the bottom one, which should be taken out at the time of topping. This is known as priming, and permits free circulation of air and distribution of light.

The bottom leaves if allowed to remain on the plant become worthless by constant whipping on the ground. No fixed rule can be given as to the number of leaves to be left on a plant; this depends on the development of the plants and the time left for ripening. The shorter the season the less leaves, the longer the season the more leaves.

SUCKERING.

Shortly after topping, suckers or lateral shoots make their appearance at the butt of the leaves and at the base of the stalks. These must be promptly pinched out while they are still young. If left, they become tough and develop flowers and seeds at the expense of the leaves. Suckering is a long job because the plants have to be gone over about every 10 or 12 days—the stronger the plants the more suckers there are.

VARIETIES AND HARVESTING.

Some of the varieties which I have grown and which have given good results are Hickory Pryor, Conqueror, White Stemmed Orinoco, Warne, Hester, Gold Leaf, Lacks, and Homestead.

This is the last operation in the field. Like topping, this operation requires good judgment and experience, for a good crop of tobacco can be spoiled in the final work by bad picking. After topping the bottom leaves will commence to ripen. Those grown in sandy soil change their color from dark to pale green. The leaves grown on heavier soil become mottled with yellow patches.

When ripe the leaves are broken from the plants, removed to the barn, and there fastened on sticks which are hung in the barn ready for curing. It is important to see that the picked leaves are removed immediately from the field to the shed or covered, as they soon become scorched by the sun.

DEHYDRATION.

[H. C. PLATTS, McLaren Flat.]

Dehydrators are used for many purposes; drying green bricks before baking, drying timber, &c., and it was only a short step before fruit and vegetables were also dried artificially.

[Papers Read at Conferences.]

There are several types of evaporators and dehydrators. The term evaporator, which to-day refers more particularly to the use of artificial heat, depends on circulation of air by natural draft. Such driers cost less to build than forced draft driers, but their operation is less efficient and more expensive. It is difficult to obtain even drying, and a long period of drying is required. The heated air after passing over the fruit is lost.

VACUUM DRIERS.

The vacuum driers will dry material more rapidly and at lower temperatures. The chief objections to this type are the high cost of construction and operation. Dehydrators or forced draft driers consist of a long tunnel in which the material and air move horizontally. The fruit is placed on trays and then placed on trucks. The loaded trucks are introduced one end and after passing in a continuous train through the tunnel, come out of the other end, by which time the fruit is dry. This type of machine is both efficient and economical.

Proper dehydration returns a clean, thoroughly dried product fully retaining the quality of the original fruit and answers the modern demand for sanitary production of foods. During unfavorable drying weather, prunes undergo a partial fermentation. This fermentation is caused by the sugar in the prunes fermenting with the aid of ever-present yeasts, and changes into alcohol and carbon dioxide gas. Both these compounds are volatile; they evaporate into the surrounding air and cause a loss in weight which is in proportion to the extent of fermentation. The temperatures normally used in dehydrators are above the temperatures at which the fermentation organisms act and consequently such losses are prevented by dehydration.

Even if the weather conditions are ideal for drying, prunes will also suffer a loss in sugar by respiration. The sugar turns to carbon dioxide gas and water, compounds that evaporate from the fruit.

Further losses are caused by bad drying conditions. Prunes will lose color and flavor through fermentation. Such injury does not prevent the sale of prunes or fruit, but definitely lowers the quality and market value. Also the prunes do not dry promptly, and the result is "bloaters," "chocolates," &c. The greatest advantage of the dehydrator lies in the fact that labor is used more efficiently. In sun drying and dehydrating the prunes are dipped and trayed; in sun drying the prunes are moved to a considerable distance on to the drying ground and the trays are spread, one at a time, on the ground. The prunes then must be stirred to promote even drying. When dry, the trays are stacked on the ground and then carried into the packing-shed and the prunes are put into sweat boxes. In case of rain, labor is further increased because of additional stacking and unstacking. In contrast to these laborious operations, prunes for dehydration are quickly placed in the dehydrator, a truck at a time, and when dehydrated, are removed, cooled, and the prunes emptied into sweats.

Since the dehydrator dries the fruit at a steady rate, the workers are stimulated to keep pace with this rate. This stimulus is less evident in sun-drying. Fewer workers are needed for dehydration and each does more effective work than in sun drying. The growers' greatest problem is adequacy and efficiency of labor and a dehydrator is of distinct value in solving this problem.

Dehydration produces fruit of equal or better quality than sun drying, results in a greater yield and size of fruit, provides insurance against rain damage losses, and the total cost of operating an efficient dehydrator is no greater than for a sun-drying ground of equal capacity.

[Papers Read at Conferences.]

MORE ABOUT THE DAIRY FARM.

[G. CONNOR, McLaren Flat.]

The economies of dairy production have needed the greatest attention on the part of those engaged in the industry perhaps dating back to the time when it was first realised that the food supply for man could be greatly augmented by the expedient of taking the milk of animals. The food that is intended by Nature for the sustenance of their young—milk, butter, cheese, whole milk—was found very nutritious for humans of all ages. Butter is very valuable in conjunction with cereals, &c. Cheese can be stored up and improves with age, having long keeping qualities, and thus enabling the people to provide for times of scarcity. Biblical history records many evidences of dairy practice. Cattle of all species, sheep, goats, deer, horses, asses, and camels have all been recruited for the purpose. There is no doubt that it soon became evident to the people in those far-off times that the better nourished animals were the most profitable. The people listened to stories of lands that were abundantly blessed with cows and wine—lands flowing with milk and honey; of better pastures, and men were filled with longing to place their flocks and herds in better conditions so that their returns would be satisfactory.

They certainly would have valued the heavier producing animals, and we should record appreciation of the work of the early pastoralists keeping their animals up to a standard that has endured to the present time and delivered them to the present generation for their use in such a wonderful state of preservation.

The present conditions of the world markets, keen competition, and the difficulty to find an outlet for dairy produce with low prices make it quite clear that if the dairy farmer is to keep in his business he must use every means that offers a saving and so balance his accounts. The herds must not include any unprofitable cows. Select a breed that suits local conditions and one for which the farmer has a fancy. Do not cross breed more than once. Breeding from crossbred beasts produces mongrels. There may be some wonderful producers among the latter, but the percentage is too low. The progeny splits into so many different types. Even the first cross may bring disaster. Heavy milking strains with a low fat content crossed with a high fat content breed and lesser quantity of milk appear to give the quantity and quality, but there is another very likely result. The low fat content of the former and the low quantity of the butter—such an animal would be a very bad proposition.

Too often we use animals of a high producing nature on both sides, but the result is a disappointing type of beast. Can it be that there is an off-generation? A plan of Nature to keep the balance between a robust fleshy body without the capacity to secrete milk beyond a safe point, and the more finely cut cows that can be stimulated to give a large quantity even to the point of exhaustion and even death.

Many champions fail to produce their like. The best that can be done is to persevere with those types that seem to possess the power to produce heavily, coupled with a constitution that will not be impaired in consequence.

The food supply must be good and economical. There is nothing to recommend the policy that so many adopt of feeding high-priced foods to create records, unmindful of the fact that such production has a two-edged effect. We are only getting a small net return and unloading a large quantity of goods on to an already glutted and depressed market; production should be brought back to an economical limit. When the dairyman has to purchase such large quantities of high-priced foodstuffs he is overstocking his holding. He must produce more of his cattle food on the farm. See that the pastures carry the stock that they should by bringing them to a fertile state, cut the holding into small paddocks, lay down the land with suitable grasses, and where necessary, shut a few acres up and cut for hay. Do not forget superphosphate.

Take an interest in your calling. Look over the herd often, and to avoid heavy losses learn a little about veterinary practice. Try to deliver the raw material to the manufacturer in good clean condition; assist him to assist you.

MANURING OF APRICOT TREES AT LIGHT'S PASS, - SEASON, 1932-33.

[By J. B. HARRIS, Dip. Hort., Horticultural Instructor.]

An experiment in the manuring of apricot trees with superphosphate, and with superphosphate and sulphate of ammonia, which was commenced in September, 1928, and which has been previously reviewed in the *Journal of Agriculture* for March, 1931, and July, 1932, has been continued during the past season, and the additional record listed below has been obtained.

Although a severe frost occurred in the district in October, 1932, it was mainly the lower lying areas which were affected and, as will be seen from the crops harvested, the test plot escaped serious damage.

The ratio of average crop harvested per tree from the different manured and check plots tallies approximately this year with results obtained during seasons 1928 to 1931, and with the average of results obtained in 1932, when Plots C. and D. showed a conspicuous shortage of crop which it was suggested may have been due to dry conditions and the shape of the plot (see *Journal of Agriculture*, July, 1932). Thus, trees which received no manure have so far shown a tendency to produce more fruit than those manured with superphosphate, and trees manured with superphosphate and sulphate of ammonia have shown a tendency to produce more fruit than those which received no manure.

Unfortunately the number of trees of even type on this plot is not large enough to permit of sulphate of ammonia being tested alone without eliminating one of the other tests which it is proposed to carry on in their present form for a further period of years.

	1928-29.	1929-30.	1930-31.	1931-32.	1932-33.	Average 1928-29 to 1932-33.
	Per Tree. lbs. ozs.	Per Tree. lbs. ozs.	Per Tree. lbs. ozs.	Per Tree. lbs. ozs.	Per Tree. lbs. ozs.	Per Tree. lbs. ozs.
Plot A—12 trees, 6lbs. 45% super per tree	135 5	211 8	135 5	47 4	166 13	139 4
Plot B—10 trees, no manure.	156 12	225 0	169 6	49 12	173 9	154 14
Plot C—8 trees, 6lbs. 45% super. first year; 6lbs. 45% super. and 2lbs. sul- phate of ammonia second year; 6lbs. 45% super. and 3lbs. sulphate of ammonia all subsequent years	171 8	239 12	206 8	42 14	190 2	170 2
Plot D—5 trees, no manure	236 0	202 0	171 10	16 13	153 1	155 14

STATE OF SOUTH AUSTRALIA.

WHEAT PRODUCTIVITY CLASSIFICATION, 1932-33.

[W. L. JOHNSTON, Government Statist.]

With a view to ascertaining the extent of acreage producing very high and very low returns of wheat per acre, all wheat farms have been classified according to their productivity per acre. The accompanying return sets forth comparative details for the three seasons 1930-31, 1931-32, and 1932-33.

The total yield for 1932-33 was 42,429,614 (48,093,102) bushels, averaging 10.43 (11.81) bushels per acre, and the Agricultural Areas Rainfall April-November was 14.70 (13.27) inches. 2,323 (3,488) farmers or 16.30 (24.38) per cent. harvested 18 bush. per acre, and upwards producing

RED COMB EGG ASSOCIATION.

OFFICIAL SINGLE TEST.

EGG-LAYING COMPETITION, 1933-34.

SECTION 1.—WHITE LEGHORNS.

Competitor.	Address.	Score to Month ending August 31st, 1933.			
		Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Totals
E. F. Ashmeade	398, Magill Road, Kensington Park	(1) 35	(2) 33	(3) 63	131
L. R. Badcock	77, Findon Rd., Woodville	(4) 30	(5) 68	(6) 53	151
C. J. C. Burton	Mallala	(7) 38	(8) 32	(9) 44	114
C. J. C. Burton	Mallala	(10) 35	(11) 27	(12) 47	109
W. A. Carter	2, Grosvenor St., Glandore	(13) 35	(14) 62	(15) 8	105
W. A. Carter	2, Grosvenor St., Glandore	(16) 61	(17) 61	(18) 13	135
B. Cooke	Kanmantoo	(19) 73	(20) 60	(21) 31	164
H. F. Cox	Samson Road, Glanville Blocks	(22) 20	(23) *	(24) 15	35
H. F. Cox	Samson Road, Glanville Blocks	(25) 39	(26) 46	(27) 60	145
L. H. Crawford	Military Road, Grange ..	(28) 22	(29) 51	(30) 46	119
L. H. Crawford	Military Road, Grange ..	(31) 41	(32) 5	(33) 37	83
R. C. Crittenden	William Street, Kilkenny North	(34) 69	(35) 64	(36) 28	161
Chas. H. Day	Box 28, Salisbury	(37) 43	(38) 20	(39) 46	109
J. H. Dowling	Glossop	(40) 59	(41) 46	(42) 38	143
T. Duhring	Mallala	(43) 50	(44) 55	(45) 32	137
T. Duhring	Mallala	(46) 32	(47) 11	(48) 25	68
H. Fidge	313, Cross Roads, Clarence Park	(49) 29	(50) 20	(51) 27	76
V. F. Gameau	Findon Road, Woodville .	(52) 13	(53) 44	(54) 45	102
W. Chas. Slape	Magill Road, Magill	(55) 48	(56) 73	(57) 58	179
G. C. Gavin	Salisbury	(58) 32	(59) 25	(60) 38	95
G. C. Gavin	Salisbury	(61) 58	(62) 44	(63) 49	151
H. H. Hefford	McHenry Street, Murray Bridge	(64) 42	(65) 31	(66) 9	82
H. H. Hefford	McHenry Street, Murray Bridge	(67) 79	(68) 34	(69) 22	135
W. H. A. Hodgson ..	Commercial Rd., Salisbury	(70) 45	(71) 43	(72) 24	112
W. H. A. Hodgson ..	Commercial Rd., Salisbury	(73) 28	(74) 38	(75) 32	98
E. A. Lamerton	Cross Roads, Edwardstown	(76) 21	(77) 23	(78) 65	109
C. H. Lines, jun.	Box 75, Gladstone	(79) 58	(80) 67	(81) 18	143
C. H. Lines, jun.	Box 75, Gladstone	(82) 56	(83) 31	(84) 46	133
V. F. Gameau	Findon Road, Woodville .	(85) 43	(86) 40	(87) 24	107
L. A. G. Pitt	24, John Street, Payneham	(88) 51	(89) 36	(90) 35	122
L. A. G. Pitt	24, John Street, Payneham	(91) 65	(92) 56	(93) 47	168
H. A. Rasmussen	Swan Terrace, Ethelton .	(94) 22	(95) 56	(96) 60	138
H. A. Rasmussen	Swan Terrace, Ethelton .	(97) 51	(98) 48	(99) 37	136
S. E. Reedman	51, Gilbert Street, Gilberton	(100) 44	(101) 75	(102) 33	152
Bruce Rowe	"St. Kevern," Two Wells	(103) 34	(104) 25	(105) 75	134
Bruce Rowe	"St. Kevern," Two Wells	(106) 43	(107) 51	(108) 38	132
H. J. Stacey	Uraidla	(109) 33	(110) 31	(111) 46	110
H. J. Stacey	Uraidla	(112) 57	(113) 58	(114) 5	120
Thomas & Elson	53, Clifton Street, Hawthorn	(115) 21	(116) 14	(117) 56	91
Thomas & Elson	53, Clifton Street, Hawthorn	(118) 34	(119) 29	(120) 38	101
H. L. Twartz	Gawler	(121) 36	(122) 55	(123) 57	148
H. L. Twartz	Gawler	(124) 41	(125) 24	(126) 48	113
F. F. Welford	1, Ludgate Circus, Colonel Light Gardens	(127) 42	(128) 72	(129) 47	161
F. F. Welford	1, Ludgate Circus, Colonel Light Gardens	(130) 78	(131) 56	(132) 12	146

EGG-LAYING COMPETITION—SECTION 1—WHITE LEGHORNS—*continued.*

Competitor.	Address.	Score to Month ending August 31st, 1933.			
		Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Totals
A. P. Uriwin	Box 80, Balaklava	(133) 24	(134) 60	(135) 47	131
A. G. Dawes	230, Portrush Road, Glenunga Gardens	(136) 80	(137) 53	(138) 42	175
Total—Section 1					5,709

SECTION 2—ANY OTHER LIGHT BREEDS.

V. F. Gameau	Findon Road, Woodville (Minorcas)	(139) 47	(140) 30	(141) 16	93
M. O. and C. A. Roberts	Torrens Road, Kilkenny (Minorcas)	(142) 12	(143) 36	(144) 13	61
Total—Section 2					154

SECTION 3—BLACK ORPINGTONS.

Arthur Cook ..	187, Goodwood Road, Colonel Light Gardens	(145) 71	(146) 78	(147) 29	178
B. Cooke	Kanmantoo	(148) 32	(149) 10	(150) 40	82
L. H. Crawford	Military Road, Grange ..	(151) 26	(152) 23	(153) 48	97
L. H. Crawford	Military Road, Grange ..	(154) 59	(155) 61	(156) 83	203
Les. Darcy	Mypolonga	(157) 71	(158) 60	(159) 48	179
Les. Darcy	Mypolonga	(160) 31	(161) 57	(162) 31	119
J. H. Dowling	Glossop	(163) 14	(164) 24	(165) —	38
H. Fidge	313, Cross Rds., Clarence Pk.	(166) 36	(167) 39	(168) 20	95
H. H. Hefford	McHenry Street, Murray Bridge	(169) 39	(170) 14	(171) 70	123
F. J. Hudson	54, Willcox Av., Prospect	(172) 40	(173) 73	(174) 21	134
A. G. Dawes	230, Portrush Road, Glenunga Gardens	(175) 24	(176) 89	(177) 42	155
C. H. Lines, jun.	Box 75, Gladstone	(178) 50	(179) 4	(180) 16	70
C. H. Lines, jun.	Box 75, Gladstone	(181) 47	(182) 23	(183) 45	115
H. J. Mills	Edward St., Edwardstown	(184) 61	(185) 81	(186) 66	208
H. J. Mills	Edward St., Edwardstown	(187) 79	(188) 54	(189) 51	184
J. Rawe	Honeyton St., Seaton Pk.	(190) 61	(191) 30	(192) —	91
S. E. Reedman	51, Gilbert St., Gilberton.	(193) 44	(194) 30	(195) 81	155
S. E. Reedman	51, Gilbert St., Gilberton.	(196) 3	(197) 61	(198) 64	128
H. L. Twartz	Gawler	(199) 35	(200) 63	(201) 54	152
A. G. Dawes	230, Portrush Road, Glenunga Gardens	(202) 81	(203) 78	(204) *	159
N. F. Richardson ...	60, Beaufort St., Wood- ville Park, Kilkenny	(205) 81	(206) 65	(207) 73	219
W. H. L. Wittenberg	3, Rushton St., Goodwood	(208) 76	(209) 17	(210) 22	115
W. H. L. Wittenberg	3, Rushton St., Goodwood	(211) 19	(212) 53	(213) 75	147
W. Woodley	Tailem Bend	(214) 23	(215) 26	(216) 27	76
W. Woodley	Tailem Bend	(217) 41	(218) 15	(219) 28	84
Total—Section 3					3,306

SECTION 4—ANY OTHER HEAVY BREED.

H. Fidge	313, Cross Roads, Clarence Park (Rhode Is. Reds)	(220) 25	(221) 37	(222) 18	80
V. F. Gameau	Findon Road, Woodville (Rhode Island Reds)	(223) 46	(224) 26	(225) 47	119
V. F. Gameau	Findon Road, Woodville (Rhode Island Reds)	(226) 22	(227) 40	(228) 57	119
H. J. Mills	Edward St., Edwardstown (Rhode Island Reds)	(229) 69	(230) 65	(231) 40	174
W. R. Williams	28, Avenue Rd., Frewville (Rhode Island Reds)	(232) 57	(233) 48	(234) 35	140
W. R. Williams	28, Avenue Rd., Frewville (Rhode Island Reds)	(235) 52	(236) 22	(237) 65	139
Bruce Rowe	"St. Kevern," Two Wells (Barnevelders)	(238) 41	(239) 20	(240) 14	75
Bruce Rowe	"St. Kevern," Two Wells (Welsumers)	(241) 12	(242) 34	(243) —	46
Total—Section 4					892

* Dead.

NOTE.—Only first grade eggs are shown above.

RED COMB EGG ASSOCIATION.

OFFICIAL EGG-LAYING COMPETITION, 1933-34.

Conducted at the Parafield Poultry Station under the supervision of the Department of
Agriculture.

LEADING SCORES TO WEEK ENDED SEPTEMBER 1st.—FIRST GRADE EGGS ONLY.

WHITE LEGHORNS.		
<i>Singles</i>	Eggs Laid.	Bird Nos.
A. G. Dawes	80	136
H. H. Hefford	79	67
F. F. Welford	78	130
<i>Trios—</i>		
W. C. Slape	179	55—57
A. G. Dawes	175	136—138
L. A. G. Pitt	168	91—93
<i>Teams—</i>		
F. F. Welford	307	127—132
L. A. G. Pitt	290	88—93
C. H. Lines (jun.)	276	79 84
H. A. Rassmussen	274	94—99

MINORCAS.		
<i>Singles—</i>		
V. F. Gameau	47	139
M. O. & C. A. Roberts	36	143

BLACK ORPINGTONS.		
<i>Singles—</i>		
A. G. Dawes	89	176
L. H. Crawford	83	156
H. J. Mills	81	185
S. E. Reedman	81	195
A. G. Dawes	81	202
N. F. Richardson	81	205
<i>Trios—</i>		
N. F. Richardson	219	205—207
H. J. Mills	208	184—186
L. H. Crawford	203	154—156
<i>Teams—</i>		
H. J. Mills	392	184—189
A. G. Dawes	356	175—177 & 202—204
L. H. Crawford	300	151—156

ANY OTHER HEAVY BREEDS.

<i>Rhode Island Reds.</i>		
<i>Singles—</i>		
H. J. Mills	69	229
H. J. Mills	65	230
W. R. Williams	65	237
<i>Trios—</i>		
H. J. Mills	174	229—231
W. R. Williams	140	232—234
W. R. Williams	139	235—237
<i>Teams—</i>		
W. R. Williams	279	232—237
V. F. Gameau	238	223—228

TOMATO SPOTTED WILT ON TOBACCO.

By GEOFFREY SAMUEL, Plant Pathologist, Waite Agricultural Research Institute,
University of Adelaide,

and

J. G. BALD, Assistant Plant Pathologist, Division of Plant Industry, Council for
Scientific and Industrial Research.

It is not generally realised even by tobacco growers themselves that the spotted wilt disease of tomatoes also attacks tobacco. In fact, although it usually occurs only on isolated plants, it is probably the disease which is most frequently met with in South Australian tobacco crops. (This, of course, is apart from the Downy



Fig. 1.—Field plant naturally infected with spotted wilt. Late stage showing drooping and death of lower leaves, as well as necrosis on younger leaves.

Mildew, or “blue mould” disease, which occurs mainly in the seedbeds.) Occasionally crops have been seen in which more than 5 per cent. of the plants were infected, and in one case more than 30 per cent. of the plants were diseased.

Since, therefore, spotted wilt is potentially a serious disease of tobacco as well as of tomato it is advisable that growers should be able to recognise it. The following brief description of the disease, with illustrations, has therefore been prepared.

THE CAUSE OF THE DISEASE.

The disease is caused by an infectious virus which is transmitted in the field and inoculated into plants by two species of thrips, *Frankliniella insularis* and *Thrips tabaci*. No special field work has yet been done on its occurrence on tobacco, but the identity of the disease with tomato spotted wilt and the possibility of its transmission to tobacco by thrips have been proved in the experimental glasshouse.*

It is probable that field spread in tobacco crops occurs in the same way as in tomato crops. The first infections come from infective thrips which have over-



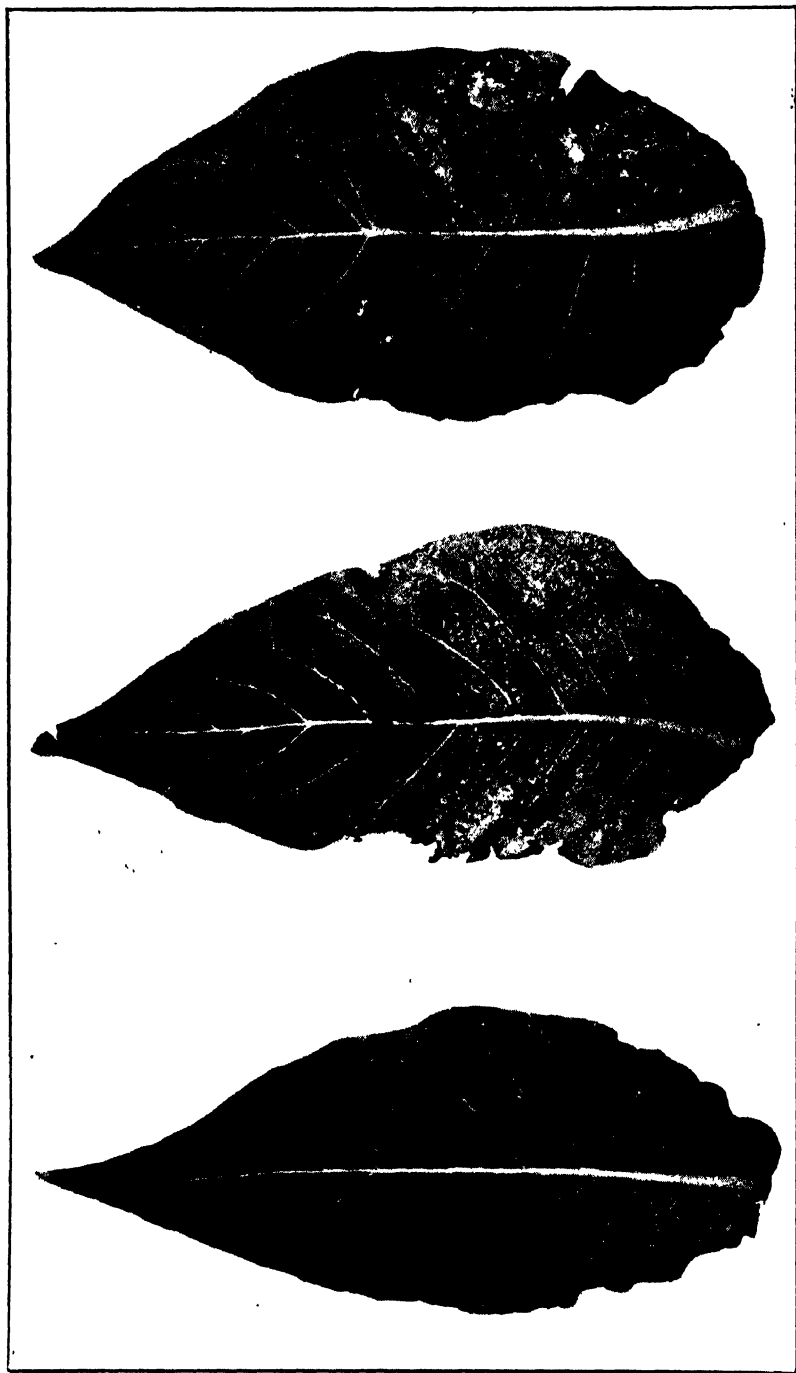
Fig. 2. Portion of tobacco field, showing four plants in the foreground naturally infected with spotted wilt at an early stage.

wintered, or which have recently hatched on some infected garden or weed plant. Healthy adult thrips cannot pick up the virus by feeding on a diseased plant, but they usually lay eggs while feeding, and the young which hatch from eggs laid on a diseased plant acquire the virus in the larval stage. After pupation and emergence as adults the infection is retained in these insects for life, and any healthy plants on which they subsequently feed may be infected.

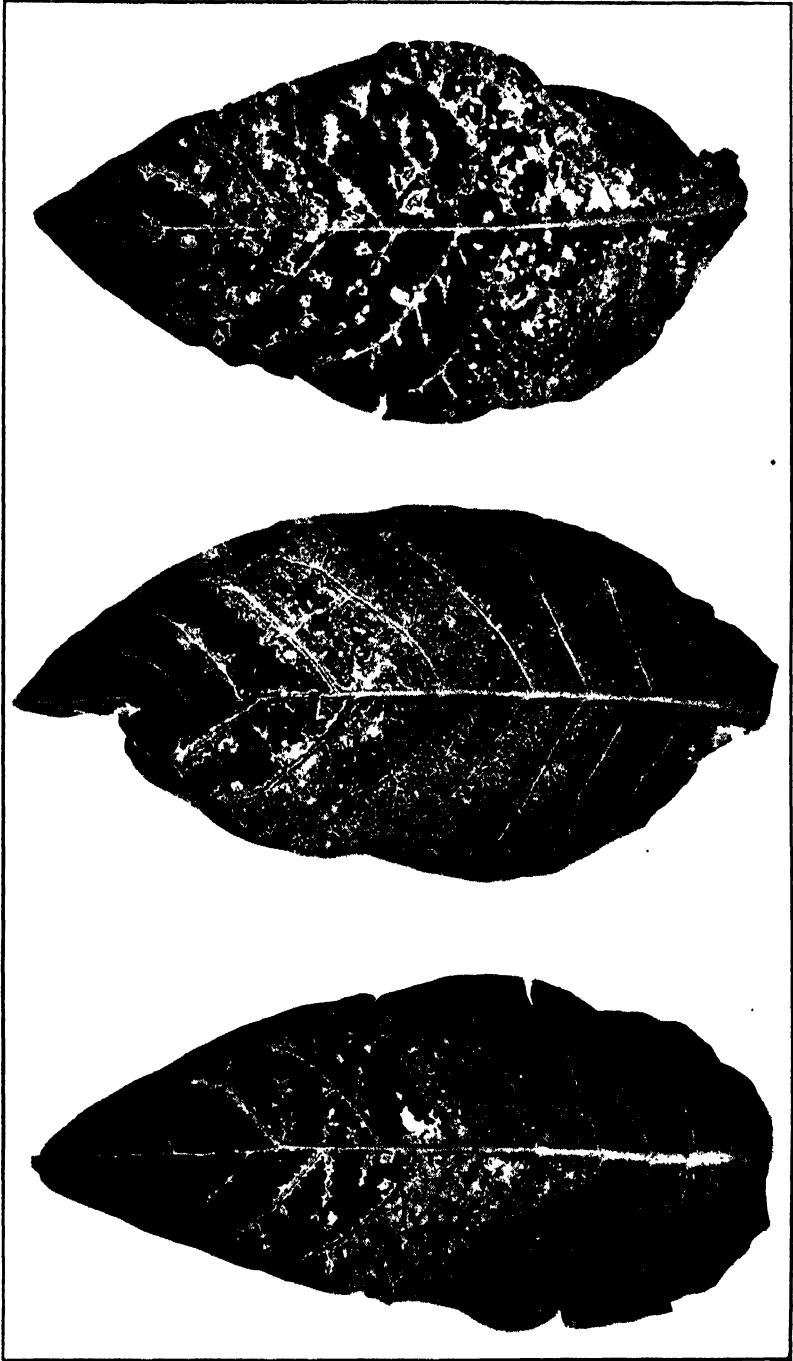
THE SYMPTOMS.

The symptoms shown by tobacco plants infected with spotted wilt are essentially necrosis or dying of the tissues of the younger leaves in very variable patterns. These include (1) circular necrotic (dead) spots of various sizes (Figs. 3, 8, 10);

*Bald, J. G., and Samuel, G.: Coun. Sci. and Ind. Res. Bul. 54.



Figs. 3-5.—Leaves from field tobacco plants naturally infected with spotted wilt. Necrosis brown; in spots, or in lines along veins.

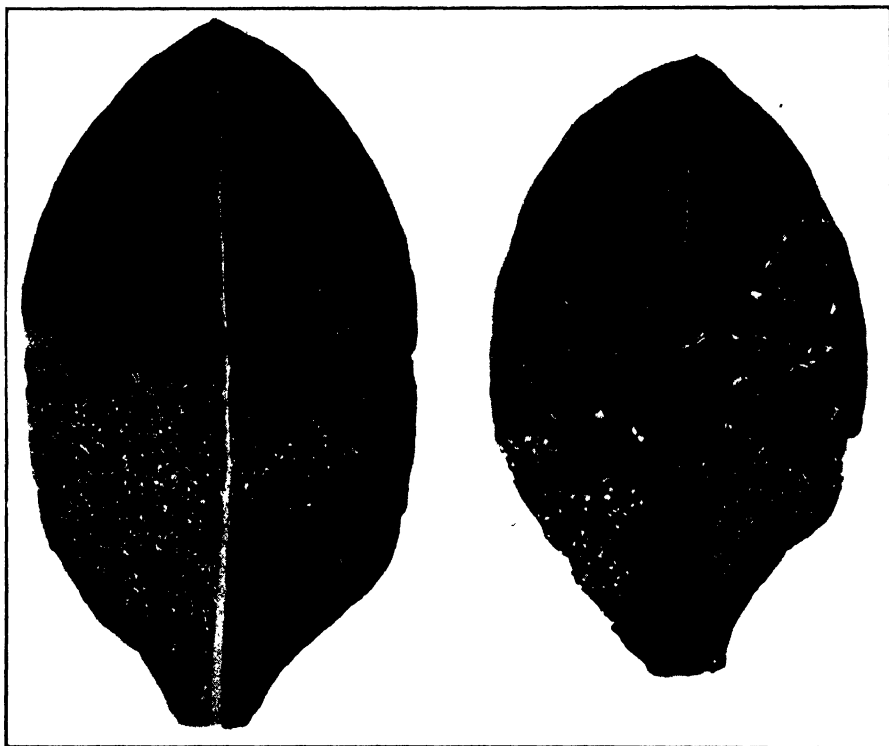


Figs. 6-8.—Leaves from field tobacco plants naturally infected with spotted wilt. Mottling of lower part of leaf, with whitish necrosis along fine veins and laterals, or in spots.

(2) necrotic areas along the lateral veins, usually on the lower half of the leaf and often on one side only (Fig. 5); (3) a characteristic mottle effect due to the invasion of all the fine veins in the lower half of the leaf—there being usually in this case a coarser pattern bordering the veins immediately above the fully-invaded area (Figs. 6, 7, 9); (4) various combinations of these symptoms and irregular patterns (Figs. 4, 8). The color changes vary from yellowish-green in the mottled area to reddish-brown or white in the necrotic spots and lines.

The top of an infected plant ceases growth, and in the early stages is frequently bent over slightly to one side. Later dark sunken streaks may appear on the stem, or when the stem is cut across dark necrotic areas of discoloration, later forming cavities, may be seen in cortex or pith.

In the field infected plants remain at a standstill for some weeks, and later all the leaves gradually droop and die, and the plants are slowly killed (Figs. 1, 2).



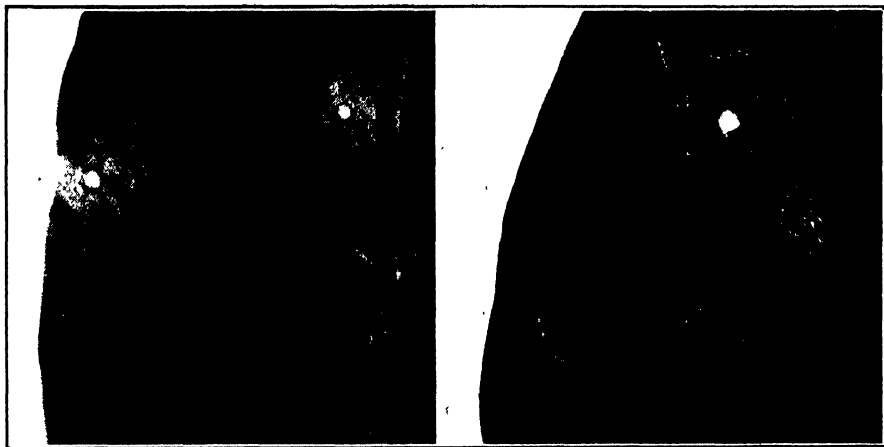
Figs. 9 and 10.—Leaves from tobacco plants experimentally infected in the glasshouse with tomato spotted wilt; showing two patterns of necrosis resulting from systemic invasion by the virus.

Occasionally, instead of the gradual dying a somewhat distorted secondary growth commences, and then almost normal leaves may be formed again. These, however, are always liable to a further onset of necrotic symptoms.

Frequently the primary lesion due to the development of the virus at the site of inoculation can be seen on field plants on one of the lower leaves. This is the point where the plant was infected by thrips feeding. The primary lesions can be better observed in the glasshouse, however, and two late stage types are shown in Figs. 11 and 12.

CONTROL.

Experience with tomato spotted wilt has shown that insecticidal sprays or dusts do not provide an adequate control. This is because so few thrips may be responsible for the spread of quite a considerable amount of virus infection. At present the best recommendations which can be given are:—(1) Avoid growing tomatoes and susceptible garden flowers such as Iceland poppies, nasturtiums, zinnias, or dahlias in the vicinity of seedbeds or field. Also keep down weeds of the tobacco family such as black nightshade. (2) Remove and bury infected plants at frequent intervals, for it is thrips which hatch on these plants which spread the infection.



Figs. 11 and 12.—Primary infection lesions of spotted wilt on tobacco at a late stage (mechanical inoculation). In Fig. 11 the spread of virus at cool to moderate temperatures is indicated by necrosis of the veins. In Fig. 12 there is less necrosis owing to higher temperatures.

POSSIBLY RELATED DISEASES.

Technical Note.—Attention may be called to the similarity in symptoms between spotted wilt on tobacco and the diseases described in the following papers:—

- (1) Böning, K. Zur Aetiologie der Streifen und Kräuselkrankheit des Tabaks. Zeits. für Parasitenkunde 3: 103-141. 24 figs. (1931).
- (2) Jochems, S. C. J. Een nieuwe virusziekte van Deli-Tabak, de Rotterdam B-ziekte. Bull. van het Deli Proefstation 26: 5-23 (1928).
- (3) Moore, E. S. A virus disease of tobacco in South Africa. Nature 129: 544 (1932).

Until further details on insect vectors, host range, and virus properties of these diseases are published no decision can be reached as to their identity or otherwise with spotted wilt.

THE DOG: ITS AILMENTS AND DISEASES.

The Library of the Department acknowledges the receipt of a book, "The Dog: Its Ailments and Diseases," by B. D. McMichan, R.V.S. The opening chapter deals concisely with the general care and feeding of dogs, and contains much sound practical matter on which every dog owner should be well informed. Simple indications of disease, medicines and their administration, and nursing, form the subjects of other brief chapters. The bulk of the book deals with the various ailments of the dog in a practical manner. Being written in a clear, easily readable style, the book is one which should be of practical service to dog lovers. Published by Messrs. Angus & Robertson, Sydney. Price 4s. 6d.

NARRUNG HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR JULY, 1933.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during July.	Per Cow during July.	Per Cow October to July.	Per Herd during July.	Per Cow during July.	Per Cow October to July.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
5/C ..	35	27-26	18,133	518-09	5,202-68	906-56	25-90	267-86	5-00
5/D ..	34-32	28	22,165	645-83	5,247-94	1,226-63	35-74	284-91	5-53
5/E ..	42	30-26	19,537½	465-18	4,524-98	1,022-78	24-35	239-33	5-23
5/P ..	32-77	25-58	21,563	658-01	5,882-90	1,078-39	32-91	297-31	5-06
5/R ..	66-29	38-13	18,745½	282-78	2,887-63	760-89	11-48	120-91	4-06
5/S ..	18	13-58	8,246	458-11	3,825-31	380-14	21-12	184-64	4-61
5/Y ..	27	18-81	12,801	433-31	5,143-04	679-55	22-84	275-37	5-37
5/Z ..	37	34-35	26,486	715-84	6,695-57	1,346-94	36-40	327-70	5-09
5/EE	17	12-65	10,556½	620-97	5,561-24	519-07	30-53	281-35	4-92
5/GG	22-16	17-03	6,105	275-40	3,336-23	306-91	13-85	162-35	5-03
5/II	29	21-71	16,613	572-86	5,324-50	832-73	28-71	266-97	5-01
5/JJ	24	16-19	16,001½	666-73	5,398-94	697-41	29-06	235-61	4-36
5/KK	20	12-29	5,682½	284-13	1,280-51	304-40	15-22	199-61	5-36
5/NN	25-84	13	11,224½	434-38	4,854-63	499-25	19-32	227-40	4-45
5/OO	20-35	13-03	9,276	455-82	4,738-82	462-26	19-77	215-03	4-34
5/QQ	21	16-94	9,450½	450-02	4,610-01	532-22	25-34	256-62	5-63
5/RR	22	21	10,943	497-41	3,509-22	589-99	26-82	193-89	5-39
5/SS	21	15-97	8,035	382-62	4,214-18	396-06	18-86	198-52	4-93
5/TT	11	6-52	4,282	389-27	5,191-62	229-71	20-88	269-59	5-36
5/UU	23	15-16	7,148	310-78	4,170-23	326-64	14-20	188-47	4-57
5/VV	27-94	27	21,917	784-43	6,306-99	941-69	33-70	271-99	4-30
Means	27-46	20-21	13,567-21	494-06	4,735-38	665-72	24-21	232-37	4-91

LAKE ALBERT HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR JULY.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during July.	Per Cow during July.	Per Cow December to July.	Per Herd during July.	Per Cow during July.	Per Cow December to July.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
6/B ..	19	17-03	13,000½	684-24	3,105-54	581-29	30-59	143-20	4-47
6/C ..	19-61	12-55	8,431½	429-95	4,187-17	348-73	17-78	182-97	4-14
6/F ..	23-97	23-26	22,733	948-39	4,956-36	1,156-30	48-24	249-69	5-09
6/H ..	28	25-19	20,238½	722-80	4,306-56	980-82	35-03	206-63	4-85
6/Y ..	11	6-23	2,140½	194-59	2,832-72	91-55	8-32	127-11	4-28
6/II	24	20-35	11,916	496-50	4,957-16	496-42	20-68	212-28	4-17
6/LL	25	22	13,144	525-76	4,392-49	461-16	18-45	167-37	3-51
6/OO	21-06	16-68	12,261½	582-21	6,106-50	517-63	24-58	276-30	4-22
6/PP	15	13-39	8,350½	583-36	4,318-76	441-25	29-42	220-10	5-02
6/QQ	24-94	15-97	14,007	561-63	5,546-41	644-53	25-84	240-30	4-60
6/RR	27	18-39	16,341½	605-24	5,209-64	672-50	24-91	223-22	4-12
6/TT	22	14-48	8,784½	399-29	4,643-91	386-67	17-58	206-48	4-38
C/VV	22-29	15-29	13,913½	624-20	5,283-07	625-69	28-07	248-27	4-50
6/XX	25-10	18	11,418½	454-92	4,937-07	495-47	19-74	210-89	4-34
6/YY	30-45	22-19	12,049	395-69	3,381-65	599-59	19-69	173-39	4-98
6/ZZ	27	19-52	11,136½	412-46	4,804-23	527-26	19-53	217-64	4-73
6/AAA	20-32	10-16	7,187	353-68	1,708-77	363-84	17-91	92-16	5-06
6/BBB	26-74	19-71	14,437½	539-92	5,227-81	567-51	21-22	212-85	3-93
6/CCC	22-19	14-94	8,430	379-95	4,424-58	335-71	15-13	184-39	3-97
6/DDD	24	16-77	10,679	444-96	4,880-69	502-23	20-93	215-80	4-70
6/EEE	26-97	23-90	22,320½	827-60	6,252-82	883-36	32-75	260-35	3-96
6/FFF	27-71	20-23	14,276	515-19	5,508-52	589-91	21-29	234-26	4-13
6/GGG	22-87	20-90	15,486½	677-15	6,425-72	610-40	26-69	255-88	3-94
Means	23-31	17-70	12,747-09	546-76	4,728-89	559-99	24-02	208-98	4-39

THE HILLS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR JULY, 1933.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.		Butterfat.		Average Test.
			Per Herd during July.	Per Cow during July.	Per Herd during July.	Per Cow during July.	
			Lbs.	Lbs.	Lbs.	Lbs.	%
7/E	26	17-32	10,379	399-19	442-36	17-01	4-26
7/H	9	8-03	4,808	534-22	228-87	25-43	4-76
7/K	14	11-77	9,493½	678-11	370-66	26-48	3-90
7/L	33	25-32	17,384	526-79	879-94	26-66	5-06
7/P	25	22-32	17,465	698-60	850-65	34-03	4-87
7/T	15	6-87	3,342½	222-83	167-14	11-14	5-00
7/Y	25	17-71	11,790½	471-86	540-65	21-63	4-58
7/AA	14	7-81	4,501½	321-53	206-91	14-78	4-60
7/KK	20	11-77	10,408½	520-43	445-36	22-27	4-28
7/MM	33-16	25-19	21,052½	634-87	798-94	24-09	3-79
7/PP	19	10-03	7,789½	409-97	412-24	21-70	5-29
7/TT	20-03	16-29	9,332	465-89	422-38	21-09	4-53
7/UU	21	8-68	4,784	227-81	225-10	10-72	4-71
7/VV	13-35	11-94	9,444½	707-45	457-45	34-27	4-84
7/XX	22	18-29	13,714½	623-38	690-97	31-41	5-04
7/YY	22-94	18-65	8,639	376-59	447-75	19-52	5-18
7/BBB	70-58	60-55	42,341½	599-91	2,010-68	32-66	4-75
7/CCC	14	11-61	5,595½	399-68	289-87	20-71	5-26
7/DDD	12	11-71	6,651½	554-29	326-47	27-21	4-91
7/EEE	12	10	5,394	449-50	281-13	23-43	5-21
Means	22-05	16-59	11,215-85	508-59	524-78	23-80	4-68

GOLDSBROUGH, MORT & COMPANY LTD.,

STOCK AND STATION AGENTS,

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THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

CONFERENCE OF HILLS BRANCHES.

Delegates from the Longwood, Balhannah, Blackwood, Kangarilla, Cherry Gardens, Clarendon, Lenswood and Forest Range, and McLaren Flat Branches held their Annual Conference at McLaren Flat on August 24th. Messrs. H. N. Wicks (Advisory Board of Agriculture), W. J. Spafford (Deputy Director of Agriculture), H. B. Barlow (Chief Dairy Instructor), R. Fowler (Manager Blackwood Orchard), E. Leishman, J. B. Harris (District Instructors), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary Agricultural Bureau).

Mr. C. Robertson presided and the opening address was delivered by Mr. H. N. Wicks. The following papers were read and discussed:—"Dehydration," H. C. Platts (McLaren Flat); "Dairying," G. Connor (McLaren Flat); "Tobacco Culture," R. G. Morphet (Kangarilla). Conference also discussed the top dressing of pasture lands, cover crops for orchards, pruning apricot trees, silver leaf of the plum, and carried the following resolutions:—"That the 1934 Conference be held at Coromandel Valley under the auspices of the Blackwood Branch;" "That the Government be asked to rescind the rule which demands the payment of 2s. 6d. per annum for the *Journal of Agriculture*;" and "That the Government be asked to abolish the licensing fees for dairy cows and bulls."

CONFERENCE OF SOUTHERN BRANCHES.

The Annual Conference of Branches of the Agricultural Bureau in the Southern Districts met at Goolwa under the auspices of the Currency Creek Branch on Thursday, August 17th. Delegates were present from the Murray Bridge, Milang, Strathalbyn, Rockwood, Finniss, Hindmarsh Island, Hartley, Langhorne's Creek, Inman Valley, Port Elliot, Rapid Bay, Currency Creek, Mount Compass, Jervois, and Belvidere Branches.

The Department of Agriculture was represented by Messrs. P. J. Baily (Advisory Board of Agriculture), W. J. Spafford (Deputy Director of Agriculture), H. B. Barlow (Chief Dairy Instructor), C. F. Anderson (Government Poultry Expert), R. Hill (District Instructor), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary Agricultural Bureau).

Mr. A. Saltmarsh presided, and the opening address was delivered by Mr. P. J. Baily. The following papers were read and discussed:—"The Future of the River Murray," J. P. Colebatch (Port Elliot); "Essentials in the Personality of the Farmer," W. E. Hargreaves (Port Elliot); "The Clydesdale Horse," A. M. Fuller (Port Elliot); "Pig Breeding and Management," B. Casley (Milang); "Marketing Wheat," S. Skewes (Currency Creek). The agenda covered a wide range of subjects relating to fodder crops, stock diseases, and management.

During the session devoted to Free Parliament the following resolutions were adopted:—"That the 1934 Conference be held at Strathalbyn;" "That it be a standing order for the Southern Conference that the invitation for the place of next Conference be given just before lunch and the vote taken immediately after the adjournment;" "That at future Conferences resolutions and questions on agenda be dealt with immediately after lunch, irrespective of any papers that may have not been read;" "That this Conference place on record its appreciation of the way in which late Fruit Inspector Beaumont carried out his duties;" "That it be a recommendation to the Government to have the tare of cream cans stamped on the can and the lid;" "This Conference

requests the Government to take steps to prevent the sale of dairy cattle that are affected with abortion;" "That the age limit for the registration of bulls be extended to nine months in place of six months;" "That as, apparently, the rule *re* new members is not giving satisfaction, it be rescinded, and the following substituted: 'That all members except life members and Branch Secretaries pay the annual subscription of 1s. if they do not require the *Journal*, or 2s. 6d. including *Journal*. Members whose subscriptions are unpaid on January 31st be struck off;" "That instead of resolutions which are carried at Conferences being sent before the Advisory Board of Agriculture, a deputation be appointed at the Conference to place them before the Minister of Agriculture."

At the Evening Session Mr. C. F. Anderson (Government Poultry Expert) spoke on several phases in the Poultry Industry.

PARAFIELD POULTRY STATION.

NOW BOOKING ORDERS FOR SPRING, 1933.

EGGS FOR HATCHING AND DAY OLD CHICKENS

WHITE LEGHORNS.

EGGS.—7s. 6d. per Setting of 15 Eggs. Incubator Lots, £2 per 100.

DAY OLD CHICKENS.—15s. per dozen; £4 per 100.

BLACK MINORCAS.

EGGS.—7s. 6d. per Setting of 15 Eggs. Incubator Lots, £2 per 100.

DAY OLD CHICKENS.—15s. per dozen; £4 per 100.

**Free on Rail,
Salisbury.**

DELIVERY.—CHICKS—August and September.
EGGS—July to September.

Intending breeders should recognise the importance of establishing their flocks with only the very best of stock also, pay particular care to the size of the egg. The future of the poultry industry in South Australia is almost entirely dependent on the export trade; the size of the egg for export is of the greatest importance. The breeding stock at Parafield is carefully selected and every egg set or sold is of a minimum weight of 2ozs., and a large percentage considerably over.

All Eggs and Chickens sold from Parafield Poultry Station are guaranteed to be produced at Parafield.

EARLY BOOKING IS ADVISABLE.

Further particulars can be obtained from the Manager, Parafield Poultry Station, Salisbury, or Poultry Expert, Department of Agriculture, Flinders Street, Adelaide.

C. F. ANDERSON, Poultry Expert.

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., DURING THE MONTH OF AUGUST, 1933.

IMPORTS.

Interstate.

Apples (bushels)	247	Potatoes (bags)	1,167
Apples, custard (bushels)	19	Bulbs (packages)	34
Bananas (bushels)	6,998½	Plants (packages)	79
Citrus—		Seeds (packages)	60
Grapo fruit (bushels)	4	Trees, fruit (packages)	38
Lemons (bushel)	1	Wine casks (No.)	1,973
Oranges (bushels)	48		
Passion fruit (bushels)	393	<i>Fumigated—</i>	
Pears (bushels)	7	Citrus—Lemons (bushel)	1
Pineapples (bushels)	916	Trees, fruit (packages)	35
Peanuts (bags)	387	Wine casks (No.)	38
Peanut kernels (bags)	21		
Beans (bushels)	3	<i>Rejected—</i>	
Carrots (bags)	112	Potatoes (bags)	22
Cucumbers (bushels)	3	Second-hand cases (No.)	7

Overseas.

(State Law.)

Wine casks (No.)	1,043	<i>Fumigated—</i> Wine casks (No.)	206
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Federal Quarantine Act.

	Packages.	Lbs.		Packages.	Lbs.
Seeds, &c.	5,004	922,874	Tea chests	2,264	—
Canes	71	—			Sup. ft.
Cocoanut chests	140	—	Timber	121,646	700,784

EXPORTS.

Federal Commerce Act.

	Packages.		Packages.
England	Citrus—Oranges . 315	Singapore	Other vegetables 172
Singapore	Apples	Netherlands East	Citrus—Oranges 217
	Citrus—	Indies	Vegetables
	Lemons	Colombo	Apples
	Oranges		Citrus—Oranges 13
	Pears		Vegetables
	Potatoes	New Zealand	Citrus—Oranges 11,189

DAIRY AND FARM PRODUCE MARKETS.

MESSRS. A. W. SANDFORD & Co., LIMITED, reported on September 1st, 1933.

BUTTER.—Although there was a seasonal increase in production throughout August, the quantity manufactured in this State was considerably less than for the corresponding period of last year. With the splendid rains received, however, during the past few days, a great fillip was given, and within the next few weeks the supplies will no doubt move forward very rapidly. The heavy rains were very opportune, as in some areas the pastures were very backward indeed. Recent reports from London indicate that the markets are continuing fairly steady, and the demand for the South Australian butter was being maintained. Values, therefore, in the local market have continued on a fairly even keel, and consignments cleared from week to week. Choicest creamery fresh butter in bulk, 1s. 2½d.; prints and delivery extra. (These prices are subject to the stabilisation levies.) Store and collectors, 7½d. to 8d. per lb. at store door, less usual selling charges.

EGGS.—The supplies are now coming along very freely, although up to within a week ago the production was not moving forward so rapidly as last year, but it appears now that a lot of the leeway will be made up, judging by reports from various country centres. With packing for export now in full swing, there is keen competition for prime quality, clean, full-sized eggs which will pass the graders, and rejects and pulp eggs are not so greatly sought after. Ordinary country eggs, hen or duck, 5d. per dozen; selected export quality eggs, 1½ozs. and over, 9d. to 10d. per dozen.

CHEESE.—The factories are now manufacturing export size cheese, as well as those for local use, and within the next few weeks it will be necessary to ship quantities to clear the surplus. Local and Western Australian buyers purchased regular quantities each week, and still continue to do so, so that the floors have been kept nicely cleared, and values are steady. New makes, medium and large, 7½d. to 8d.; loaf, 7½d. to 8½d.; semi-matured and matured, 9½d. to 10½d. per lb.

BACON.—Curers during the month under review were kept working at full pressure to cope with the supplies of live hogs available, and the sales of bacon were greater last month than for some time past, as not only was there a good local demand experienced, but also interstate trade was negotiated from week to week. With the higher prices ruling for the live hogs, the supplies have increased, so that there are heavy stocks of bacon in process of curing. Lard continues in shorter supply than requirements can absorb, and therefore values have firmed. Best local sides, 9½d. to 9½d.; best factory cured middles, 10d. to 11d.; large, 9d.; rolls, 8½d.; hams, 11½d. to 1s. per lb.; cooked, 1s. 1d. to 1s. 2d.; lard, prints, 7s. per dozen.

ALMONDS.—Active demand was experienced, and still continues, for all grades of almonds, but consignments received have been only limited, as many growers have ere this quitted the bulk of their stocks. Kernels have been short in supply, and are wanted. Softshells and Brandis, 8½d. to 9½d.; hardshells, 5d. to 5½d. per lb.; kernels, 1s. 11d. to 1s. 11½d. per lb.

HONEY.—Some interstate trade was done throughout the month, and local buyers operated more freely, so that consignment stocks were considerably reduced throughout the month. Prime clear extracted in liquid condition, 3d. to 3½d. per lb.; lower grades, 1½d. to 2½d. per lb.

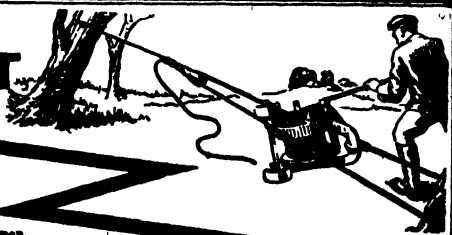
BEEWAX.—All lots met with ready clearance, and at date stocks were very short. 1s. 0½d. to 1s. 1d. per lb., according to sample.

LIVE POULTRY.—Exceptionally good markets ruled for poultry during the last few weeks, and although the quantities received were extensive, there was a good winter sale throughout, and with the close proximity of the Royal Show in Adelaide poulterers are now replenishing stocks in expectation of an influx of visitors to the city. We advise consigning. Crates loaned on application. Prime roosters, 3s. 6d. to 4s. 9d.; nice conditioned cockerels, 2s. 10d. to 3s. 5d.; fair conditioned, 2s. 3d. to 2s. 9d.; chickens, lower; heavy-weight hens, 2s. 9d. to 3s. 6d.; medium hens, 2s. 3d. to 2s. 8d.; light hens, 1s. 10d. to 2s. 1d.; couple of pens of weedy sorts, lower; geese, 3s. to 4s.; goslings, lower; prime young Muscovy drakes, 4s. to 5s. 6d.; young Muscovy ducks, 2s. 9d. to 3s. 4d.; ordinary ducks, 1s. 9d. to 2s. 8d.; ducklings, lower; turkeys, good to prime condition, 8½d. to 11d. per lb. live weight; turkeys, fair condition, 7d. to 8d. per lb. live weight; turkeys, fattening sorts, lower; pigeons, 3d. to 4½d. each.

POTATOES.—Local new, 5s. 6d. per cwt.

ONIONS.—New season's, 4s. 6d. per cwt.

TEARING THEM OUT.



is the regular job of the Monkey Grubber; in fact it was born to the work.

TREES and STUMPS. It matters not, they say, how big, with roots intact, a thorough job can be done. Run to the job like a horse, break, and worked in the same manner as a team is roved, it develops the power of 200 men, progressively applied, and always under perfect control.

In any position, so long as the operator has room for a swing, the machine is efficiently worked. An Automatic Gear allows a load to be heaved or released at will. Besides the great power and portability there are embodied other labour saving features, such as special rope couplings, rope shortener, smooth block, etc.

Agriculturalists in Australia, New Zealand, Great Britain, South Africa, the Americas, as well as Planters in India, China, Central Africa, Fiji, the East and West Indies, recognized its merits and applied its help.

THE "MONKEY" GRUBBER

is fabricated from material mined and made within the Empire, by Empire craftsmen, to assist with the full and efficient development of Her Majesty's resources.

Patentees and Makers—Monkey Grubber, Monkey and Wallaby Jacks:
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ADELAIDE STOCKISTS—

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Australian Implement House Furnishing Co.

Gulston Palmer & Preston
South Australian Farmers Union.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department show the rainfall at the subjoined stations for the month of August, 1933, also the average precipitation for the month of August, and the average annual rainfall.

Station.	For Aug. 1933.	Av'ge for Aug.	Av'ge Annual Rain-fall.
FAR NORTH AND UPPER NORTH.			
Oodnadatta	1.48	0.16	4.70
Marree	1.12	0.35	5.89
Farina	0.82	0.40	6.47
Copley	1.40	0.61	7.94
Beltana	1.47	0.63	8.54
Blinman	1.41	1.06	11.95
Hookina	1.08	1.18	11.53
Hawker	1.74	1.40	12.30
Wilson	1.70	1.21	11.78
Gordon	2.22	1.03	10.63
Quorn	1.94	1.71	13.29
Port Augusta ..	1.53	0.87	9.42
Bruce	1.82	1.06	9.93
Hammond	2.00	1.25	11.31
Wilmington	2.84	2.13	17.43
Willowie	2.71	1.35	12.19
Melrose	3.58	2.71	22.85
Booleroo Centre	3.25	1.79	15.15
Port Germein ..	2.57	1.35	12.43
Wirrabara	2.77	2.40	19.21
Appila	1.96	1.69	14.57
Craddock	1.86	1.11	10.83
Carrieton	1.98	1.45	12.31
Johnburg	1.55	1.21	10.61
Eurelia	2.49	1.56	12.87
Orroroo	2.41	1.54	13.21
Nackara	2.08	1.09	11.16
Black Rock	2.07	1.44	12.41
Oodlawirra	2.04	1.24	11.56
Peterborough ..	2.45	1.52	13.21
Yongala	2.90	1.78	14.42
NORTH-EAST.			
Yunta	0.69	0.72	8.50
Waukaringa ...	0.76	0.72	8.00
Mannahill	1.01	0.70	8.28
Cockburn	0.30	0.65	7.96
Broken Hill	0.23	0.82	9.63
LOWER NORTH.			
Port Pirie	2.64	1.37	13.17
Port Broughton	2.55	1.65	13.93
Bute	2.50	1.95	15.36
Laura	2.56	2.18	17.91
Caltowie	2.64	2.09	16.69
Jamestown	2.53	2.23	17.71
Gladstone	2.65	1.99	16.29
Crystal Brook ..	2.47	1.93	15.78
Georgetown	2.70	2.25	18.35
Narridy	2.35	1.96	15.85
Redhill	2.60	2.18	16.55
Spalding	2.39	2.46	18.96
Gumare	2.71	2.44	18.56
Yalca	2.60	2.02	15.33
Koolunga	2.20	2.01	15.40
Snowtown	2.90	2.10	15.64
LOWER NORTH.—continued.			
Brinkworth.....	2.38	2.07	15.74
Blyth	2.13	2.03	16.77
Clare	2.66	3.08	24.53
Mintaro	2.56	3.35	23.42
Watervale	2.50	3.65	26.91
Auburn	2.87	3.03	23.98
Hoyleton	2.20	2.16	17.32
Balaklava	2.38	1.81	15.49
Pt. Wakefield ..	2.21	1.46	12.93
Terowie	2.15	1.62	13.35
Yarcowie	1.84	1.62	13.57
Hallett	1.82	2.16	16.40
Mount Bryan ..	1.99	2.28	16.65
Koorunga	1.92	2.20	17.89
Farrell's Flat ...	2.40	2.53	18.65
WEST OF MURRAY RANGE.			
Manoora	2.46	2.59	18.83
Saddleworth ...	2.66	2.48	19.55
Marrabel	2.83	2.74	19.84
Riverton	3.03	2.70	20.75
Tarlee	2.50	2.26	18.11
Stockport	2.38	2.05	16.88
Hamley Bridge .	2.23	1.97	16.54
Kapunda	2.58	2.45	19.79
Freeling	2.56	2.25	17.85
Greenock	3.30	2.82	21.56
Truro	2.79	2.62	19.96
Stockwell	2.90	2.56	20.12
Nuriootpa	3.66	2.68	20.64
Angaston	3.73	2.91	22.43
Tanunda	4.36	2.80	22.02
Lyndoch	3.86	3.15	23.45
Williamstown ..	4.54	3.80	27.71
ADELAIDE PLAINS			
Owen	2.63	1.80	14.33
Mallala	2.16	1.94	16.56
Roseworthy	3.20	2.13	17.34
Gawler	2.56	2.25	18.96
Two Wells	2.83	1.80	15.70
Virginia	3.69	2.06	17.12
Smithfield	3.33	2.17	17.50
Salisbury	3.13	2.27	18.54
Adelaide	3.36	2.51	21.10
Glen Osmond ..	3.94	3.18	25.96
Magill	3.74	3.11	25.50
MOUNT LOFTY RANGES.			
Teatree Gully ..	3.77	3.38	27.30
Stirling West ..	7.66	6.26	46.91
Uraidla	6.21	5.88	43.91
Clarendon	5.00	4.25	32.82
Morphett Vale ..	4.04	2.69	22.64
Noarlunga	3.34	2.45	20.34
Wailunga	3.89	3.19	26.01
Aldinga	3.06	2.45	20.21

RAINFALL—continued.

Station.	For Aug. 1933.	Average for Aug.	Average Annual Rain-fall.	Station.	For Aug. 1933.	Average for Aug.	Average Annual Rain-fall.
MOUNT LOFTY RANGES—contd.				WEST OF SPENCER'S GULF—contd.			
Myponga	4.56	3.56	29.48	Rudall	1.92	1.73	12.19
Normanville ...	2.37	2.50	20.69	Cleve	2.15	1.81	14.66
Yankalilla	2.42	2.71	22.85	Cowell	0.91	1.13	11.10
Mount Pleasant	3.69	3.62	27.18	Miltalie	1.85	1.50	13.54
Birdwood	3.98	4.02	29.15	Darke's Peak ..	2.04	2.31	14.92
Gumeracha	4.55	4.57	33.39	Kimba	1.81	1.60	11.52
Millbrook Res. .	5.13	4.81	34.86				
Tweedvale	5.01	5.00	35.89	YORKE PENINSULA.			
Woodside	4.39	4.43	32.25	Walleroo	2.45	1.54	13.91
Ambleside	4.32	4.82	34.87	Kadina	2.49	1.87	15.61
Nairne	2.65	3.58	28.09	Moonta	2.05	1.69	15.05
Mount Barker ..	3.70	4.27	31.79	Paskeville	2.12	2.11	15.46
Echunga	3.88	4.26	33.15	Maitland	2.30	2.55	19.90
Macclesfield	3.45	3.88	30.43	Ardrrossan	1.88	1.79	13.93
Meadows	3.88	4.58	36.12	Port Victoria ...	1.63	1.91	15.40
Strathalbyn	2.08	2.33	19.34	Curramulka	1.79	2.33	17.87
				Minlaton	3.01	2.38	17.80
MURRAY FLATS AND VALLEY.				Port Vincent ...	2.64	1.77	14.40
Meningie	2.48	2.19	18.37	Brentwood	2.31	1.98	15.45
Milang	2.22	1.66	14.92	Stansbury	2.39	2.15	16.81
Langhorne's Ck.	2.28	1.69	14.76	Warooka	3.12	2.37	17.51
Wellington	2.32	1.63	14.56	Yorketown	2.23	2.22	16.94
Tailem Bend ...	2.61	1.66	14.70	Edithburgh	2.67	2.04	16.34
Murray Bridge .	1.44	1.46	13.59				
Callington	1.41	1.82	15.20	SOUTH AND SOUTH-EAST.			
Mannum	1.70	1.22	11.47	Cape Borda	2.99	3.43	24.83
Palmer	2.02	1.97	15.43	Kingscote	2.75	2.52	19.11
Sedan	1.83	1.51	12.11	Penneshaw	2.38	2.52	18.85
Swan Reach ...	1.56	1.13	10.60	Victor Harbor ..	2.72	2.51	21.27
Blanchetown ...	1.50	1.11	11.04	Port Elliot	3.00	2.33	19.91
Eudunda	2.34	2.24	17.11	Goolwa	2.48	2.01	17.81
Sutherlands	1.75	1.35	10.82	Copeville	1.86	1.31	11.44
Morgan	1.50	0.94	9.20	Meribah	1.41	1.03	11.10
Waikerie	1.29	1.05	9.66	Alawoona	1.71	1.05	10.02
Overland Crnr...	1.02	1.00	10.41	Mindarie	1.85	1.53	11.91
Loxton	1.52	1.33	11.59	Sandalwood	2.13	1.70	13.57
Renmark	1.25	1.08	10.49	Karoonda	2.02	1.88	14.33
				Pinnaroo	1.61	1.75	14.54
WEST OF SPENCER'S GULF.				Parilla	1.83	1.73	13.90
Eucla	0.76	0.96	9.98	Lameroo	2.09	1.90	16.08
Nullarbor	0.69	0.99	8.73	Parrakie	3.20	1.90	14.49
Fowler's Bay ...	2.08	1.46	11.82	Geranium	2.98	2.20	16.41
Penong	1.97	1.62	12.12	Peake	2.54	2.01	16.03
Koonibba	1.99	1.67	11.82	Cooke's Plains ..	1.81	1.82	15.38
Denial Bay	1.72	1.53	11.36	Coomandook	2.68	2.08	17.11
Ceduna	1.59	1.32	9.95	Coonalpyn	2.88	2.12	17.42
Smoky Bay	1.56	1.40	10.28	Tintinara	3.03	2.19	18.60
Wirrulla	1.86	1.56	10.08	Keith	2.60	2.11	17.87
Streaky Bay ...	3.71	1.99	14.82	Bordertown	2.07	2.22	19.22
Chandada	2.69	—	—	Wolsley	2.14	2.22	18.41
Minnipa	2.68	2.00	13.68	Frances	3.04	2.49	19.99
Kyancutta	1.91	—	—	Naracoorte	3.11	2.73	22.59
Talia	2.84	2.18	14.63	Penola	3.31	3.31	26.06
Port Elliston ...	3.47	2.31	16.39	Lucindale	3.81	3.01	23.16
Yeelanna	2.88	2.44	15.72	Kingston	2.52	3.11	24.33
Cummins	2.99	2.79	17.35	Robe	2.77	3.31	24.64
Port Lincoln ...	2.85	2.67	19.34	Beachport	3.16	3.55	26.93
Tumby	2.00	1.78	13.92	Millicent	3.13	3.87	29.76
Ungarra	2.28	2.26	16.73	Kalangadoo	3.63	4.20	32.03
Carrow	1.98	1.54	13.08	Mount Gambier ..	2.60	3.91	30.52
Arno Bay	2.08	1.45	12.44				

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page.	Dates of Meetings.		Branch.	Report on Page.	Dates of Meetings.	
		Sept.	Oct.			Sept.	Oct.
Adelaide	*	—	—	Gladstone	*	1 & 29	—
Alawoona	†	—	—	Gladstone Women's	†	19	17
Allandale East	†	1 & 29	—	Glencoe	*	12	10
Alma	†	—	—	Goode	†	6	4
Appila-Yarrowie	†	1	6	Goode Women's	*	6	4
Ashbourne	*	27	—	Greenock	210	18	9
Auburn Women's	†	29	27	Green Patch	†	28	—
Balaklava	*	25	3 & 23	Gumeracha	†	4	2
Balhannah	†	—	—	Hanson	*	—	3
Balumbah	†	—	—	Hartley	*	6	4
Balumbah Women's	†	6	4	Hindmarsh Island ..	*	—	—
Beetaloo Valley	†	4	2	Hope Forest	†	4	2
Belalie Women's	†	5	10	Hoyleton	*	18	16
Berrri	†	6	4	Inman Valley	228	21	19
Belvidere	*	—	—	Jamestown	*	20	18
Blackheath	†	7	5	Jervois	†	14	12
Black Rock	*	5	9	Kalangadoo Women's	*	9	14
Black Springs	208	—	—	Kalangadoo	*	9	14
Blackwood	†	11	9	Kalyan	*	20	18
Blyth	†	22	27	Kangarilla Women's	†	21	19
Booborowie	†	5	2	Kanni	*	—	—
Booleroo Centre	*	1 & 29	—	Kapinnie	†	—	—
Boolgun	†	28	26	Kapunda	*	8	13
Boor's Plains	†	7	5	Karoonda	*	6	4
Bowhill	*	4	2	Keith	*	—	—
Brentwood	†	7	5	Kelly	†	2 & 30	—
Brinkley	†	—	4	Ki Ki	†	—	—
Brinkworth	†	4	2	Kilkerran	†	5	3
Brownlow	†	—	—	Kongorong	*	4	2
Buchanan	*	—	—	Koolunga	206	28	—
Bugle	*	12	10	Koonibba	*	—	—
Bute	*	21	19	Koppio	216	—	3
Butler	215	—	—	Kringin	*	4	2
Caliph	*	5	3	Kulkawirra	221	21	—
Caralue	*	27	—	Kyancutta	†	5	3
Carrow	*	—	4	Kybybolite	†	—	—
Charra	†	—	—	Kybybolite Women's	*	5	3
Cherry Gardens	†	2 & 30	28	Lameroo	*	2 & 30	—
Chilpuddie Rock	215	—	—	Langhorne's Creek	†	7	—
Clare Women's	†	—	—	Laura	†	2	7
Clarendon	223	4	2	Laura Bay	†	5	10
Cleve	*	2	7	Laura Bay Women's	†	5	10
Collie	*	6	4	Lenswood and Forest	—	—	—
Coomandook	†	29	27	Range	†	—	—
Coonawarra	*	7	5	Light's Pass	†	—	2 & 30
Coonawarra Women's	†	20	18	Lipson	*	2 & 30	—
Cummins	†	8	13	Lone Gum and	—	—	—
Cungena	†	7	5	Monash	*	—	4
Currency Creek	†	4	2	Lone Pine	*	4	2
Dudley	209	—	3 & 31	Lowbank	*	—	4
Elbow Hill	216	28	—	Loxton	*	8	13
Eudunda	*	4	2	Lyndoch	†	—	3
Eurelia	†	9	14	McLaren Flat	*	—	—
Eurelia Women's	†	6	4	McLaren Flat Wm's	*	7	5
Farrell's Flat	*	29	27	Macclesfield	†	21	19
Finnis	†	—	—	MacGillivray	*	—	3
Frances	†	—	—	Mallala	*	18	16
Frayville	†	—	—	Maltee	†	28	—
Gawler River	†	—	—	Mangalo	217	—	—
Georgetown	*	2 & 30	—	Mangalo Women's	*	—	—
Geranium	*	30	28	Marama	†	—	—

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Meadows	*	—	4	Roberts & Verran..	221	—	—
Meribah	*	—	—	Rosedale	†	—	—
Milang	†	6	7	Roseworthy	†	—	—
Millicent	†	29	27	Rudall	*	—	3
Millicent Women's ..	238	—	—	Saddleworth	*	1	6
Miltalie	218	2 & 30	—	Saddleworth Women's ..	239	5	3
Monarto South	†	—	—	Scott's Bottom	†	2 & 30	—
Moorlands	†	—	4	Shoal Bay	226	—	3
Morchard	†	1 & 29	—	Smoky Bay	†	—	—
Morchard Women's ..	†	1	6	Snowtown	†	8	13
Mount Barker	*	18	16	South Kilkerran ..	†	—	3
Mount Bryan	†	—	—	Springton	*	—	4
Mount Compass	†	7	—	Stanley Flat	*	18	16
Mount Gambier	†	8	13	Stockport	†	—	—
Mount Hope	†	—	3	Strathalbyn	226	6	4
Mount Pleasant	†	—	—	Streaky Bay	*	22	27
Mudamuckla	†	9	14	Sutherland	211	7	5
Mundalla	†	—	—	Tailem Bend	*	7	5
Mundalla Women's ..	238	7	5	Talia	*	29	27
Murray Bridge	†	—	—	Tantanoola	†	2	7
Murraytown	*	—	—	Tantanoola Women's ..	†	—	4
Mypolonga	*	6	4	Taplan	†	—	3
Myponga	*	21	19	Taplan Women's ..	*	—	—
Myrta	*	—	4	Taragoro	†	28	R
Nantawarra	*	28	—	Tarlee	*	5	—
Naracoorte	*	9	14	Truro	†	18	—
Narridy	†	—	—	Tulkinera	*	7	5
Nelshaby	*	—	—	Tweedvale	*	21	19
Nelshaby Women's ..	†	—	—	Ungarra	*	7	5
Netherton	*	—	4	Upper Wakefield ..	212	28	2
Nunjikompita	*	28	—	Uraidla and Summer-			
Nunkeri	*	—	4	town	*	4	2
O'Loughlin	†	11	9	Waddikee Rocks ..	*	2 & 30	—
Overland Corner ..	†	—	4	Waikerie	*	8	13
Owen	*	11	9	Wallala	†	13	11
Palabie	†	—	—	Wanbi	*	27	25
Parilla	*	19	17	Wandearah	*	—	3
Parilla Women's ..	†	26	18	Warcowie	†	—	3
Parilla Well	*	19	17	Warcowie Women's ..	†	5	—
Parilla Well Women's ..	†	19	17	Warramboo	*	5	3
Parrakie	†	—	—	Warramboo Women's ..	240	—	—
Parrakie Women's ..	*	26	24	Wasleys	*	14	12
Paruna	†	1	6	Wasleys Women's ..	†	7	5
Paskeville	†	—	3	Watervale	*	18	16
Pata	*	1	6	Wauralte	*	—	3
Penola	†	2	7	Weavers	214	11	9
Penola Women's ..	†	—	—	Wepowie	†	4	2
Penwortham	†	28	—	Wepowie Women's ..	†	—	—
Petersville	*	—	3	Williamstown Wm's ..	†	—	4
Petina	*	23	28	Willowie	*	25	23
Pinbong	†	—	—	Wilmington	†	19	17
Pinnaroo	*	—	—	Wirrilla	*	2 & 28	—
Pinnaroo Women's ..	†	1	6	Wirrilla Women's ..	*	7	5
Port Elliot	*	—	—	Wirrulla	*	20	18
Pygery	220	—	3	Wolseley	*	4	9
Pygery Women's ..	*	—	—	Wudinna	†	—	14
Quorn	†	—	—	Yadnarie	†	—	3
Ramob	222	4	2	Yandiah	†	8	13
Redhill	*	4	—	Yaninee	*	—	—
Rendelsham	*	2	7	Yeelanna	*	—	4
Rendelsham Women's ..	†	—	—	Yurgo	†	—	—
Riverton	*	11	9	Yurgo Women's	*	—	—

* No reports received during the month of August. † Held over. R In recess. ‡ Form

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

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MEN'S BRANCHES.

SOUTH-EASTERN.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Frances	2/8/33	11	Annual Meeting	C. Koch
Allandale East .	4/8/33	14	Discussion	J. Laslett
Penola	11/8/33	15	Annual Meeting	F. Hinze
Tantanoola	5/8/33	12	Address—E. S. Alcock ..	H. Kennedy
Millicent	28/7/33	9	Annual Meeting	L. Hutchesson
Mundalla	24/8/33	20	"Winter School," A. Ross	A. Ross

UPPER-NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Warcowie	11/7/33	17	Address—J. O. Hatter ..	A. Crossman
Warcowie	22/7/33	27	Address—W. J. Spafford	A. Crossman
Warcowie	9/8/33	85	Annual Meeting	A. Crossman
Wilmington ...	18/7/33	27	Address—H. B. Barlow .	C. Cole
Morchard	4/8/33	9	"Soldering," A. McCallum	E. Tilbrook
Quorn	11/8/33	6	Formal	O. Noll
Eurelia	19/8/33	6	Formal	E. Wall

MIDDLE-NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

KOOLUNGA (Average annual rainfall, 15.40in.).

July 4th.—Attendance, 10.

The Hon. Secretary read the annual report and balance-sheet, and officers were elected for the ensuing year. Mr. H. Spencer read a paper, "Where Does Economy Begin on a Farm?" He stated that, with the value of farm produce at its present level, and the cost entailed in producing the same, it was almost impossible to make ends meet. One was often at a loss to know just where economy began or ended, and

whether money spent for extra labor or plant was really economy or extravagance. Economy lay not so much in rigidly curtailing all expenditure as in spending wisely, and putting money into farming operations that would show more profit. Often it was false economy to persevere with harvesting machinery when it had become badly worn, since, in the course of a few weeks' work, a farmer could easily lose sufficient wheat to pay a substantial deposit on a new machine. The same applied to employing men in the harvesting operations who were careless about their work; and it applied to every phase of work in connection with the farm. In all classes of work implements and machinery should be well cared for, and so set as to do the best work by offering the least resistance. Cultivators and ploughs could often be made to pull two horses lighter if the shares were set at a correct angle for cutting their way through the ground, instead of dragging through it. Thus a saving in horseflesh—or, if working a tractor, a saving in fuel and oil—would be effected. Stump-jump cultivators and ploughs should have sufficient draught on them to prevent the frame of the tine riding on the frame of the implement practically the whole time unless resistance was offered by stones, stumps, &c. Tines that were lifting partly out of the ground all the time so that the shares were riding on the points offered greater resistance to the power which was pulling the implement, and thus did poorer work. The life of the cultivator and plough axles could be doubled if protected from dust and dirt, especially in undulating country. No matter how well the box of a wheel might fit the axle, there was always room for dust to get in on the inside end unless further protection than the manufacturers supplied. He recommended binding a piece of bag firmly round the arm of the axle until practically flush with the collar on the hub of the wheel, and then binding another piece around it so that it overlapped the collar or the box. If it were then soaked with waste oil it would be practically dust-proof, and would eliminate the wear on the axles by 100 per cent. Such practices took but a few minutes, but gave years of service and were real economy. It paid handsomely to try a few different brands of cultivator shares at times, because some would be found to have 100 per cent. more wear than others, through being made of better or harder tempered steel. A blacksmith's shop on the farm was essential, and good economies could be made in that direction. One should never delay the working of the land to do the jobs of the blacksmith unless compelled to, but an eye should be kept on implements, &c., and when it was seen that a job required attention it should be done on the first wet day. By adopting that method there was no time lost when the land should be worked, and it was a pleasure to do such jobs on wet days. A large saving could be made by plating the plough shares. If the shares were plated underneath the same sockets would last for years, and the draught of the plough would be lighter. When fallowing was finished the opportunity should not be lost of working fallows after a rain. Some farmers neglected that part of the work at times because they thought that rains were too early and they might have to go over it twice. That was a bad policy, and it often ended up in having to work the land dry, when it could not be worked to the same advantage. After seeding it was a good plan to take the seed box off the combine and put it in the shed or on a stand and cover it over with iron, thus protecting it from the weather, and making the combine, which was used fairly extensively for cultivating, several cwts. lighter to pull. Harvesters, &c., should be thoroughly overhauled and put in order in the slack periods, because valuable time might be lost in the fields. When harvesting was finished the machine should be taken straight to the shed and placed under cover. A good practice was to make a note of anything that required replacing or renewing prior to starting next year's harvest.

BARLEY

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Harness should be kept well oiled with good neatsfoot oil, as leather soon perished when allowed to become hard and dry. Good oil and a good oilcan should be a golden rule with all farmers. Oil was much cheaper than bearings. It was no trouble to get a man to oil a machine well if he had a good can to do it with, and a few shillings spent in that direction might mean pounds saved in bearings. It was often good economy to have an assortment of nuts and bolts on the farm, and a pound or two spent in that direction might save miles of travelling. A good supply of scrap iron would be most useful at the farm smithy. A pound spent to secure an old machine at a sale would often return ten times its value in bolts, iron and bearings. A good set of wrenches and tools saved time when executing repairs, and a few pounds spent in that direction was a wise investment. One should always endeavor to work with a system, and keep up with seasonable jobs, especially field work. The work for the next day should be planned the night before, so that there was no time lost in wondering what to do the next morning. All farmers should be members of the Agricultural Bureau, and by interchange of their ideas, methods, and tests, help themselves and their fellow farmers. (Secretary, I. J. Jones.)

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Appila	5/6/33	7	"Travelling," W. Lange.	E. Wurst
Booborowie ...	9/8/33	17	Address—W. C. Johnston	A. Fairchild
Beetaloo Valley	3/7/33	80	Annual Meeting	B. Giddings
Beetaloo Valley	7/8/33	14	Discussion	B. Giddings
Mount Bryan ..	5/8/33	6	Annual Meeting	A. Jefferies

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

BLACK SPRINGS.

June 6th.—Attendance, 7.

PIGS AS A SIDE-LINE.—Paper contributed by Mr. E. Siegert:—"At the present time pigs are not very profitable, but if properly cared for, will help the revenue of the farm. The class of pig should be given first consideration. I prefer the Large White-Berkshire cross—the Large White for length and the Berkshire to add fat. Very often the heavier breeds of pig have to be kept until they are baconers, and if a suitable cross is introduced, they can be passed out as porkers. The sow should only have two litters a year. In the first place, the little pigs need not be weaned so young, and they do not get such a setback. They can be weaned at eight weeks. To get three litters of pigs a year the sow must be mated three days after she farrows, but this is not advisable, because the piglets are more or less stunted, and there is a possibility of a small litter next time. The piggery should consist of a small paddock or yard with a straw stack for shelter. The pens should be placed in a corner of the yard, one pen being set aside for farrowing, with a rail 6in. high and about the same distance from the wall, to allow the young pigs to get out of the way of the sow. Put the sow into the pen several days before farrowing so that she will settle down and get her bed ready. Provide short straw. In feeding the pigs it is advisable to crush and soak the grain; pigs do better on sloppy food. There is always a certain amount of skim milk on a farm in which to soak the grain. Pigs should never be given fresh skim milk. Green hay chaff will take the place of green feed if the latter is not obtainable. It can be either soaked or scalded. A pinch of super can be added to the feed to aid the growth of the pigs." (Secretary, K. Dunn.)

July 4th.—Attendance, 14.

FALLOWING.—The following paper was read by Mr. P. Abbott:—"Fallowing is the foundation of the next year's crop, and on it depends to a great extent the success of the undertaking. The first step should be a good clean burning off, preferably during March. By that time the paddock is practically valueless as regards feed, and the resultant burn should destroy any diseased plants present in the previous crop. Fallowing should be commenced as soon as possible after seeding to conserve the early rains, and to enable the ploughing to be finished in time for the farmer to avail himself of the later rains for harrowing. During the last few years farmers have been more or less tardy as regards fallowing, arguing that late fallowing requires less

working or less strength to work it, and thus enable the cultivating to be done more quickly. These farmers overlook the fact that fallowing means the conserving of moisture for the following crop; that the early fallow benefits by the early rain, and if harrowed towards the end of August or early in September, conserves this moisture which soaks into the soil. Cultivated with a springtooth implement the finer soil is filtered to the bottom, thus making an even seed-bed. Left in this condition, little evaporation takes place during summer, and the rougher layer of soil brought to the top prevents the fallow from setting. After harvest it should be harrowed following the first suitable rain, to encourage the germination of weeds. Subsequent cultivating, if necessary, should be shallower than the spring-working. Sheep play an important part in keeping the fallow clean, and in packing the soil by constantly crossing over it."

HORSE BREEDING.—Paper read by Mr. A. Mickel:—"If people had realised what the consequences would be of nearly everybody giving up breeding horses they would have bred enough horses to maintain their teams. At the present time it is almost impossible to buy a good young draught horse. The modern type of Clydesdale is too light. If farmers had very big mares they could expect good types of horses from the new type of Clydesdale, but as only good farm sorts were available, and these mated with the modern sires, one can only expect lighter foals. In Scotland this type of horse was bred some years ago, but it was found that heavier horses had to be introduced to maintain their standard. At the present time Shire stallions are being obtained from England to improve the weight of the horses. In breeding horses, every farmer should have a few good weighty mares and then mate them with the best stallion." (Secretary, K. Dunn.)

DUDLEY.

June 6th.—Attendance, 16.

CARE OF THE FARM HORSE.—Paper read by Mr. V. Lally:—"The first requirement of the farmer who is 'starting off scratch' is a well-matched team. I prefer the Clydesdale stallion mated with a half-bred shire mare. The result is a weighty, well ribbed, active horse, with good bone and not too much hair. Some farmers at present are crossing Clydesdale mares with Percheron stallions. The result is a quiet, leggy horse, with hardly enough weight for heavy land. I prefer a stable of wood and iron, although much is to be said for a straw shed; it is cool in summer and warm in winter. It's only drawback is the danger of fire. Most farmers leave their horses loose in the shed. I prefer to have each horse in a separate stall, and all tied up. This entails a certain amount of work, namely, when tied up they have to be bedded and their stalls cleaned out daily; but it is worth the trouble. The horses are always dry, and can be cleaned down and harnessed without disturbing their feeding. Further, each horse has its own feed, and no more, as against the horse that is loose sometimes gets too much food. The main disadvantage of tying up horses is that they have to be looked after regularly. Loose horses can go in and out of the stalls, and do not want so much attention. *Feeding Horses.*—I prefer good, well-cut chaffed wheaten hay, with crushed oats, morning and dinner feeds (10lbs.), with chaff for the evening and night feeds, 1½ hours feed each. *Watering.*—Horses should be watered 1 hour after they are fed in the morning, when they are going to work, and before the dinner and evening feeds, and also last thing at night. *Harness.*—A well-fitting collar is the best means of avoiding sore shoulders; a pipe collar to fit snugly. There should be room to pass the finger between the horse's neck and the bottom of the collar. A collar that is too big can be made to fit by holding up a bran bag lengthways, putting it round and tying it up at the bottom of the horse's neck, drying the bag when wet with sweat. In working abreast teams, backbands save the horses's shoulders, taking the rise and fall of the swing, and also keep up the chains when turning around. I prefer, when possible, to work a tandem team, providing there are good leaders. The horses can be placed to better advantage than in an abreast team. *Working the Team.*—Start at sunrise, or before, if necessary; work on till about 12 o'clock; give 1½ hours for dinner; then work on till sundown. Horses that are kept working on till it is too dark to see come home wet with sweat, and they are cold and damp all night, and cannot be given a good grooming in the morning. To keep up the team's strength, every farmer should have at least one or two good mares, and breed a foal or two every year. *Mares.*—It is a good policy to always have at least one or two spare horses to always keep up the strength of the team and to provide for a sick horse. An in-foal mare should do light work up to within two weeks of foaling. The mare should be separated from the rest of the horses and kept close to home where she can be watched. See that the mare cleans and that the foal sucks and has the use of his bowels. When the foal is six months old he should be weaned. To keep the foal growing after leaving its mother, it should have plenty of good food; bran I consider one of the best feeds to keep the foal fit providing he is in good condition. He should be ready to break in at three

years old. In breaking in a young horse, first mouth him well, either by lunging him or by reins tied to a surcingle. When he can be driven on either side and leads well he should be taught to tie up. When this is done for the first time, use a branbag around the colt's neck. There is less chance of hurting his neck or of choking down; when he ties up quietly he can be put in the team, preferably on the outside in the body of a tandem team. Half a day's work is enough until his shoulders pull into shape. After a few weeks he should be able to take his place in the team." (Secretary, M. Telfer.)

GREENOCK (Average annual rainfall, 21.56in.).

June 12th.—Attendance, 38.

PAINT AND OILS.—Mr. C. Cartwright (Koolunga) read the following paper:—"Farm buildings and appliances call for several types of paint. These range from the highest grade of prepared paints to whitewash with its multifarious uses; but in purchasing paints care should be taken because there are paints for every class of material. In considering the employment of paints—particularly in reference to farmsteads—one has to naturally study the economic factors of cost and time. The farmer has a definite routine to adhere to, and painting should have its place in that routine, but if not already allowed for, a small amount of time is all that the farmer may be able to set aside for the work. When contemplating painting buildings he should note the merits of high grade paints, for it costs no more to apply than an inferior type of paint, and its life being so much longer allows more seasons to elapse before re-painting is necessary. First and foremost of the high grade paints available for this purpose there is the hardware prepared paint of lead or lead and zinc basis, colored with the necessary coloring pigments and having linseed oil as the principle constituent of the liquid portion. For roofs and tanks the paint manufacturer has prepared a range of roof and bridge paints which are lead free and are therefore essential if rain water is collected for household purposes. These roof paints are made in several different shades of red, grey, and green, and are so constructed to give the maximum durability; excessive temperature changes are experienced on roofs, and therefore the paint must possess elasticity. Of the equipment on the farm one naturally thinks of the various implements, wagons, and any machinery which is incidental to the type of farm. Whilst these are always painted when acquired they can be kept in a state of good preservation by the use of wagon or implement paints that are manufactured in several colors. Unfortunately some of the original paints on implements rapidly decays once the implement is exposed to the weather. Before applying paint, see that the surface is thoroughly clean. Paint will not harden over grease. Paint applied over a dirty surface does not stay on long, because in the hardening of paint it shrinks and causes blisters. Another type of paint which is comparatively cheap and yet efficient on mechanical parts and inside of tanks and troughs is bitumen black, which is easy to apply and can be easily recoated. Unfortunately the color limits the number of places where it might be used. A few words on oils: Boiled linseed oil should not be used unless one is aware of its actions. Raw linseed oil should be in every producer's holding because of its value for burns, drenches for stock, and the saving of tying of wheels providing they are not gone too far. If a wheel that has its spokes and tyre loose is given a good coat of linseed oil and then painted it will be years before it will require tying. A good way to oil a wheel is to get an old motor tyre, cut it in three, jack up the wheel and place part of the tyre under the wheel so that it will hold oil, fill this up with oil and allow the wheel to stand in it until it will not absorb any more oil. Then revolve it until the whole of the wheel has been completed. Let dry for a few days, then give it several coats of good carriage paint. If this plan is put into practice, instead of putting water on the wheels or letting them lie in the dam for a few hours it will save many pounds and make it much easier for the blacksmith to make a good job of tying when it becomes necessary." The following points were brought forward in the discussion:—Best colors for roof painting—green or stone colors. Patent driers were best for outside use. For iron work red oxide was thought best, with a little drying added. Kerosene should not be used in paint under any conditions. Pine tree turpentine should be used for thinning paints. Some members knew of glue having been used in paints to give a gloss. Mr. Cartwright thought it was best for an amateur to go to a professional painter to have his paints mixed. Lead-free paints were advised for ironwork, and lead or zinc paints for woodwork. Treatment of brushes after use: Wash either in turpentine, kerosene, or soap water and dip in kerosene occasionally to keep soft. To soften a brush left in paint, remove a thickness of 6 or 7 hairs from the outside, wash in extract of soap and hot water, or in boiling water. Raw linseed oil was found best to break the strength of paint. Some members found that paints remained sticky, even years after being applied. Mr. Cartwright said this was due to paint being fatty—raw linseed oil should be used to thin. Caustic soda was suitable to remove paints. Onions cut and put in a freshly painted room would take up the fumes of fresh paint. A bitumastic paint was recommended to be

used for painting inside of tanks or any damp surface. Kalsomine was considered too expensive to be used for painting outside walls. Ordinary whitewash was advised, but if desired, Mr. Cartwright said it might be colored any other color. (Secretary, A. Schubert.)

SUTHERLANDS.

Meeting held June 1st.—Attendance, 40.

VARIETIES OF WHEAT SUITABLE FOR THE DISTRICT.—The following paper was contributed by Mr. A. Twartz:—"There are some 250 distinct varieties of wheat in South Australia, but in this paper I propose to deal with early, mid-season, and late-maturing varieties. Early maturing varieties, such as Aussie, Florence, and Sultan have been tested for some years in this district. I recommend sowing the above varieties for grain: they are good yielders with plump grain, thresh out readily, and should succeed on the light land of this district. They are fairly drought resisting, and to get the best result must be sown late in the season or last of all. Sow these varieties rather thickly as they do not stool. They have a tendency to crowd out weeds. Their straw is white, and stock do well on the straw and cocky chaff. For mid-season varieties I favor Hard Federation, Rancee, and Free Gallipoli of the brown chaff varieties. These should succeed on the heavier soils in the district. They are more suited for grain than for hay, and do not grow so long in the straw. The grain being plump, it is well suited for milling purposes. Being of the brown chaff variety these are not so suited as a feed as are the white chaff varieties. They are good yielders, and easily threshed. Of the white straw varieties I recommend Caliph, Ford, Nabawa, and Felix as suitable for the district and likely to succeed in any kind of soil. These

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varieties are suitable for hay or grain, have a plump grain, and good yielders, and are easily threshed, the straw and cocky chaff being suitable for stock. I recommend the straw of Felix as being suitable for thatching haystacks, &c. Of the late maturing varieties I suggest Dart's Imperial. This has white straw, and as it takes longer to mature, it should be sown at the beginning of the season. It will only succeed on the best, well-worked fallow which is absolutely free from weeds. I have had good results with this variety when sown as stated above. It is a fine milling wheat, with good flour-baking qualities. All the varieties mentioned in this paper do not shake out. For economic reasons I am not including any bearded varieties. Besides those mentioned I have also experimented with many varieties which have long since gone out of existence. I admit that many of the new varieties such as Sword are as suitable as those mentioned above, but I have not yet tried them. The varieties mentioned should be ample for the average farmer. In choosing new varieties it is important to know whether they are early, mid-season, or late maturing. Having ascertained this, the plot of land may be chosen. For the general layout of the plots I recommend 40 to 50 acres." (Secretary, E. Schiller.)

UPPER WAKEFIELD.

June 8th.—Attendance, 9.

MANAGEMENT OF DAIRY CATTLE.—Mr. J. Cleary read the following paper:—"When the calf is three days old it should be taken from the cow and fed on separator or skimmed milk; it can be brought on to the skimmed milk gradually. Sweet milk can be mixed with skimmed milk, each day making the percentage of skimmed milk greater until no sweet milk is required. In hand-feeding the greatest care has to be exercised in cleanliness. Never leave a bucket of milk in the calf yard. Remove all milk from the yard after the calf has been fed, and immediately clean the feeding vessel in readiness for the next feed. Milk will go sour more quickly than generally anticipated, and dirty vessels will bring on scours, sometimes in such a way as to be fatal. The milk should be warmed to the same heat as when taken from the cow; never use milk as it comes from the separator, it has quite a lot of gas in it, and will prove detrimental to the calf. Let the milk cool and settle from the separator, and warm it again after the froth has disappeared. Feed the calf three times a day, and not too much at a time for the first week or so—about $\frac{1}{2}$ gall. is a good meal for a young calf—the quantity can be increased as the calf gets older. After about a week the calf will commence to nibble a little grass. When it shows the tendency to feed, give about a handful of chaff and a cupful of bran. Keep a little rock salt in the feed boxes for all cattle; also feed a little sweet bone meal, this is excellent for all animals. It is most essential for the female animals, as it is a splendid preventive against 'milk fever.' If heifers and cows have a 2oz. tobacco tin full of bone-meal in the chaff about two or three times a week they will be most unlikely to contract this illness. In the case of a cow or heifer in calf, the bone-meal will assist the strengthening of the cow's internal organs, and enable her to calve without any undue loss of blood. Cows in milk should have a little bone-meal at least twice a week. Calves can be weaned off milk at about four months, but a little longer will do them good, and at the age of six to eight months in the case of Jerseys, and eight to 10 months in the case of any other breeds, the heifer can be mated. This will bring her in with her first calf at from 15 to 19 months of age. She will then be ready to commence her earning capacity for her owner, and she should be brought in with a calf once in every year, as she will do better by continuity of breeding and milking than she will if she is allowed to have much spell. Supply them with plenty of good feed, and they will milk all the time, right up to 20 years of age."

Paper read by C. F. Neumann, "THE AGRICULTURAL BUREAU."—"The Agricultural Bureau is part of the Department of Agriculture. It provides the most economic means of contact between the agriculturist and the officers of the Department of Agriculture. It is the principal channel by which the distribution of knowledge gained in research and investigational work on experimental farms and laboratories is made available to its members. In most civilised countries of the world there has been little difficulty in establishing and equipping institutions for agricultural research, but the general drawback has been to interest those concerned in agricultural pursuits. However, in South Australia there has been little difficulty in interesting the farming community because of the existence of a body of agriculturists seeking guidance on these subjects and making their information available long before the Agricultural Bureau existed. Recognising the advantages that these circumstances presented the Department of Agriculture has set itself to cultivate to the fullest this institution, which is the best means available for distributing the knowledge available to agriculturists. The Agricultural Bureau provides the Department of Agriculture with an organised centre

in every district in which there is a Branch. Thus when occasion arises it is possible to establish contact with agriculturists of a district in one body, an economical and efficient method when compared with the dissipation of time and effort involved in an individual canvass. And because of this fact it enables a small technical staff to accomplish much more than it would were there no such organisation available. Hence the various Branches of the Agricultural Bureau are looked upon as outposts in their various rural districts. It seeks the co-operation of the Branches in every possible way, in the arrangements for visits by technical officers, in the planning and conduct of experimental tests, and in the collection of data on local agricultural matters. It also encourages the local Branch of the Bureau to seek its aid on behalf of its members desiring advice on all problems affecting their crops, stock, &c. The success of our Branch lies entirely in the hands of its members. If every member gives his Branch his regular attendance and takes a keen interest in the subject under discussion there need be no fear of failure for the future. Also another factor which goes hand in hand with success is the training of our younger members, as in my opinion the Agricultural Bureau is the proper place to become familiar with public speaking, because as a rule all members are familiar with the subject and are merely asked to voice their opinions. I wish to again emphasise the above fact, because some of the younger members will no doubt be called upon later to fill the responsible positions, and on these depend entirely the future success of our Branch. There are many and various ways of exchanging ideas by means such as papers, debates, question boxes, lectures, etc., which provide many advantages to the agriculturist. The Agricultural Bureau provides a valuable medium for bringing its members together when considered from a social point of view, as by this means the members discuss many interesting and educational topics outside of the meeting. From an educational point of view the Agricultural Bureau fills a long overdue necessity in our district, as it provides an excellent medium for self-education, and takes the place of a literary society. From a general point of view the Agricultural Bureau spells success to any district, and to make the best of the many advantages offered every member of the Branch should be able at the conclusion of a meeting to say, 'I learned something to-night.' (Secretary, C. Neumann.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Black Springs ..	4/7/33	13	"Horse Breeding," A. Mickel; "Fallowing," P. Abbott	K. Dunn
Black Springs ..	8/8/33	19	Address—W. C. Johnston	K. Dunn
Balaklava	24/7/33	6	Annual Meeting	R. Herriot
Dudley	20/7/33	18	Address—H. B. Barlow	M. Telfer
Truro	18/7/33	39	Demonstration—W. G. Bennett, B.Sc.	L. Davis
Brinkworth	10/7/33	12	Annual Meeting	E. Carlyon
Penwortham ...	27/7/33	9	Annual Meeting	A. Jenner
Koolunga	1/8/33	9	Address—W. C. Johnston	I. Jones
Greenock	7/8/33	38	Address—J. L. Williams	A. Schubert
Upper Wakefield	3/8/33	6	Question Box	C. Neuman, Halbury
Lyndoch	1/8/33	14	Discussion	J. Hammatt, Williamstown
Lyndoch	5/8/33	—	Pruning Demonstration—E. Teusner	J. S. Hammatt
Alma	11/7/33	11	Address—E. Branson	E. Drescher
Gawler River...	7/8/33	20	Address—W. J. Dawkins	K. Roediger
Rosedale	14/8/33	20	Address—R. Baker	S. Sincock
Roseworthy ...	5/6/33	15	Address—F. E. Waddy	S. Bowden
Roseworthy ...	5/7/33	200	Annual Social	S. Bowden
Roseworthy ...	10/7/33	35	Address—C. F. Anderson	S. Bowden
Roseworthy ...	14/8/33	30	Address—H. B. Barlow	S. Bowden
Yandiah	24/7/33	27	Address—M. Aird	F. Jettner
Yandiah	11/8/33	45	Annual Social	F. Jettner
Light's Pass....	28/8/33	27	"Public Speaking," C. Verrall	C. Verrall

YORKE PENINSULA DISTRICT.

WEAVERS (Average annual rainfall, 16.81in.).

May 8th.—Attendance, 9.

QUESTION BOX.—Mr. H. Cornish asked how soon after birth should lambs be tailed, and how long should the tail be left?—Mr. G. Anderson said green feed should be available for the lambs before tailing them, and the work done on a suitable day. It was advisable to leave one or two joints. Mr. Piggott said the lambs should not be driven immediately before tailing; it made the blood thin, and they were inclined to bleed excessively. Mr. G. Anderson asked: "Which is the better pickle to use for wheat or barley?"—Mr. Piggott reported very good results from formalin, turning over the grain with a shovel on the floor. Mr. W. Cornish had used bluestone and salt in equal parts and dipping the bags into the dip with satisfactory results. Mr. F. Evans spoke in favor of dry pickling. Mr. T. Farrant wanted to know a good cure for horses with severe colds. One member advised a swab of Stockholm tar, pushed down the throat, and sulphate of iron placed in the drinking water—1lb. to 1,500galls. of water. (Secretary, H. Cornish.)

June 19th.—Attendance, 13.

CARE OF THE FARM HORSE.—Mr. G. Farrant read the following paper:—"One has only to follow up the various auction sales of the season to see the enormous prices paid for good horses. In view of this fact, it behoves farmers to take better care of the horses if the maximum amount of work is to be expected from them. A horse that has received good attention and been properly handled will do a greater amount of work for a longer period than one that has been roughly treated and only half-fed. It is necessary to get a team into good condition before seeding. To do this they should be fed before commencing work. They should be fed during the slack periods of the year, if there is sufficient hay to do so. Never allow a horse to rush to water immediately after work, because they usually will drink too much; it is better to let them wait for five or ten minutes, when they will not be so hot and will drink more steadily. When about to yoke up in the morning always groom the shoulders of every horse with a good stiff brush; this will remove any dirt or sweat which, if allowed to remain on the shoulders, will encourage sore shoulders. A horse with a sore shoulder suffers a considerable amount of pain when working. It is not wise to use any preparation which will cause a hard scab to form on the sore over night. Keep the sore clean and soft over night so that a scab will not form. 'Prevention is better than cure,' and it can well be applied to the care of sore shoulders. Sore shoulders in many cases are purely the result of carelessness—working with uneven chains, or with the draught of the hames too high or too low, or illfitting collars. A horse should pull from as close to the neck as possible. A young horse should always be handled carefully when being broken in; a roughly handled animal will result in a timid and easily frightened horse. A horse will not live to do a great amount of work if it is overloaded too often. The wind becomes broken and the horse is not able to stand up to a good day's work." (Secretary, H. Cornish.)

July 3rd.—Attendance, 11.

PREPARATIONS FOR SHEARING.—The Hon. Secretary (Mr. H. Cornish) read the following paper:—"I propose to deal mainly with the small farm flocks of 500 sheep or less. The first thing to do is to get the sheep ready. Go through the flock about a fortnight before shearing, and pick out the old sheep, those of poor quality wool, and any sheep not up to standard. Raddle the culls, and if too many have been picked out the best of the rejects can be put back in the flock, and the others marked with a permanent figure brand in a conspicuous place. While this work is being done the sheep can be crutched, removing all stained and dirty wool from around the tails of the ewes and the bellies of the wethers. After shearing put another figure on the culls unless they can be disposed of in the wool before shearing time. Do not try to over-class the wool in a small clip; only pick out a few of the bad fleeces, and put these in a separate bale with the ram's wool and any odd pieces. When baling try and make all bales of uniform weight, as near 320lbs. to 350lbs. as possible, as the amount of wool available will allow. For instance, if 175 sheep cut 10lbs. of wool each do not make 4 bales of 390lbs. and one of 310lbs.; make 5 bales of 350lbs. *The Shearing Shed.*—Clean out all rubbish from the shed, and everything else that is not needed for shearing. Always aim at having a separate pen for the shorn sheep, apart from the woolies. It is very awkward for a shearer to have to drag a sheep past 5 or 6 stubborn sheep; and have the gate in the middle of the pen. Always have the wool presses up, and a bale in ready for starting. See that there is plenty of branding oil to give each sheep a clear distinct brand, and see that the brand is put on the correct place. Always try and find room for the learner in the shed, and if he does not do a good job for a start try and show him what to do."

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Brentwood	13/7/33	32	Address—J. Honner	E. Carmichael
Paskeville	1/8/33	17	" Bulk Handling," T. Brinkworth	J. Prouse
Boor's Plains ..	3/8/33	12	Annual Meeting	S. Chynoweth
Brentwood	10/8/33	7	Discussion	E. Carmichael

WESTERN DISTRICT.**BUTLER.**

June 20.—Attendance, 16.

TIME OF SEEDING.—Mr. H. Turner read the following paper:—"The first week in June is quite early enough in which to make a start, providing opening rains have fallen to allow for the working back of fallow and dealing with rubbish. If opening rains are later then seeding must be delayed. Under no circumstances should seeding be done prior to the opening rains. Even new land will give better results if seeded under good conditions. Some farmers may say that owing to the area to be seeded they are unable to wait, but there is no doubt that these farmers would be better off to curtail the acreage. There are several reasons why seeding should not be started too early. Firstly—It takes 13 weeks for a grain of wheat to mature under ideal conditions, and, generally speaking, finishing conditions in this district are very good. Secondly—Wheat is subject to different diseases as soon as it is put in the ground; therefore the shortest time possible should be allowed. Thirdly—Later seeding allows better working of fallows and better germination of rubbish, and in turn gives a cleaner crop. Fourthly—Later seeding does away with rankness, and also the lodging of crops, thereby making harvesting a much better undertaking at no more risk than that attached to early seeding. Fifthly—Earlier crops cannot stand the early north winds, whereas later crops are not so much affected, and later north winds are more seasonable and not so detrimental to crops. Under local conditions I favor the sowing of mid and early wheats only, particularly the more rust-resistant varieties." (Secretary, P. R. Lange.)

CHILPUDDIE ROCK.

June 7th.—Attendance, 14.

BROOD MARES AND FOALS.—In a paper on this subject Mr. H. A. Cochrane stated that it was advisable to breed from the best mares on the farm and try to start breeding when the mares were young. It was quite safe to breed from a well-grown two-year-old mare, but the horse to which she was to be mated should not be too big, especially if she was not well grown. The best stallion in the district should always be selected. Even though it might cost a little more, it would prove to be money well spent. "Like begat like," and a good foal provided a foundation to work on when breeding later. When starting a mare breeding, she should be put to the horse early, because if she were late the first year, a year might have to be missed or she would always have a later foal. A mare's period of oestrus was about a week, with three weeks between each period, and a mare would usually get in foal more easily when going off than when coming on. If a mare proved difficult to get in foal, a good plan was to give her a douche, using bicarbonate of soda, one to two hours before service, at the rate of 4 tablespoons per $\frac{1}{2}$ gallon of warm water. A mare in foal needed every care being taken to prevent abortion. Abortion might be caused by excessive work, especially when the mare was not used to it, or to accidents, such as kicks and falls, a serious illness, or disease of the uterus. The twelfth week of pregnancy was considered a dangerous time, because the attachment of the foetus was then very weak. Contagious abortion seldom occurred with mares, but it was always wise to have mares which had aborted removed from others for a few days. In case of abortion, a mare should always be given a wash out with weak Condy's fluid. A wide swing or spreader should be used when the mare was heavy in foal. If possible, the mare should be kept out of the shafts and worked on the outside of the team. A mare should never be taken through narrow gates when coupled with other horses, because she might be bumped, neither should she be given heavy pulling. The mare should be kept in steady work until within a fortnight of foaling and then put in a small paddock—one near the home for preference—where she could be watched and given assistance if required. First it was necessary to see that the foal was presented with the head resting on the forefeet.

If that was not so the foal should be turned. When working around a mare, hands should always be disinfected and oiled. Work should be done as quickly and quietly as possible. If a mare foaled all right, she should be left alone for a time, so that she and her foal became used to each other. After a while the foal should suck the mare and have the use of its bowels. In a case of stoppage 1 eggcup full of castor oil and linseed oil should be given, also a warm enema. If the afterbirth did not come away in 10 or 12 hours it should be removed gently by hand. The mare should not mix with other horses until the foal was strong. Very few horses would hurt a young foal, but there was some danger, and it should be guarded against. If possible, the mare should not be worked when suckling a foal, but if that became necessary, the foal should not be shut up in a barb-wire yard, because it might be injured or cause the foal to become a fencer. Foals were generally quite contented if left in the yard with spare horses. Allowing the foal to suck when the mare was over-heated sometimes caused scours. A foal should be encouraged to eat as early as possible. It should be weaned at about six months. Weaning was a great trial to a foal, and he should be well provided for; if possible turned out in a paddock with green feed among other horses. If hand-feeding had to be resorted to, plenty of chaff, crushed oats, hay, and water were essential. If possible a foal should have hay as well as chaff, because it prevented him from bolting his feed and kept the teeth in order. It was a good plan to handle a foal early, which would save much inconvenience if medical attention was needed." (Hon. Secretary, H. Brown.)

ELBOW HILL (Average annual rainfall, 11in. to 12in.).

May 9th.—Attendance, 15.

HOME CONSUMPTION PRICE FOR WHEAT.—Mr. G. Payne read a paper on this subject, and in the discussion that followed, Mr. John Rehn said wheat being such an essential food should be sold at a fixed price and not a gamble price as at present. Fixing of prices had been a success in the dried fruits industry. Why not then in the wheat industry? He outlined a scheme whereby the Commonwealth Government should guarantee a fixed price of 3s. 4d. per bushel over a period of three or five years. Mr. Payne replied and said that a similar scheme had been introduced by Mr. Parker Maloney in the Federal House some time back. This scheme was rejected by the Senate. The only difference was that 4s. per bushel was the amount to be paid, instead of 3s. 4d. Mr. S. Wake said it was time farmers did something for their own benefit. They had a moral right to demand a home consumption price. All the goods the farmer had to buy were at inflated prices. Mr. Wills said a home consumption price was being favorably considered by some sections of the community. A lot would depend on the World Economic Conference. Exchange rates had much to do with the price of wheat. In England recently bread had risen by ½d. a loaf and the Government had been surprised that there had not been a big outcry against the rise. Mr. Cooper did not believe in tariffs. They were the ruination of any country and had caused a good deal of trouble in the world to-day. If other sections were entitled to bounties and bonuses the farmer was entitled to them as well. He should at least get London parity plus freight for home-consumed wheat. Mr. Story said it was not right that the amount of wheat in a 4d. loaf of bread was worth only about ½d. Mr. P. Wake said the working man was better off than the average farmer was at present. They at least did not have to work as hard or as long hours. (Secretary, W. Cooper.)

KOPPIO (Average annual rainfall, 22.40in.).

May 9th.—Attendance, 14.

BUSH FIRES.—The Hon. Secretary (Mr. M. Gardner) presented the following paper:—"Now that autumn rains have arrived and the danger from bush fires is over for another year, it is advisable to reflect on the question of preservation of fences, feed, and property for the coming year. Generally this district is bountifully blessed with a heavy growth of spring fodder, which leaves a quantity of feed that dries off and remains on the ground until it is consumed or allowed to rot away when winter rains fall the following season. The same spring growth takes place in the scrub and timber country, and with the thick bush leaves enough material to burn on suitable days. One of the most essential tasks in this district is the clearing of scrub, which is otherwise waste land, and the job of getting more scrub cleared is most commendable and necessary. Here again the onus of taking care is on the man who is thrifty and who may be classed as a worker. Scrub land is of very little use to anyone. It robs the landholder of revenue; rent, rates, and taxes have to be paid on it, and it is the policy of careful husbandry to clear land and keep it cleared. It is in keeping the land cleared that fires often get away into scrub and threaten danger. Very often when burning logs or bushes there is sufficient grass near by to run the fire away. When log fires are left burning and a high hot wind develops, the grass that would not catch alight on an ordinary day burns like tinder. It is realised that it is necessary to burn the rubbish, but it should be borne in mind that care must be

taken to see that the fire does not get away. Frequently the trouble occurs a day or two after the fire has been lighted. Hot winds blow sparks a long way and light up beyond what was thought to be sufficient break. It is necessary for someone to be on guard where logs are burning—if a wind springs up—to promptly put out the outbreaks from sparks. No matter how careful one may be there is always a risk when burning off scrub or grass if sufficient help is not handy during the job. One man to patrol the breaks and put out anything that appears dangerous may make all the difference. Likewise when fires are being controlled, there should be some men detailed to watch the wind side when others are having refreshment. There must be no cessation of watchfulness once the fire is under control till night, and then vigilance should again be maintained next morning. There have been serious losses close to this district this year through inadequate numbers of men when burning, and next burning season landholders should not hesitate to ask neighbors to assist." Discussing the paper, Mr. Low, as fire controller in the district, said it was difficult to keep control of firefighters without some uniform or distinguishing badge that was easily recognised by workers at fires. Mr. Smart thought some fixed time for burning scrub should become law because winds shifted about in the morning and became more settled in the afternoon. Mr. V. Gardner said district co-operation could well be organised for burning. As the system was at present, often several lit fires the same day and did not notify neighbors because none knew until a good day came for burning when the job was to be done. All then lit fires, and as a consequence there was not sufficient help to control them. Several serious fires had occurred not far from the district this year. What was thought apparently safe were neglected, and fires had got away.

MANGALO (Average annual rainfall, 14in. to 15in.).

May 2nd.—Attendance 11.

TRANSPORT AND THE TWO-WHEELED TRAILER.—Mr. F. Coles read the following paper:—"Because in this district transport is a branch of farming which demands the strictest economy, I offer my experience and conclusions in this regard, with particular reference to two-wheeled trailers. From a close study of the transport problem which included an exact day to day record of all journeys, reasons for such, and the loads carried in connection with my farm of 2,000 acres, I came to the conclusion that if the property was to be worked to its full producing capacity, the use of the motor vehicle was a definite necessity. Whilst making this statement, I do not mean that horses could not be used. Horses could handle the situation, but because by far the greatest need for travelling is done in trips from 60 miles upwards with heavy loads, the consequent number of animals required, together with the time involved, in actual figures works out at about the same, so that motors can be recommended for convenience. However, the records indicated that short journeys—up to 10 miles—were covered nearly always with a light load, and, therefore, promised an opening for the use of a horse-drawn vehicle. On the long trip with the motor it appeared that economy could be effected if fewer trips were run and more load carried per trip without increasing the capital outlay or renewing cost to any great extent. To serve both the short distance trip with a horse and yet permit of the same vehicle being used with motors, I built a two-wheeled cart, fitted with pneumatic tyres. This vehicle can have shafts fitted for a horse, which can be removed easily and a pole fitted so that the cart can be towed behind a car or truck as desired. The following is a description of, and a few details on the construction of the two-wheeled trailer. Two old type Ford wheels were used, fitted with roller bearings running on a stub axle cut from steel to take the wheel. A piece of 2in. piping 3ft. 6in. long serves as an axle, into this the stub axles are inserted and rivetted, over the pipe ends a collar is sweated to prevent the pipe splitting. To the axle is mounted two sets of springs, complete with scrowls, similar or the same as used on spring drays. These are clamped to the axle as near to the wheels as the body will allow. The frame of the body is built of stringybark, 2in. x 1½in., the front and rear cross members projecting 7in. each side. To their projecting ends fits an ½in. round iron stay, conveniently curved to support the sides. The floor is of ½in. Baltic flooring. The sides are of matchboard held in position by iron uprights properly spaced. The front and rear tail boards are made so that they can be lifted out. When complete, the measurements are 5ft. 6in. long, 3ft. 9in. wide, and 13in. high; from floor to ground 2ft. 3in. This, however, should be governed by the level of the draw bar on the car. From under the middle stay of the body the frame is fitted by two bolts spaced to a U bolt, at the front end is the pole. It is made from 3in. x 1½in. stringybark, and projects 1ft. 9in. out from the front of the body. Probably the most important factor contributing to the successful operating of a trailer is the device used to attach the trailer to the car. After many experiments with fittings for this purpose, I found that success and a comparatively unbreakable hitch could be made by joining the two female parts of a Ford universal joint. When these are joined, attach one end to a Ford axle, which is allowed to work parallel with the pole in two guides clamped in

preference to bolts under the pole. Behind the rear guide is a spiral spring made snug by a nut on the end of this axle. Another spring is placed in front of the front guide. These take the thrust. The universal joint is attached to the draw bar of the car by a threaded stud rivetted to the joint. This is placed through a hole in the draw bar and held fast by a large nut screwed very tightly. With a hitch of this one can operate a car in any kind of country, turn the sharpest circle, and the trailer can be put on or taken off very easily. When used behind a motor it is better to distribute any load evenly over the floor, to cope with occasions when, say, a 40-gall. drum of petrol is to be carried. Slots should be made on the sides of the body, about one-third way along, so that a piece of board can be let into them. A board in front of the drum and one behind will hold this load in the centre. After nearly two years' experience with a trailer of this description I have no hesitation in recommending every farmer to build one where the occasion demands. It is always handy, and there is no marked increase in petrol consumption in towing one. On one occasion I travelled 330 miles in 12 hours with Sewts. in the trailer behind the car. The efficiency of the outfit is now an accomplished fact." (Secretary, K. Nields.)

MILTALIE (Average annual rainfall, 13.56in.).

May 13th.—Attendance: 18.

HOME CONSUMPTION PRICE FOR WHEAT.—Mr. G. Payne read the following paper:—

"The question of a home consumption price for wheat is of great importance to every farmer in this State. It is one of the several practical ideas that can be adopted whereby all wheat producers would benefit without penalising any one section of the community to any section. Last month the Branch discussed 'How to get a better price for wheat?' and several very interesting ideas were put forward. It was stated that there were three practical methods which could be adopted: bulk handling, compulsory pooling, and home consumption price, any of which would increase the price pence per bushel. One cannot look for greatly reduced tariffs for a long time. The Federal Government's recent attitude clearly shows this; therefore, farmers must aim for something that can be put into practice with as little delay as possible. Farmers must demand at least cost of production, otherwise hundreds must go off the land very quickly. There has been a great deal said and written for and against fixing a price for home consumption. One of two things must happen—wheat prices must go up, or cost of production must come down. Producers are compelled to pay Australian price for every commodity—cornsacks, super, machinery, tools, etc. The price demanded ensures a profit to the manufacturer and a profit for everyone who handles the goods. When the farmer has wheat to sell he can only ask the wheat buyer, 'What are you giving for wheat to-day?' The farmer must take the price offering or leave it, which to-day is far below cost of production. To accept a world parity price for locally consumed wheat is an injustice and most unfair. Wherever a farmer turns he is up against organised industries; everyone but the farmer is organised to protect themselves. The flour millers have the Millers Association, which fixes the price of flour. The master bakers have an association which fixes the price of bread, and those who produce the wheat take what is offered. South Australia produced approximately 40,000,000bush. of wheat last season. The average over a period of eight years is a little over 30,000,000bush., and the home consumption about 3,000,000bush.—comparatively small to some of the eastern States. If 2s. 4d. per bushel were added to the present price, or the price give the South Australian farmer £350,000, or, roughly speaking 2½d. per bushel on a 30,000,000bush. crop. That is one of the advantages gained by fixing a price of wheat at the moment for home consumption fixed at 5s. per bushel, it would for this State alone. It may be said that the price of bread will go up, but bread should not be sold for more than 4½d. for a 2lb. loaf with wheat at 5s. a bushel. The wheat content in a 4lb. loaf is as follows:—60lbs. of wheat produces 42lbs. of flour, 7lbs. pollard, 10lbs. bran, and 1lb. of waste. In a 4lb. loaf there are about 3lbs. of flour, and it takes 4-2/7lbs. of wheat to produce 3lbs. of flour, and from that quantity of wheat, bran and pollard is also obtained. Therefore, 4-2/7lbs. of wheat is the wheat contents of a 4lb. loaf. Roughly it can be said there is a pound of wheat to 1lb. of bread. Wheat at 5s. bushel is a 1d. per lb. for bread, without considering the value of the offal. To-day bran is worth £4 17s. 6d. per ton and pollard £5 5s. There should be sufficient margin of profit for the miller and baker should bread be sold at 4d. or 4½d. per 2lb. loaf. The average consumption of bread is two loaves per week. If that is so, should any increase be made in the price it would hardly be felt. In fact, ½d. per loaf would be 4s. 4d. per year, but the benefit to the grower would be considerable. Should the price be fixed throughout the Commonwealth for home consumed wheat, the advantage to the State would be further greatly improved. Under a Commonwealth quote basis, as outlined by a proposed Federal Marketing Board, we should receive an additional £150,000, making this State's total approximately half a million, or 4½d. a bushel on a 30,000,000bush. crop—equal to last year's

wheat bounty. Recently a scheme was put forward in Western Australia, where it was proposed to establish an Australian Consumption Wheat Pool. The idea is to fix a price for home consumption wheat for the Commonwealth to return at least cost of production to the grower. This proposal has gained much favor throughout Australia. If farmers bring sufficient pressure to bear on the Government, they cannot refuse to bring in legislation to help the farmers by increasing the present price of wheat or other produce. The duties imposed on imported wheat will show what Continental countries are doing to protect their wheat industries. France has put on a duty of 3s. 6d. a bushel; 10s. 6d. on *Australian wheat*. In 1931 when wheat was 8s. 2½d. a bushel, bread was 4½d. for a 2lb. loaf. Italy has a duty of 3s. 7d. a bushel and Germany 6s. 8½d., while Sweden has a duty of 1s. 1½d. and her mills are compelled to use 80 per cent. of domestic wheat. A bushel of wheat will produce nearly 50lbs. of bread, without counting the value of offal, and yet to-day's value of a bushel of wheat will only buy seven loaves of bread. The allocation of cost of bread is very interesting. To-day wheat at Port Adelaide is on the basis of 2s. 8d. per bushel and flour is £8 2s. 6d. a ton. The latter has risen during the past month 10s. a ton. Wheat over the same period has only varied 2d. In fact, on April 1st wheat was 2s. 6½d. and flour £7 17s. 6d. It takes 48 bushels of wheat to produce 1 ton flour of 2,000lbs. and 880lbs. of offal; 2,000lbs. flour will make 1,373 loaves; 150lb. bag will make 103 loaves of 2lbs. The cost of wheat at mill door, allowing 4d. for handling charges, would be around 3s. per bushel; 48bush. at 3s. equals £7 4s., the value of offal, 880lbs., or 44bush., at 1s. 6d., equals £2 4s.; and deducting that from the net wheat cost, we find 1,373 loaves is £5, or ¾d. of a penny. Out of the above the farmer gets 2s. 4d. a bushel, freight and other charges 8d. With bread retailed at 4d. the producer receives only ½d.; the miller, baker, and others get 3½d. At the moment the price of bread is compared with the following figures:—

1920-21 season—Wheat was 9s.; flour, £18 12s. 7d.; bread, 5½d.

1930 season—Wheat was 2s. 8d.; flour, £9; bread, 5d.

To-day—Wheat is 2s. 8d.; flour, £8 2s. 7d.; bread, 4d.

Price cutting in bread is absolutely prohibited, and consumers are not getting the benefit of cheap wheat. They are paying Australian price, and the cost of bread should not increase with a fixed price for home consumption at 5s. a bushel. Should wheat remain at its present price levels, the end of hundreds of farmers is not far distant, and yet every section handling the grain is guaranteed a profit, or living wage, regardless of the low price received by the grower. In 1914 a binder could be purchased with 240bush.; to-day it costs about 800bush.; 600bush. would have bought a harvester in 1914, to-day it is doubted if 1,500bush. would buy it. The figures quoted may be of interest and represent the production of wheat for the Commonwealth over a period of eight years:—

	Bushels.
Average	140,000,000
Home consumption	32,000,000
Retained for seed and feed	18,000,000
Exported	90,000,000
South Australian production	30,000,000
Home consumption	3,000,000
New South Wales production	42,000,000
Home consumption	12,500,000
Victoria production	40,000,000
Home consumption	9,000,000
Western Australian production	27,250,000
Home consumption	2,000,000

Consumption is estimated at 5bush. per year per head of population. It would be reasonable to ask farmers to be content with London parity if this were a free trade country, but to expect farmers to supply foodstuffs under cost to workers in protected industries earning standard wages based on their cost of living, is unjust." (Secretary, G. Smith.)

June 10th.—Attendance, 9.

FARM MACHINERY.—Mr. S. Ramsey read the following paper:—"There are five essential points in the care of farm machinery—adjustments and repairs, lubrication, careful handling, protection from wind and weather, and painting. Before starting any machine, everything should be in perfect working order, and all nuts and bolts tight, especially on a binder or harvester, because there are so many important working parts. When putting in fresh bolts dip them in tar so that they can be removed without any trouble if necessary. All nuts should be tightened, especially on a new machine that has been worked for two or three days. Replace worn out parts before putting away the machine. The importance of keeping a machine ready for work cannot be over-estimated. Before starting to work any machine, lubricate all

wearing parts with good machine oil. Low cost and better work will come from machinery given proper care and attention with oil and grease. The life of an implement is often shortened by rough handling, which generally happens by hurrying over rough ground. Where a farmer has to go over a lot of new ground it is advisable to purchase a heavier implement, one especially built for rough ground. When a machine is finished work it should be housed in a waterproof shed; a machine left out in the weather is damaged by heat and rain. A lot of machinery is only worked for one month in the year and left out under a tree for the remaining 11 months. In that case more damage is done to the machine when it is standing idle than for the month it is in use. A machine neglected in this way soon has a second-hand appearance. It is possible to get long service from an implement only when it has proper shelter when not in use. All machinery should have a coat of paint occasionally, it adds a few years life to the wooden parts of machinery and also improves the appearance. Neglect of machinery has meant the ruin of many a farmer." (Secretary, G. Smith.)

PYGERY.

May 9th.—Attendance, 9.

PESTS AND THEIR DESTRUCTION.—Paper read by Mr. R. Woodrup:—"This paper is intended to deal with animal and bird pests which from time to time harass the farmer, and methods employed to destroy same. Rabbits are the chief offenders. The occurrence of rabbit plagues coincides with the return of good seasons, or seasons of abundant feed following droughts. Droughts check the numbers of the pest, owing, no doubt, to the scarcity of feed and water, but with the return of seasons of abundant feed the rabbit, being a prolific breeder, very soon assumes plague proportions. There are many methods used to destroy this pest. Phosphorous poisons, used per medium of the poison cart, being most generally used in this district. This method is fairly efficient if properly used. The laying of this poison with the poison cart gives best results if used immediately following a rain during any of the summer months, and before any green feed appears. Where there are large burrows, and the poison cart is being used, the users usually go right around the burrows with the cart; a better method is to more or less follow the runs that go out from the burrows and often radiate in various directions. When phosphorus is being mixed, it should not be touched by hand, but in a receptacle where it can be effectively mixed with a stick. If the pollard is too sticky, the addition of wheat meal or bran will make it of a consistency that will readily cut with the knife of the machine. When conditions are not good for the use of the poison cart, and the ground is wet—as in the winter or spring months—fair results can be obtained by using cynogas, a chemical preparation which, when exposed to air, gives off deadly fumes. This chemical is used by being laid in or pumped into burrows, which are then blocked up to prevent escape of the fumes, the latter, being heavier than air, penetrates to all reaches of the burrow. The results from this method are sometimes made negligible by the action of outside rabbits which open the burrow from the outside. Other methods used are suffocating with carbon monoxide. In this method a car, truck, or tractor is employed, the exhaust gases being carried through rubber hose into the burrows, all exits of which are filled with earth. Strychnine poisons are very effective, especially in summer, but many people object to the use of such owing to the possible danger to stock, through chewing bones, &c. Foxes can also rightly be described as pests, and, unless some effort to keep them in check is adopted, they take considerable toll of young lambs. A common practice of destroying foxes is by laying baits poisoned with strychnine. Some people claim that small baits of poisoned caul fat are the most effective. Good results can be obtained with poisoned baits of fresh liver from freshly killed sheep; these should be laid at intervals along a trail made by dragging sheep offal or a freshly killed fowl opened up. Care should be taken that the baits to be laid are not touched by hand. Liver can be opened up with a sharp knife, while held with a stick with the other hand. A suitable place to lay baits in summer is around and some distance away from a water trough or dam, where they are accustomed to come for drink. Eagle hawks, too, are a feathered pest that can do a deal of damage among young lambs. They also seem to have a liking for fowls. They are wily birds, and are difficult to shoot. These destructive birds can be caught by making a cylindrical wire netting cage, 15in. or 18in. in diameter, and placing therein a young white fowl. This should be taken out in the paddock and placed on the ground and anchored. Then a number of rabbit traps should be set close together all around the caged fowl. If these eagles are about they will very soon sight the fowl, and in their endeavors to get at it they will almost surely get in the traps, which, if possible, should all be linked together by a thin wire. It often happens that these birds go in pairs in search of food, and if one happens to get alongside an expected feed it is soon joined by its mate, and the chances of both getting in the traps are good." (Secretary, A. Day.)

ROBERTS AND VERRAN.

May 17th.—Attendance, 5.

CARE AND TRAINING OF A SHEEP DOG.—Mr. S. Barber read the following paper:—"In choosing a puppy, see that you select one from a litter of pure-bred sheep dogs. While puppies from a cattle and sheep dog cross make useful dogs, they are usually too timid for cattle and too rough for sheep. In selecting a pup from a litter, let the mother do it by putting the puppies out in a row and away from the nest, and it will be noted that the mother takes the best pup back to its place first. This should be done three times in succession to make sure of the right pup. If no confidence is placed in this method, the observance of the following points may be helpful:—See that the pup has a pointed head—this denotes intelligence; see that the roof of the mouth is black—this denotes hardiness. Always select a bitch, for they are best workers and most intelligent. *Care of Pup.*—After taking the pup from its mother, see that it gets plenty of milk, and feed it on cooked meat, which has been cooked in water to which salt has been added. This keeps worms away, thereby giving the pup a better chance to thrive. Keep the pup in a good, warm kennel and teach it to tie up, but do not keep it continually on the chain, because this makes it too eager to chase anything about when it grows to the age when it is to be trained to work. *Training of Dog.*—Start as young as possible, and a lot of patience will be needed. The dog will make mistakes, but do not lose your temper and illtreat it. If the latter is done, the dog becomes frightened and loses confidence; very often a good dog is spoiled in this way. Kindness and coaxing will give very much better results. A good way to start a young dog to work is to take it out with an old dog and couple them together; it then soon becomes accustomed to the other dog's ways and understands more readily. The owner of the dog should do the training, as he always uses the same method of working the dog, either call, sign, or whistle. Under no circumstances should anyone else be allowed to handle the dog until it is thoroughly broken in, and only then with a full explanation of how the dog works." (Secretary, C. Masters.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Chilpuddie Rock	19/7/33	16	Address—S. Billinghamurst	H. Brown
Kyancutta	1/8/33	15	Annual Meeting	J. Dyke
Kelly	5/8/33	28	Demonstration—H. D. Adams	I. Grund, Kimba
Taragoro	6/7/33	7	Formal	T. Winters, Clevo
Pygery	1/8/33	10	Discussion	A. Day
O'Loughlin	7/8/33	12	Discussion	E. Pfeiffer
Mudamuckla ..	9/8/33	15	Address—W. H. Brown-rigg	A. Maguire
Cungena	3/8/33	16	Question Box	A. Voumard
Cummins	11/8/33	10	Annual Meeting	K. Trigg
Charra	10/8/33	9	Discussion	A. Haseldine
Palabie	12/8/33	7	Question Box	C. Rashleigh
Pinbong	15/7/33	8	Discussion	C. Scholz
Pinbong	5/8/33	14	Discussion	C. Scholz
Koppio	3/8/33	14	Annual Meeting	M. Gardner
Chilpuddie Rock	16/8/33	12	Address—W. H. Brown-rigg	H. Brown
Wudinna	18/8/33	10	Discussion	D. Duguid
Kapinnie	18/8/33	9	Discussion	C. Green

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

KULKAWIRRA (Average annual rainfall, 14.34in.).

May 9th.—Attendance, 15.

PREPARING PIGS FOR MARKET.—Mr. Coombs read the following paper:—"When getting pigs ready for market they should be confined in a sty—not more than three pigs in the one enclosure. The type of sty recommended as a run of, say, four or five in a straight line. Pitch pave with limestone and cement the joints. Make the sties 10ft. x 12ft. In this district, where there is a shortage of big timber and plenty of stone, I recommend that the walls be built of stone and plastered with cement. For the roof, broom bush makes a very good covering, it is warm in winter and cooler in

summer." Mr. Coombe here used a blackboard to demonstrate the type of sty that he advocated. "The sty has a cleaning race down the back of the buildings. This can also be used for loading or unloading pigs. It is necessary to have the ramp at the top end of the race. With the small sties the pigs do much better when they cannot ramble about. Further, for best results, the pigs must be kept clean and dry in winter. Have a good supply of clean water in summer. The roof can be put over the whole of the sties fairly high above them to allow plenty of room for light and ventilation." (Secretary, H. Elliot.)

RAMCO.

June 5th.—Attendance, 10.

PRUNING.—The following points are taken from an address by Mr. F. Elliott of Waukerie, who used pieces from various trees and vines and a pair of secateurs to illustrate his remarks. There were different ways of pruning trees and vines, said Mr. Elliott, not only in the actual operation, but also with regard to life and financial results. The great factor required was judgment. A vigorous vine should be given something to do, but if the vine was weak then its work should be reduced. Trees and vines differed, and it was not possible to make a set standard. His remarks on pear pruning were illustrated with a lateral cut from a main arm which was cut to a fruit twig. It had two wood shoots. He advised cutting one out and allowing the other to go. It would not go far, but fruit back and build up. Apricots.—Laterals should not be cut too hard, they would grow again. The laterals could be left until they spurred, then built up with judgment. It was better to leave alone rather than treat drastically. The limbs must be protected from sun in hot climates or they would burn. If a leader was growing strongly and was cut back it would only go ahead again. He advised leaving it alone—it would not go far and could then be dealt with. He favored rubbing off, in early spring, growth that was not wanted. If that was not done then he would not cut the resultant laterals, but about December they could be bent over. Treatment for peaches was similar to the above. They should be pruned according to the sap channel. Vines.—Again the speaker stressed the importance of judgment of the individual vine. Before pruning the Sultana the vine should be examined and the growth compared with last year's treatment. If vigorous then one more cane than last year could be left; if weaker one cane would be removed, leaving about the same number of rods. Cuts should be made at the correct angle; the square cut gives a less exposed face. Cuts should not be made too close to buds. (Secretary, J. Odgers.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Bowhill	17/7/33	11	Address—R. L. Griffiths	M. Cockshell
Parilla	25/7/33	8	Annual Meeting	J. Carman
Alawoona	19/7/33	9	Annual Meeting	B. Finey
Coomandook ..	28/7/33	6	Discussion	W. Trestrail
Coomandook ..	25/8/33	20	Address—M. Aird	W. Trestrail
Boolgun	3/8/33	14	"Killing and Scalding a Pig," W. Woollard	G. Spencer
Yurgo	7/8/33	18	Address—S. D. Garfett, B.Sc.	H. McKenzie
Marama	9/8/33	11	Papers from <i>Journal</i>	T. Hinkley
Overland Corner	2/8/33	60	Annual Social	H. Löffler
Frayville	3/8/33	43	Lecture—Vacuum Oil Co.	V. Eichler
Paruna	22/8/33	9	"Milling Wheats," Karlbaum	F. Sumner
Kulkawirra	22/8/33	10	Discussion	H. Elliot

SOUTH AND HILLS DISTRICT

CLARENDON (Average annual rainfall, 33.91in.).

April 24th.—Attendance, 11.

FARM ECONOMY.—Mr. H. Harper contributed the following paper:—"There is much truth in the old proverb, 'a pound saved is a pound gained.' The better treatment that is given to the stock on the farm the better return they will give, whether it be horses, cows, pigs, or sheep. The same principle can be applied to the farm orchard or garden. **Implements.**—Too often they are left standing in the sun and rain, and in this district where the rainfall is about 32ins. one season's exposure to the weather

will do more harm than the work they do in two years. Build a shed, even if only of timber and straw, and it will keep off the sun and most of the rain. House the implements in the shed when not in use. If fences and gates are allowed to become dilapidated it takes pounds off the value of the property. I prefer gates to slip-rails; the latter are often out of repair and take much time to open and shut. Gates are cheap to make and are much quicker to open and safer when shut. From three or four shillings' worth of timber, a few bolts or nails, a gate can easily be made that will last a number of years. Good hinges can be made out of parts of old machinery. If this kind of gate is too much expense a good makeshift can be made with three iron droppers. Stretch four wires across and a piece of netting, put a piece of chain and a spring hook on one end, and it will act more satisfactorily than rails. Fences are another important factor. If allowed to get out of repair young stock soon acquire the habit of creeping and become a curse for ever after. By putting in a cuddler or two where the posts are broken off, the fence may last for a number of years. By going around the fence once a year with the strainer and tightening up the broken and slack wires, much improvement can be made. With regard to tools, 'a place for everything and everything in its place' will save much time and annoyance. It often takes longer to find the tools than it does to do the job.' (Secretary, T. B. Brooks.)

FINNISS.

June 5th.—Attendance, 7.

USES OF CONCRETE.—Mr. L. Dunn read the following paper:—"With a concrete feeding floor in the sties, a farmer knows that the pigs can get all he gives to them and that they will not trample the feed into the ground. If the floor is constructed with a kerb around it, the feed will be doubly protected, because the pig will not be able to nose the food off the feeding surface. The concrete used for this work consists of one paper bag of cement to 2 cubic ft. of sand and 3 of broken stone or gravel. The particles of broken stone or gravel should not exceed 1½ in. in diameter. *Mixing.*—Mix the cement, sand, and gravel thoroughly, so that the combination will have a uniform color. Then mix in sufficient water to secure a workable concrete. Do not add too much water. In order to prevent the pigs from slipping on the floor, finish the surface off with a wooden float, which will give a gritty surface. Too much trowelling should be avoided. Care should be taken to see that the floor is thoroughly 'cured' before being used. The floors of the sleeping quarters should also be con-

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creted. I recommend that a wooden covering be constructed, which must be movable so that it can be removed and the floor underneath cleaned out. *Pig Wallows.*—On farms that are situated away from creeks and waterholes, concrete wallows should be constructed for the use of pigs in summer. A wallow 20ft. long and 12ft. wide, sloping from 9in. to 15in. deep, will accommodate 20 pigs. The bottom should be sloped so that the wallow can be cleaned out when necessary. The concrete in this wallow consists of 1 part cement, 2 parts sand, and 3 parts gravel. *Concrete Fence Posts.*—Fence posts that will neither rot nor burn put an end to periodic replacement expenses. The farmer can make these posts between seasons. A rectangular mould 6ft. in length, with a cross section of 4ins. or 5ins. at the base, tapering to 3ins. or 4ins. at the top, can be built with smooth straight-grained timber. A good plan is to place wet brown paper inside the moulds—paper cement bags being ideal for the purpose. The wet paper prevents the concrete sticking to the mould. Other good ideas are to paint the insides of the moulds with crude oil, linseed oil thinned with kerosene, or machine oil. Quarter-inch steel bars running the length of the post are used as reinforcing; in rectangular posts, a rod is placed in each corner 3ins. from the two adjacent sides. The mixture used for post consists of 1 part cement, 2 parts sand, and 3 parts screenings or gravel, the screening or gravel not to exceed ½in. in diameter. When the mixture is placed in the mould it should be well worked around the inside of the mould to ensure a smooth surface. If the posts are made in summer, they can be removed from the mould in 24 hours; in winter a longer time is required for the concrete to harden. Do not use posts as soon as taken out of the moulds; "cure" them in wet sand for several days. *Durable Walks in the Farm Yard.*—Most paths should be constructed of 4ins. of concrete. A good plan when constructing paths is to divide the path into sections and to put down each alternate section. When the paths are put down in this way it prevents cracking, but see that each section is dry before the remaining sections are put down. After the concrete has been placed in the forms it can be levelled off with a straightedge. To secure a gritty surface, finish the work with a wood float. To "cure" the concrete, place wet bags over it for about a week. Where the path is being continually used, the mixture should consist of 1 part cement, 2 of sand, and 3 of gravel." (Secretary, L. A. Dunn.)

INMAN VALLEY (Average annual rainfall, 26in. to 27in.).

June 15th.—Attendance, 12.

SCRUB FARMING.—The following paper was read by Mr. D. Nosworthy:—"The scrub land in this district can be divided into three classes:—First, the hilly type, with rather heavy timber and large yaccas. This particular kind is only suitable for grazing; therefore, clearing for the plough is too expensive. Knock the hearts out of the yaccas in winter, starting in May, and grub on until October. As soon as possible, ring the trees that are considered too big for falling. The smaller ones can be chopped close to the ground. The chopping of the small trees would make enough room to get through with the top-dressing machine. All the axe work should be completed by the end of December on account of the need for the leaves and bark to fall to carry a good fire over what has been cleared. This is very important, and, if possible, pick a day when a hot north wind is blowing, after which very little work will be necessary before the ground is ready for clover or other seeds. The method of seeding depends entirely on the thickness of the yaccas. If possible, a drill will make the best seed bed for clover seed, but if the conditions are not good enough, then a broadcaster will do the job very well. It will take from 3 to 5 years for the yaccas to decay. Then top-dressing annually will do all that is required to make this sort of land some of the best in the district. Any shoots from either either trees or yaccas must be knocked off before the growth becomes too strong. It is an excellent plan to keep a good flock of 3 or 4-year-old wethers in the paddock; they will kill both kinds of shoots. On no account should the young growth be neglected. May or June is the best time for this work, because the sap is dormant. Twice over the shoots will prove sufficient to kill 90 per cent. of them. A mistake often made is that more scrub has been knocked down than can be looked after; this should be avoided. There is a large area of scrub that consists of low stringy bark and very small yaccas. This is best handled with a roller or log. This class of country is being very successfully handled by Mr. J. B. Roberts, of Mount Compass. Fallow this land, and then sow with oats and clover seed early the following year. On scrub of this sort the shoots persist longer than on the heavily timbered country, but experience has proved that ploughing 2 or 3 years later will almost rid the land of stumps. The best treatment for white sandy land covered with bracken fern is to leave it in its natural state. It cannot be expected to bring green scrub land under full profit for at least 6 to 8 years. (Secretary, H. Lewis.)

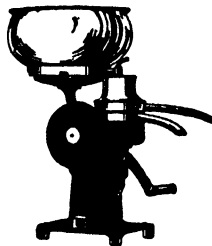
LENSWOOD AND FOREST RANGE (Average annual rainfall, 35in. to 36in.).

May 29th.—Attendance, 9.

Mr. E. Leishman (District Instructor) presented a Life Membership certificate of the Agricultural Bureau to Mr. H. Schultz. Addressing the meeting on South Australia's export trade in apples, Mr. Leishman in the course of his remarks said:—“While Australia held her own amongst her competitors there was great and urgent need for uniformity, both in quality and package. South Australia had made definite improvement in the last few years in both directions, but whereas softwood cases were used exclusively in this State, other States were using different boxes of different woods, some of which were unsuited for apple packages, and all were called ‘Australian apples’ when they arrived at their destination. Packing and standards also differed even within this State, but he thought the time would come when these difficulties would be greatly minimised. Of the two methods of transport—rail and motor truck—motors were the worst offenders at bruising fruit. They were stacked too high and the bottom layer—when projected too far over the side rail—must unavoidably be bruised because it had the rest of the load bearing upon it in one spot. A very marked improvement was noticeable in the handling the fruit received at the wharves. Ships crews also showed a desire to handle fruit as well as possible, one firm using timber to place between the boxes to provide ventilation, which when unloaded had to be thrown away. This timber, which was ultimately wasted, was worth £2,000. In a number of instances printed labels which curled and peeled off gave cases a bad appearance. Brands also placed on haphazardly, and sometimes upside down, also told against good appearance. With regard to quality, light or medium crops should be avoided when picking, and large sized apples should not be exported. Sizing of fruit was not all that it should be. Grading and packing he thought should be two separate jobs. Fruit sold by count was more sought after by overseas buyers, because they could better estimate their supplies. Twenty-eight varieties of apples were shipped last year, which was far too many. Corrugated straw-board was thought to be the best packing-case lining. Labels with a white back ground showed up best and looked most attractive. Wiring must be done near to the cleat. Its object was not to tighten the case around loosely packed contents, but to protect the case from pilferage, and its object was best achieved by being close up to the cleat. Packing must not be done on a flat table. Bottom bulge must be made while packing, and not created by being put on the press and pushed through.

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He suggested that a Board of Control should be set up in the United Kingdom to prevent rough handling and control the sales. At present, according to reports, a great deal of the care taken this end was nullified by the rough handling it received upon arrival. (Secretary, B. Lawrance.)

SHOAL BAY.

July 4th.—Attendance, 38.

The evening was devoted to a lecture by Mr. Lines, of the Animal Nutrition Research Institute, on experimental work conducted on Messrs. Seager Bros.' property at Hawk's Nest. He gave an outline of the experiments and results in connection with coast disease. After the address the experiences of those present were given, many of which Mr. Lines considered of value. (Secretary, E. B. Bell, Wisanger.)

STRATHALBYN (Average annual rainfall, 19.34in.).

May 10th.

The following papers were read by boys of the local high school:—

THE CODLIN MOTH (P. Bidstrup).—"The codlin moth is one of the worst pests that the fruitgrower has to deal with. It causes a considerable loss for that particular year, although it does not damage the tree for further crops. The codlin moth causes worm eaten or maggoty fruit of apples chiefly, although pears, plums, quinces, peaches, and apricots fall to its ravages. The moth is of a greyish color, but sometimes it is tinged with brown. It appears soon after the blossoms fall, and lays its eggs upon any part of the tree, but generally upon the fruit. The same moth never deposits two eggs in the same apple. The grub hatches from 8 to 10 days, and obtains its first few meals from anywhere on the apple. At this stage the grub is open to attack by means of sprays, which have been put on the apple before the grub hatches. For this purpose a poisonous spray is necessary, arsenate of lead, mixed with flour or glue to make it stick, is perhaps one of the best. Two and a half gallons of arsenate of lead to 50galls. of water for the first spraying, and 1½galls. of arsenate of lead to 50galls. of water for subsequent sprayings, give the best results. The spray should be applied with a fine nozzle, and an attempt should be made to cover all the apples with a thin layer. It is absolutely essential that it should be put on at the right time. This time is when the petals have just fallen, and the spray then enters the calyx cup before it closes, which it does some 10 days after the petals have fallen. If this is done the grub is generally poisoned as it is beginning to bore its way into the apple, for the main point of attack is at the eye of the fruit. Two more sprayings of the same ingredients should be given at about 4 to 6 weeks, and 10 weeks after the fall of petals. The object of these is to kill any later hatching of grubs. If the grub is not killed at this stage it is impossible to stop the destruction of the fruit, for once it is inside the apple it is quite safe and the damage is done. The grub generally burrows into the core, thus causing the fruit to drop prematurely. If the grub is fully developed before the fruit drops it eats a fresh channel out and lowers itself to the ground by means of a silken thread. If it has not left before it falls it does so then, and straight away seeks shelter. At this stage the grub is again open to attack, although a thorough wiping out cannot be given, for there are many places in which the grub seeks shelter. Rubbish, old bags, straw, posts, but chiefly loose bark form a hiding place. By securing a piece of hessian about 6in. wide around the trunk of the trees, a suitable hiding place is made, and many moths can be lured into a trap by this means. The hessian should be removed at least once a week, and all grubs killed. Fowls allowed to feed in the orchard eat many of the grubs. The grubs that secure a safe hiding place spin themselves a cocoon, so mixed with pieces of surrounding material that it forms a substantial shelter. In this the grub changes into a chrysalis. The chrysalis may develop into a moth in 7 to 10 days, or later. If it is the last brood for the season the grub does not change straight away into a chrysalis, but remains hidden until a few weeks before the flowers burst, and then changes, coming forth as a moth soon after. When the moths are observed, it is possible to kill a few by means of traps, consisting of a tin containing a sticky substance, such as apple juice mixed with honey being hung up in the trees. This method is sometimes successful, but more frequently only a very few are captured. The moths soon mate, and before long lay about 80 eggs. Sometimes the eggs are infertile, due to cold, foggy weather or to the moths failing to mate, generally the latter under Australian conditions, as infertility is rare. The life cycle generally begins again with a great increase in numbers."

THE PREPARATION OF LAND FOR WHEAT (G. Yelland).—"Preparation of the land is of vital importance in the growing of wheat. It is more important than manuring, seed treatment, &c., all put together, especially in drier districts, where water conservation is the object. The usual rule is to precede wheat with a fallow. Results show that fallow crops practically double the returns of stubble. The following are some figures to illustrate:—In 1926 stubble crops averaged 8bush. in Australia and fallow crops

averaged 14bush. In the following two years fallow crops averaged about three times as much as stubble. So it generally pays in the long run to fallow, although it means two years' rent. Land for wheat requires an early stirring, followed by frequent cultivation to conserve moisture, and to make a good consolidated seedbed, easily penetrable by roots. There should be a 1in. to 2in. loose mulch on top. These conditions may be attained by long periods of fallow (10 to 15 months). In drier districts the soil must be broken up finer to conserve moisture, but in wetter districts the main thing is to kill weeds. The land could first be ploughed about 4in. to 5in. deep as soon as possible after seeding, and then followed by a packer or harrows. It can then be cultivated to the full depth of ploughing. After this keep down weeds, preferably by grazing, and conserve moisture by cultivating after every fall of rain over, say, ½in. in heavier districts, and over 30 points in lighter soils, bringing each successive cultivation shallower, leaving the loose mulch on top. Bare fallow is now quite common in South Australian wheatgrowing. The following figures show the progress made:—In 1900, 34 per cent. of wheat grown on fallow; 1910, 50 per cent.; and 1926, 66 per cent. On a wheat farm in New South Wales over a 2-year period, stubble crops gave 11bush. average, and fallow crops 21bush. The following are the figures obtained:—The 21bush. gave a gross return of 84s., from which the deduction of 65s. working expenses leaves 19s. profit per acre; the 11bush. on unfallowed land realised 44s., and cost 50s. to produce, showing a loss of 6s. per acre. This was a typical wheat belt. Unfallowed land may carry 2in. to 3in. available moisture, and fallowed land will conserve an extra 3in. to 5in. So in dry districts fallow is extremely important. Then comes the order or cycle in which to grow wheat. If fallow and wheat are grown alternately without a period of rest or pasture, the organic matter in the soil will slowly deteriorate. The organic matter in the soil is the most important soil constituent. Wheat cannot be grown continuously on the same land. It will soon be grown at a loss. It has been proved, however, that wheat can be grown continuously on new land and also on older land by heavy applications of manure and 28in. to 30in. rainfall. Nowadays sheep are generally run in connection with wheat farming. To keep sheep continuously, a rotation must be worked so that some paddocks may be grazing and others in wheat. Also different crops take different proportions of the soil constituents; if two wheat crops were grown in succession phosphates and nitrogen in particular would be used. If wheat had taken all the disease should be followed by oats, which are immune from it to starve it out. Different districts again require different rotations. The following are some typical rotations:—(1) Fallow-wheat gives good returns for a period of years, but is very exhausting to the soil. Only suitable on rich, black friable soils. (2) Fallow-wheat-pasture; this gives a little less return but maintains humus and nitrogen supply and helps keep land clean. (3) Fallow-wheat-oats or barley-pasture or fodder crop (peas) return more humus, and peas supply nitrogen. Oats starve out take-all and flag-smut. Suitable for districts over 16in., and most suitable for this district. (4) Fallow-wheat-fallow-oats-pasture has most of the advantages of No. 3, but is better suited in drier districts, under 15in. (5) Peas-wheat-barley-oats—only in cases 22in. to 28in. rainfall, where fallow is unnecessary. (6) Fallow-wheat-peas-wheat-oats-grazing for 18in. to 22in. It gives 4 revenue crops in cycles. But wheat is not always preceded by fallow. A stubble wheat crop should follow other crops, whose cultivation more or less prepares the land for wheat. This will only occur in 22in. to 30in. rainfall. A stubble wheat crop following another serial could be treated as follows:—Burn or graze the stubble, plough early as possible, then give a short period of preparatory cultivation. The seed will then be sown on a loose seedbed."

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TREATMENT OF YOUNG TREES BEFORE PLANTING (L. Oakley and L. Thring).—"The trees should be obtained from a reliable nurseryman. The tree may be headed, which means cut back in the nursery, but sometimes it is not headed. The roots are most likely fractured and they will be growing in all directions. If possible obtain a guarantee that the tree is free from disease. If the tree has no guarantee it should be dipped in bordeaux mixture or kerosene emulsion. The bordeaux mixture is made up of 8lbs. bluestone, 4lbs. of lime, and 25galls. of water. This mixture should be only used for dormant trees. The kerosene emulsion consists of 2galls. kerosene and 1lb. soap mixed with water. This dipping will kill living fungus diseases or disease spores which may enter the plant through the cut section of roots or stems. On planting the tree, make sure that the stocks are suitable to the soil. If the tree is a straight stick when it comes from the nursery it should be pruned back to a bud, about 9in. to 1ft. high. If the tree is headed in the nursery the branches should be pruned back until only a few inches from the main stem. When pruning the stem back to a bud make sure that the lowest part of the section is above the bud, otherwise the sap will evaporate out of the low part and the bud will die. The section should be made by a pair of secateurs. The tree may be knocked about and the main roots may have broken ends, and may be growing upward instead of down or across. The broken ends must be cut off to make clean cut sections; cut out the roots which are growing upwards. The object of cutting off is to allow the cut to heal quickly to lessen the probability of the tree getting diseased before it heals. Do not remove the top until the tree is in the ground. When this treatment has been effected it is ready to plant. A black mark will indicate its depth in the nursery, so when planting the tree make sure it is put in to the same depth again."

C. Griffin gave a short description of the care and uses of carpentry tools. (Secretary, F. Allison.)

FARM STOCK AILMENTS AND REMEDIES.

Paper read by Mr. W. F. Roads at a recent meeting of the Inman Valley Branch.

THE HORSE.—One of the most common troubles the horse is subject to is flatulent colic. Some people are apt to think that the horse has water trouble when colic is prevalent, but this is very rare with horses at any time. The three chief causes of colic are:—(1) Overwork when out of condition; (2) errors in diet; (3) worm trouble. Many farmers who should know better put horses fresh from the paddock into hard work; the horse is soft and his muscles flabby, and in a couple of hours he is exhausted, and if not released from work is very likely to go down in the team or as soon as taken out. This is a stomach pain brought on through exhaustion. The preventive for this is not to work the horse too heavily for a few days, and feed good food for a few days in advance.

Error in Diet.—It is bad practice to give a horse a feed of chaff and put him straight to work on a full stomach should he be running on green feed. If it so happens that this cannot be avoided, put a pint of bran in the chaff and that will help to keep the horse's stomach moving. Another horse will go down in the night after a day's work, even though he be in good working order. This horse usually comes home hungry and bolts the feed. The remedy for this is to feed a sheaf of hay until his appetite is relieved, and then give chaff. Any horse that has shown a tendency to colic should always be watered before meals.

Worm trouble is the worst offender for pain in the stomach. The worms take all the goodness out of the blood vessels on the walls of the paunch and cause severe digestive disorders. The worms attack horses of all ages, although they may be quite fat and even with good coats. The blood worm is so small as to be hardly visible to the naked eye. **Remedy.**—Starve for 15 hours and give a drench of 1½ pints linseed oil and 2 egg-cups of turpentine, and repeat in three weeks. If you have reason to suspect sand as a cause of trouble drench with milk and honey. A simple remedy for wheat gorge is bicarbonate of soda every two hours until relieved, with an enema of soapy warm water, and as much water as the animal will drink.

Cattle are somewhat different from horses in their manner of eating, &c., and they are not so subject to stomach pains as horses. If a cow scours badly for any length of time, it can be attributed to digestive troubles. Too much bran, too much clover hay or early green feed will upset the best cow, and the remedy is to balance it with food not so rich, such as chaff or good cereal hay or some other roughage. Another complaint not generally understood is mineral deficiency. Cows on heavy, top dressed country seldom show it, but the best cure is sweet sterilised bonemeal in the feed—a tablespoonful twice a day. This also acts as a general tonic, both for dry bible and milk fever.

Milk fever seems to be on the increase and it must be recognised quickly and prompt action taken. The first precaution is to ascertain that the cow's bowels are working well; if not, drench carefully while she still has her senses and power to swallow. A bottle of linseed oil and 2ozs. of turpentine with a little ground ginger will prove

helpful. Be sure and bed the cow down well and keep her warm and propped up on her brisket. Wash the teats and udder with disinfectant and keep a clean sack under her bag. Sterilise hands and instruments. Use a milk fever outfit in preference to a bicycle pump and inflate the udder tightly. Tie the teats with tape if necessary, and if one application is not successful repeat again in two hours.

Cows that frequently return to the bull should be syringed with a quart of warm water with Condyl's crystals, diluted to a wine color, for a couple of weeks before coming in season. This should be done carefully once a day until a few days before, and then an hour or so before service inject a quart of lukewarm bicarb soda. If it is evident that a cow will have a difficult calving, give her 12 hours' trial by careful watching; if by that time she is still in trouble assistance may be needed, such as putting the calf in a better position or using force by hand. Should the cow not clean quickly, a scalded bran mash is a good and simple remedy.

Mammitis.—The simple form of this trouble is caused through a bruise, a knock, or a congested udder after calving. This kind generally rights itself after massaging with camphor oil, following a quarter of an hour's fomenting with flannels rung out in hot water. Infectious mammitis is practically incurable and very dangerous to the rest of the herd. Even if cured, it leaves weakened quarters, with more or less caloused lumps around the base of the teats, which makes milking difficult. Such cows should be sent to the butcher.

Lumpy jaw is caused mainly through an infected tooth. The jaw gradually develops a hard lump, and eventually the jaw breaks. The tooth cannot be pulled because the jaw would be so weakened that it would break in two. The veterinary surgeons effect a cure by putting the beast under chloroform and boring a hole underneath the tooth. The tooth is then punched out with a hammer and the cavity filled with a disinfectant on cotton wool.

Impaction often claims a beast in death, and this usually shows up about mid-winter. It is caused through cattle eating dry, indigestible grass and herbage in the previous summer and autumn. Cut plenty of meadow hay and feed in these months, and there will be little trouble in this respect. The cure is to give a strong purgative and then a little later administer 3galls. of warm soapsuds as an injection.

Pigs are not subject to many ills other than digestive disorders. Give them green feed and plenty of charcoal to eat, and not much trouble will occur. Bloat in cattle or pigs can be relieved with linseed oil and turpentine as a drench. The danger with bloat in pigs is off green pastures and milk fresh from the separator. If the pigs are on grass, always arrange to have the previous milk for feeding. In case of bloat in cows, place a stick in the mouth in the form of a bit, and this with a smearing of Stockholm will generally effect a cure in 15 minutes. Cows subject to bloat should not be allowed in luxuriant pastures unless they have had a morning feed of solid food of hay or chaff. Scours in calves are nearly always caused through overfeeding or unclean feeding utensils. Keep clean buckets for feeding, give about a quarter of the milk that the calf would drink normally, and add about 1 quart of whole milk, after which there will be a gradual improvement. A good plan is to first give 1 tablespoonful of castor oil.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Fynnis	31/7/33	32	Address—C. F. Anderson	L. Dunn
Langhorne's Crk.	2/8/33	4	Formal	P. Nurse
Hope Forest ...	7/8/33	18	Address—S. B. Opie ...	E. Muldoon
Balhannah	4/8/33	48	Address—E. Mattner ...	C. Grasby
Cherry Gardens.	5/8/33	14	Question Box	A. Stone
Mount Compass .	3/8/33	200	Lantern Lecture—T. Not- tage	C. Verco
Shoal Bay	8/8/33	10	Annual Meeting	E. Bell
Blackheath	10/8/33	11	Discussion	E. Paech
Macclesfield ...	17/8/33	15	Address—O. Kuchel	H. Ross
Scott's Bottom	5/8/33	7	"Profitable Crops," E. Atkinson	E. Atkinson
Strathalbyn ...	9/8/33	—	Inspection of High School	F. Allison
Mount Pleasant	11/8/33	5	Annual Meeting	D. Smith
Jervois	13/7/33	19	Potato Exports	T. Baily
Jervois	24/8/33	27	Address—A. Hilton, B.A.	T. Baily

WOMEN'S BRANCHES.

WOMEN'S INTERESTS IN COUNTRY LIFE.

[By Mrs. CARNE, Penola Women's.]

(Paper read at the 44th Congress of the Agricultural Bureau, September, 1933.)

The life of the average country woman who has her home and its welfare at heart is a very busy one, nevertheless life under Australian conditions is much more fortunate than any other country, for there is a freedom of open spaces like no other country in the world.

To make that country life profitable is not altogether such an easy matter, and it needs the help of every woman to curtail any undue expenditure and create that little profit whereby country life becomes more comfortable.

Life on the land is full of inconveniences, not like city homes, built to regulations, with all labor-saving devices; indeed, one has only to read that recently published book by Mrs. White entitled *No Roads Go By* to realise the hardships some women endure in the far north of Central Australia, which fill us with admiration, who with their cheerfulness and determination seem to overcome all obstacles.

Life for men on the land is none the less trying, for the prices of products to be profitable are hard earned during these days of depression.

Much diversified opinion has been given lately by men and women in letters to the press as to whether a woman should help her husband in outside work. Much depends upon the stamina of the woman and the work in progress, whilst no doubt her man appreciates the help nevertheless she must remember upon her health and strength depends the welfare of the home, and if in later life the heavy work, such as lifting, &c., may possibly undermine the health, resulting in endless medical expenses, then it has not been worth while.

A home that is worth while, no matter how humble, if it be spotless, its children healthy and clean, its larder well filled, and the health and strength of the parents unimpaired is a home.

Recently a writer to one of the daily papers mentioned that "a man on the land needs a lawyer and a private secretary to cope with the various correspondence received." Very often this is one of the many little things that a woman can do to help. Many men detest the business side of farm life, and if a woman takes a keen interest in balancing the budget of her household expenses, then she is certainly a capable person to handle the correspondence received in that household.

All households should be "run" on an allowance, and whether the necessary items be paid or entered it is a small matter to wait for the docket and check all expenses, keeping the paid and unpaid accounts upon two separate files. Each month's accounts should be reviewed by every housewife in a small cash book kept for the purpose of receipts and expenditure, leaving "the man of the house" or head of the household the books for farm expenditure, merely showing allowance. This does away with pages of household commodities in case he has to engage a lawyer to furnish his income tax.

POULTRY.

The management and marketing of poultry can also be run by women. This is often an interesting hobby. From experience I find the White Leghorn more of a pest than any other fowl unless cross-breeding is adopted. Whilst without doubt they are the best layers if housed and cared for they are, when allowed their freedom, into all places least expected. Being of a restless nature they do endless damage to haystacks and gardens, lay their eggs in unthought-of places, and if disturbed shift sometimes further afield. Of course, if eggs are the main point in view, White Leghorns can be housed and cared for, but this entails much

work. The cockerels are useless for marketing—never gaining much condition—and if any great distance from the city the freight takes the profit. The black or grey fowls are more suitable for table use and marketing, and are good layers until they reach their second year.

Turkeys, if the time can be spared, are more profitable, but are difficult to raise. I have raised a large number of turkeys annually. As soon as a clutch is hatched, I place the mother (turkey hen or fowl) in sections of an old disused tank out on a grass patch with wire-netting over the top to prevent the bird from flying out as a turkey hen is very clumsy. Give clean water daily, and a warm mash of pollard or table scraps, or crushed wheat mixed with pollard three times daily.

Drag the tank section to a fresh patch each morning, because turkeys are grass-loving birds. The sides of the tank protect the delicate chicks from keen winds, and if the weather is wet a few sheets of plain or corrugated iron held firmly down by weights of wood, planks, &c., keeps them dry and warm. I have no faith in rearing turkeys loose; they either get lost or die with cold, or the gobblers kill them. I wonder at Nature making the turkey hen such a stupid mother!

MARKETING.

In the marketing of poultry do not overcrowd the birds, and nail the tins to the insides of boxes; it is cruelty leaving them without food and water when the tins capsize.

If birds are to be consigned by rail fill the food tins with wheat or oats before they leave the home, and give instructions for water to be added at the station whilst awaiting the truck.

In the marketing of eggs let them be clean and fresh even though the price is most disheartening, but as in all farm produce let us hope for better times ahead.

MENDING AND RUG MAKING.

During winter when the housework is completed and out of doors is only of sheer necessity, there is always that everlasting mending or patching where children are concerned, and I have found it worth while in the mending of tweeds and serges to hunt up a scrap of material of which it was made and unravel it. Mending the torn edges with its own material, even sometimes if the effort looks a little clumsy, a vast difference is made when pressed with a damp cloth.

There is always knitting and sewing to do, but it is remarkable in these times of depression what hobbies some of our country women have undertaken. Many are the beautiful hand-made rugs that one sees in these homes made from scraps of waste material on clean hessian foundations or on canvas. Some are works of art in design.

Those worked in skeins of wool in harmonising colors on canvas are more expensive—costing from 21s. to 35s. Others again are made of unravelled woollens, hooked through the desired material in lockstitch, and when completed being clipped short and level with a sharp pair of shears. I have seen rugs of clipped sheep skins trimmed well, and either home tanned by an advertised preparation or sent to a tanner. Many people like black as a color for floor rugs, but it is a hard color to keep clean.

JAM RECIPES.

It is during winter that very often the supply of jam in the pantry runs low—perhaps we underestimated the consumption—so whilst oranges are in season we can help the pantry with a little marmalade, for which a well-tested recipe is as follows:—

Marmalade.—Two large oranges and 2 large lemons. Cut the fruit very fine, removing all the white pith from the skins, and using the skins also. Measure cut up fruit, and allow 3 cups of cold water to each cup of fruit, and stand aside

until about the same time next day; then put on the fire, and boil hard for 10 minutes. Then lift off and set aside until same time next day. Then add 1 cup sugar to each cup of pulp and $\frac{1}{2}$ cup of sugar over, and then boil till it jellies (about an hour).

Dried Apricot and Pineapple Jam.—1lb. dried apricotes, 2qts. water, 4lbs. sugar, 1 cut up pineapple. Cover apricots with boiling water in which 1 teaspoon soda has been added. Soak $\frac{1}{2}$ an hour. Pour off water, then add 2qts. cold water. Stand 24 hours. Bring to boil, adding pineapple and sugar.

Jam Pudding.—Beat 1 tablespoon sugar, 1 tablespoon butter, 2 tablespoons dark jam, $\frac{1}{2}$ cup milk in which 1 teaspoon carbonate of soda is dissolved, and add pinch of salt and 1 cup flour. Steam 2 hours. Sufficient for five or six persons.

GARDENING AND HOUSEHOLD WORK.

As spring advances we are tempted more and more out of doors, and work among the household vegetables is combined with pleasure when reaping the reward of one's labors. The raising and planting of "shelter" trees is also an interesting hobby, and the majority of country women can dig the necessary holes for these quite as well as any man. The Cootamundra Wattle and the Tree Lucerne are easily raised, grow rapidly, and make ideal shelter from winds.

In spring cleaning of the household, if worked in a methodical manner of one room at a time, it will be more pleasant to the household.

In most homes a different room in the house has its "thorough" cleaning weekly, yet it is surprising how dirty some of them are found to be when spring cleaning. It is not "turning out" a room properly if the furniture is not moved from against the walls and the skirting boards left unwashed.

When the wallpaper is only slightly soiled it can be freshened by rubbing over lightly with stale bread, or a ball of dough if very dirty, working with an "up and down" movement. If the paper is damaged or torn, and some of the original covering is available, it is not a difficult matter to patch it, whilst carefully noting the pattern, pressing firmly into position.

The woodwork of furniture should be carefully washed with warm water to remove dust from the crevices, adding a little vinegar, and when thoroughly dry polished with a wax polish. Stained boards can be re-stained or waxed. Walls can be patterned or plain, but as a general rule if the furnishings are patterned it is better to choose plain walls; or, if the carpets and coverings are plain, then a patterned or "roughened" surface is often more suitable.

All blacklead brushes should be boiled in an old tin with a small quantity of soap and soda every now and again, and hung out to dry.

To preserve wire mattresses from rusting rub them over with a soft rag saturated in paraffin oil; if they persist in rusting, give a coat of aluminium paint.

If all mattresses have an extra cover—these can be made at home or bought ready made—it will save a lot of trouble in washing and re-filling. I often think these few lines by Longfellow are aptly fitting:—

"Labor with what zeal we will,
Something still remains undone;
Something uncompleted still,
Waits the rising of the sun."

SWEET MAKING.

[By Mrs. B. EGGERS, Wasleys Women's.]

(*Paper read at the 44th Congress of the Agricultural Bureau, September, 1933.*)

When making sweets, one of the most important rules is to weigh all materials carefully. Use only the finest sugar. Always cover the sugar and other ingredients with water, unless otherwise stated in recipe. Too little water will cause a batch to

burn, and a little extra will only take a little longer to boil out. This, of course, cannot be done when the batch is being timed by the clock, but then the exact quantity of water is given in the recipe. Always boil sweets fiercely. A primus is very handy where gas and electricity are not procurable. When the ingredients have been put into a saucepan and put on the stove stir until the batch starts to simmer or until the sugar dissolves. Wash the sides of the saucepan with a brush. I use a round pastry brush, dipped in warm water. This is to prevent any grains of sugar staying on the sides of the saucepan. Do not allow the brush to touch the batch, but a little water running into it will not hurt it. Do not stir the batch, unless otherwise stated in the recipe, after it comes to the boil. This is a very important rule if one wants a fine candy or a clear toffee. When using a thermometer be careful not to allow it to become higher than the degree stated in the recipe. Always remember that no matter how much the ingredients may be increased or decreased the degree for boiling still remains the same. Always warm the thermometer before placing it in the batch. Glucose is used in most recipes to prevent granulation. Cream of tartar may be substituted, but when making chocolate centres the use of glucose produces a much finer and softer article. There is more likelihood of the batch burning when using glucose, so for toffees, butterscotch, or any other high degree sweet I use cream of tartar. A wooden paddle is used for stirring the batch before it boils and again if it is necessary to beat the mixture after it comes off the stove, being careful, of course, to wash it before using the second time. A two-pronged fork is used for dipping chocolates and bon bons. When using glucose always dip the hands in water, then pull out as much as is needed. If one has to put their hand in for more, dip again in cold water. Weigh the sugar, and then weigh the glucose on top of it. This prevents the glucose sticking to the scales. Always use sheet gelatine, and after soaking it until soft, dry it on a cloth before using.

RECIPES.

Toffee.—3lbs. sugar, 1 teaspoon of cream of tartar; cover the batch with water, and stir until sugar is dissolved. Wash the sides of saucepan, and boil to 315°, or until, when tested in cold water, it will immediately become brittle, like an egg shell. Flavoring and coloring may be added, if desired, when the batch is ready. By putting it in just as the saucepan comes off the fire the mixture, still boiling, will send the flavoring through it. Pour into a buttered dish. If nuts or preserved fruit be used, place same on the bottom of the dish, and pour the mixture in carefully in order that the nuts are not disturbed. Just before it is cold mark the top with a sharp knife the size required, and, when cold, take out of the tin, and it will break off quite easily. Another way is to cut the batch with buttered scissors, when just cool enough to handle, into pieces, and form with buttered fingers the shapes desired. Yet another way is to cut in strips and then crossways.

Butterscotch.—Same amount of sugar and cream of tartar, but boiled to 320°. Take off the fire, and when it has ceased to boil add ½lb. butter. Beat until well mixed, but if beaten too much it will go sugary. Turn out into greased tin or dish, and cut the same way as toffee.

Milk Kisses.—2½lbs. of sugar, 4½ teaspoons cream of tartar. Moisten and boil to 270°, or, until tested in cold water, it becomes crisp and will break, but not as hard as for toffee. Boil this sweet very fiercely. Take off the fire, and add ½lb. butter and ½ tin of condensed milk. Malt or honey may be used instead of milk. Beat this in, and pour into a greased tin. When cold, cut or break off, and wrap in wax paper.

Cocoanut Ice.—Take 1½lbs. sugar, ½lb. glucose; moisten and boil to 235° or, when tested in water, it becomes a soft ball between the fingers. Take off the fire, and divide in two. Beat up one half, and, when getting white, add ¼lb. cocoanut; pour into a cigar box lined with wax paper. Beat up the other half and color pink, and add a little essence. I do not add cocoanut to this half. Pour on top of white.

Chocolate Ice is made the same way, but when beating up second half add a little melted chocolate instead of pink coloring.

Jujubes.—Take 15ozs. sugar, $\frac{1}{2}$ teaspoon cream of tartar, 2ozs. gelatine. Place sugar and cream of tartar in saucepan, moisten with water, and boil to 240° or soft ball degree. Take off the fire and add the soaked gelatine, color and flavor, and return to the fire, stirring for 1 minute. Pour into a tin moistened with water, not buttered. When set cut up and roll in ordinary crystal sugar.

Caramels.—This is one of the few recipes that is stirred all the time. Place 1lb. sugar in a saucepan with 12ozs. glucose and 1 cup of sweet cream. Stir to 245° or between the soft ball and the firm ball degree; then add $\frac{1}{2}$ cup more cream and boil to 245°; add another $\frac{1}{2}$ cup of cream and boil again to same degree. Remove from the fire, flavor with a little vanilla, and pour into a greased tin or dish. I use sandwich cake tins. When not quite cold mark with knife, and when cold cut into squares. Do not use too large a cup for the cream, or the batch will be too soft.

Chocolate Caramels.—Add $\frac{1}{2}$ lb. grated chocolates to the mixture; nuts may be added after it comes off the fire. Wrap in wax paper.

Fondant is the base for chocolate creams. To make: Take 1 $\frac{1}{2}$ lbs. sugar and $\frac{1}{2}$ lb. glucose; cover with water and boil to 240°, or soft ball degree; pour into a basin and when getting white from beating, add stiffly beaten white of one egg. Do not start to beat until mixture is luke-warm. Take small quantities and flavor with whatever is desired and work into shape with the fingers, using cornflour to prevent sticking. Some may be left white and flavored with either lemon or vanilla, and made pyramid shape; others colored pink and flavored strawberry or raspberry; others vanilla flavored, with a little butter worked in; coffee essence may be added to some, and a little caramel to darken. Raisins, nuts, and crystallised fruit may be used by flavoring some fondant vanilla and wrapping a piece around each nut or piece of fruit.

Peppermint Creams may be made by using a little peppermint essence in some fondant. When the centres have been formed, place them on wax paper to allow the outsides to get firm. Next day they are ready to dip into melted chocolate. Scrape any quantity of block chocolate into a double boiler. I use one small basin placed in another larger one. Have warm water in the under basin. Stir the chocolate in the small basin until it has melted, keeping the water in the under basin no more than very warm. If too much heat is used it will cook the chocolate which will become coarse and hard. If it is too thick add a little scraped cocoa-butter. The less heat used in melting the chocolate the less danger of a grey and spotted coating. When cocoa-butter is used care must be taken to have it well mixed into the melted chocolate, otherwise it may streak. It sometimes takes hours to melt the chocolate sufficiently. Beat it well all the while, keeping scraped well away from sides of basin. To test take out a little and place on wax paper. If hard and glossy in 5 minutes it is ready for dipping; if it takes longer stir a little more. When it is ready, drop in the centres one at a time, and before they have time to melt remove them with the fork; scrape off the superfluous chocolate on the side of the basin, and place on wax paper to dry.

Toffee, butterscotch, cocoanut ice, caramels, jubes, or any such sweets may be used as chocolate centres. A very nice chocolate is vanilla fondant wrapped around an almond coated with chocolate, and a raisin placed on top, also *vice versa*. Preserved ginger cut in small pieces and mixed with fondant makes another nice centre. Peanut clusters may be made by melting chocolate as directed, then dropping peanuts in and take them out 5 or 6 at a time. Chocolate roughs, by melting chocolate and adding cocoanut; place in rugged lumps on wax paper.

Licorice Allsorts.—Place 1lb. sugar, 1 $\frac{1}{2}$ teaspoons cream of tartar in a saucepan, moisten and boil to soft ball degree. Take off the fire and add $\frac{1}{2}$ oz. soaked gelatine. Thicken in the saucepan with about 2lbs. icing sugar. Sift some icing sugar into

a dish and pour the boiling mixture into the centre and work into a thick paste. Roll out $\frac{1}{4}$ in. thick and place a piece of thin licorice on top, roll out another piece of the mixture and place on top of licorice. Cut with a sharp knife.

Puff Balls.—Soak 1 oz. gelatine in 1 cup water for 2 hours. Add 1 lb. sugar and 1 cup water and boil about 10 minutes. When cool beat until stiff. Turn into moulds, either egg cups or small marmite pots. Wet the moulds before putting in the mixture. A gem scone tray is another good mould. When set, dip in melted chocolate and roll in cocoanut. The moulds may be dusted with corn-flour instead of being moistened.

Honey Comb.—1 lb. sugar and a good pinch of cream of tartar, moisten with water and boil to 320° or egg shell degree. Take off the fire and stir in a small teaspoon of butter and a large teaspoon of carb. soda. Stir ingredients as little as possible, and quickly. Pour into a buttered tin and when cold cut with buttered scissors.

THE FUTURE WOMEN OF AUSTRALIA.

[Mrs. F. CUMMINGS, Belalie Women's.]

(Paper read at the 44th Congress of the Agricultural Bureau, September, 1933.)

Mrs. Edison, wife of the great inventor, in an article entitled "The Biggest Job in the World," writes:—"I am old-fashioned enough to believe in the old saying that the hand that rocks the cradle rules the world." I agree with Mrs. Edison in that, but how many mothers realise this and the big responsibility which is theirs? The baby girls of to-day will be the future women of Australia, and the mothers of the generation to come. How careful then should their training be; for the women will have much to do towards making Australia the land for which our pioneer parents worked and hoped.

The training of our little women cannot begin too early; quite a young child can be trained in the habits of neatness and carefulness. The small task of taking care of the toys and putting them carefully away will instil in the child habits which will be useful in later years. Give the little ones simple duties to perform, which they will do willingly to "help mother." This may not be a help, as oft times the work has to be done over again; but do not discourage the small helper, because she is early learning the sense of responsibility. Teach them to see the beauties in Nature; flowers and music are all aids in forming beautiful characters.

SCHOOL DAYS.

Too soon our girls commence their school days, and other interests enter into their lives. Most mothers dread this time and the influence of perhaps unsuitable companions, but keep your girls' confidence, and help them to choose their friends wisely. I have heard mothers say, "Oh! I never listen to tales brought from school," but I do not agree with them in this respect. Listen to the little stories of things which vex or worry during school hours, then advise or explain their faults. It is not necessary to side with the child if it is in the wrong, nor to encourage what is known as tale-bearing. In this way you keep your child's confidence, and also know how she spends her play hours among her school mates.

Invite the school mates to your home, and learn to know the friends your daughter has chosen. Girls should be given every opportunity of mixing freely and playing with children of their own age.

The girls should understand that it is their duty to make the best use of school hours, and that education is one of the best assets for a successful life. No child should waste these valuable years, but do not allow the growing girl to over study. Nothing undermines the strength and makes nervy, irritable girls

more than the strain of too much study. A mother of a family once said to me, "I never sacrifice my children's health for their education." Education after all is worthless without good health.

HOME TRAINING.

The young girl should be taught how to spend wisely, and the best way to do this is to make a small allowance for pocket money. One of the greatest of wrongs can be done to the child by giving too much pocket money. This is not unusual just now as money is too scarce with most parents, but many of the extravagant habits and ideas of so many young women are due to the fact that in their childhood days they were given an unlimited supply of pocket money to spend as they pleased.

It is a good idea to let the pocket money be earned by some small daily or weekly task. On the farm it can be easily arranged that the girls care for the poultry or help with the cows, and money earned in this way will be more valued. They soon learn to spend their money wisely; if spent foolishly they are the losers, and will know better next time. We all learn by experience, but often for lack of proper teaching in our young days experience is gained in a hard school. Keep the girls at school as long as you can; they are the happiest days of their lives, and soon enough they will have to shoulder the cares of life. Besides when a girl leaves school, say, at 14, she grows into womanhood far too quickly.

It is a pathetic sight to see these young girls—in dress and manner—copying girls many years their senior with the innocence and bloom of childhood gone for ever.

School days ended our girls have to take up bigger responsibilities either in the home or at business, but unless your young daughter has been taught to be useful do not expect her to settle down quietly to the responsibility of work of any kind. The life will be new and irksome to her. For instance, the little girl who has been allowed to help mother on baking days, or to try her hand at stitching up a frock on the sewing machine will feel confident when she takes up the work in earnest. If mothers get away sometimes for a holiday, and leave the young housekeeper to manage without running to mother for advice it will help her to become capable and independent.

Where there are two or more daughters let them take week about at cooking and housekeeping, and so become competent in all the things which help to make a house a home.

Why do so many of our girls go to towns to work in offices and shops instead of qualifying for what Mrs. Edison calls the "biggest job in the world"—home making. Mothers should not be pushed into the background, but girls should realise that she comes first.

Do not let the girls form the habit of thinking anything will do for mother who never needs a new dress or a holiday. In one sense it is not fair to mother who sacrifices so much for her children, and in another it will make a selfish woman of the daughter, who will grow up to think only of herself. Every girl should have a dress allowance, be it ever so small.

Girls enjoy spending their own money for clothes; they then realise the value of money, learn to spend wisely, and dress well. Every girl should be brought up to take a pride in her personal appearance. It does not, as some people think, cause vanity in children to foster a love for pretty clothes, for a tidy, neat, and well-dressed woman is certainly preferable to a slovenly and careless one. Do not let the girls run accounts for drapery; if they cannot pay for what they want it must not be bought. Teach them Mr. Micawber's maxim, "Spend 19s. 6d. out of your pound and you have happiness, but spend 20s. 6d. and you have misery." How many people would be saved a world of trouble at the present time if that advice had been acted upon! Extravagance has ruined many homes in late years.

Girls should be taught to respect the aged and have reverence for the higher things of life, for noble and pure-minded women are needed in the world to-day.

RECREATION AND AMUSEMENTS.

On a recent visit to the city my husband and I visited one of the theatres just to pass away the evening. The play was a disappointment to us, and to my mind very low classed, but every suggestive story or vulgar song was greeted with great applause by the audience, which consisted mostly of young girls and their boy friends, showing the depraved tastes of a great number of the young folk of to-day. Are amusements of that kind—which I believe are common enough in the city—going to do anything to form the noble women we want to carry on Australia in the future?

An interest in things outside the home circle is necessary, as sooner or later the younger generation must step into the positions filled by their elders. To this end it is advisable to encourage the girls to take an interest in social work, such as social clubs, guilds, &c. It is selfish to live for oneself alone, and an interest in the outside world will give broader views of life.

In the matter of sport and amusement much may be said. I do not believe in "all work and no play," and neither do I favor "all play and no work." Sport is a fine thing for girls in moderation, and helps to instil in them many valuable lessons which go to make character. Taking a defeat good naturedly—at tennis, for instance—will help them to make the best of the setbacks which are sure to come some time in life.

The tendency of late years has been to place too much value on sport. It has been overdone, and had our young folk of late years put as much time and thought into their "jobs" as they have their sport the country would be better off to-day. A well-known minister recently made this remark, "Pleasure and sport is not an end, but a means to an end. To make it one's sole interest in life is wrong, but in moderation it is a great help in character building." So let your girls have amusements—their sport, dances, and social entertainments—but as a recreation only, not their chief aim in life. If you like your young girls to attend public dances—and personally I see no harm in this class of amusement—go with them and know what company they are in. Get to know their young companions, and show them that they are free to entertain their friends in their own home. It is not always a pleasure to accompany young girls in the evenings, an easy chair by the fire with work or book is more enticing, but mothers are often called upon to make a sacrifice for their children.

Cultivate in your daughters a taste for good books; one who is fond of reading is rarely discontented or bored with home life. Mothers should not be discouraged with their job of training the young; we all have our disappointments, and one cannot expect perfect results, but you will have the satisfaction of knowing that you are doing your part towards raising a generation of pure-minded, industrious women in whom we must trust to help our beloved Australia and make it a good and great land.

I conclude by quoting a few lines from a poem which I learnt many years ago:—

"The girls that are wanted are good girls—

Good from the heart to the lips—

Pure as the lily is white and pure,

From its heart to its sweet leaf tips.

"The girls that are wanted are home girls—

Girls who are mother's right hand—

That fathers and brothers may trust in,

And the little ones understand."

MILLICENT (Average annual rainfall, 29.77in.).

June 16th.—Attendance, 13.

STEWES, CURRIES, AND WINTER PUDDINGS.—The following recipes were submitted:—*Orange Dumplings* (Mrs. J. Schultz).—Mix 3 cups bread crumbs with $\frac{1}{2}$ cup each castor sugar and S.R. flour, $\frac{1}{2}$ cup soft butter, and grated rind of orange. Moisten with a well-beaten egg, juice of an orange, $\frac{1}{2}$ cup of milk. Put into small buttered mould, cover, and steam 20 minutes. Serve with orange sauce or hot marmalade. *Date Pudding* (Mrs. R. Oberlander).—2 $\frac{1}{2}$ cups flour, 1 cup suet, $\frac{1}{2}$ cup sugar, $\frac{1}{2}$ lb. dates, 1 cup milk, $\frac{1}{2}$ nutmeg, 1 teaspoon soda. Boil 3 hours in a basin. *Seven Cup Pudding*.—1 cup each of bread crumbs, flour, chopped suet, sugar, currants, $\frac{1}{2}$ cup milk, 1 egg, 1 teaspoon of cinnamon, 1 teaspoon c. soda. Mix all dry ingredients together, beat the egg, and add milk. Stir both into dry ingredients, mixing well. Put into a greased basin, steam for 2 hours, and serve with a sweet sauce. *Suet Pudding* (Mrs. Nitschke).—2 cups flour, 1 cup shredded suet, 1 teaspoon soda, 2 teaspoons c. tartar. Mix with milk, put into a floured cloth, and boil 1 $\frac{1}{2}$ hours. To be eaten with treacle or honey. If desired, 1 cup each of sugar and raisins can be added, and the pudding eaten with hot milk or cream or sweet sauce. *Mutton Hot Pot*.—Take 2lbs. lean mutton, cut into neat pieces. Fry in butter until brown. Have a saucepan half full of water boiling when the meat is ready. Put into the saucepan. Have ready 1 carrot, 1 parsnip, and 1 onion to put in the frying pan. Fry until brown, then add to meat in saucepan. Boil for 1 hour, then add thickening. Place in a casserole, put in the oven, and bake another hour. Mutton treated in this way is delicious. *Boiled Jam Rolly* (Mrs. Altschwager).—To make the pastry take $\frac{1}{2}$ lb. flour, pinch of salt, $\frac{1}{2}$ teaspoon baking powder, $\frac{1}{2}$ lb. suet, $\frac{1}{2}$ cup water. Sift flour and baking powder, shred suet, and rub into flour. Add water to make a soft dough. Roll out the crust, spread jam over, moisten edges, roll up, and press edges together to prevent jam from coming out. Tie up in a floured cloth, fold over, leaving plenty of room for the pudding to swell. Tie the ends securely, and put a pin in the middle of the cloth. Have the water boiling when the pudding is put in. Boil 1 $\frac{1}{2}$ hours. *Jam Rolly, Baked*.—Paste: 1 cup flour, 1 tablespoon butter, 1 teaspoon baking powder, pinch of salt, mixed with a little milk. Roll out, and spread over with jam. Roll up, and put in a buttered dish. Pour over a syrup made of 1 cup water, $\frac{1}{2}$ cup sugar, 1 tablespoon butter (boiled), and bake 30 minutes. *Plum Pudding Without Eggs* (Mrs. L. Oberlander).—6ozs. each flour, suet, bread crumbs, raisins, and currants, 2ozs. each candied peel and brown sugar, 1 teaspoon spice, $\frac{1}{2}$ teaspoon carb. soda, $\frac{1}{2}$ cup treacle, 1 cup milk. Shred suet, rub it into sifted flour, salt and soda, add crumbs, then add cleaned fruits. Cut up peel, then sugar and spice. Blend the treacle with the milk, stir all in, and mix well. Boil either in floured cloth or in a greased pudding basin, with cloth tied on top, or in a greased pudding mould with self-fitting lid for 4 hours. Serve with white sauce. *Sago Date Pudding*.—1 cup each bread crumbs and dates, $\frac{1}{2}$ cup sugar, 2 tablespoons sago soaked in cup of milk for 1 hour, 1 teaspoon carb. soda in a little milk, 2 tablespoons melted butter. Mix all ingredients, butter last. Steam in a greased mould 26 hours. Serve with a powdered custard sauce. *College Pudding* (Mrs. H. J. Hutchesson).—2 cups S.R. flour, 2 eggs, 1 tablespoon butter, $\frac{1}{2}$ cup milk and water, 2 cups sugar. Beat eggs for 20 minutes. Dissolve butter and sugar together, add to eggs with milk and water, and then sift flour in slowly and stir in. Put a little jam in basin, and pour in ingredients. Steam for 1 $\frac{1}{2}$ hours. *Apple Dumplings*.—2 cups flour, 2 teaspoons baking powder and pinch salt sifted together, add 1 cup chopped suet. Make into soft dough with milk. Flour the hands, take a piece of dough, and bury the peeled apple well. Put into a deep, well-buttered piedish, and on top of all sprinkle a cup of brown sugar. Then pour over them 1 cup boiling water. Bake $\frac{1}{2}$ to 1 hour, according to oven, and serve with cream. This quantity makes 6 or 7 good sized dumplings. *Cottage Pie* (Mrs. Bryant).—Mince 1lb. steak kidney, and 2 onions together, add pepper and salt to taste. Mix altogether with a small cup of soup, and place in a buttered piedish. Have a sufficient quantity of mashed potatoes to spread on top, adding little pieces of butter. Bake for 1 hour, according to heat of oven. *Seasoning Salts*.—Home cooks will find it a great advantage to prepare salts, especially for seasoning, and keep on hand for flavoring soup, &c. Take 6ozs. salt, $\frac{1}{2}$ oz. ground cloves, 1oz. ground ginger, $\frac{1}{2}$ oz. each cinnamon, cayenne, nutmeg, black pepper, and Jamaica pepper. Mix all together well, place in a bottle, and cork tightly. Add a little to the soup. (Secretary, Mrs. M. Hutchesson.)

MUNDALLA (Average annual attendance, 19.22in.).

June 8th.—Attendance, 14.

QUESTION BOX.—The meeting took the form of a Question Box. A member who asked the best way to test the heat of an oven was advised to place a newspaper or flour on the oven slide and if same browned quickly, the oven was well heated. As a preventive for

dandruff in the hair, the following were suggested:—(1) Use colinated cocoanut oil; (2) rub salted water well into roots of hair with finger tips; (3) one part kerosene and two parts olive oil rubbed well into scalp. Mrs. Hawke addressed the meeting on "Girl Guiding."

July 6th.—Attendance, 15.

HOUSEHOLD HINTS.—Make children's flannelette underwear fireproof by this simple precaution: After washing dip the garments into a solution of alum water; this renders the material non-inflammable. Put salt between two layers of paper at the bottom of cake tin and cake will keep fresh for some time. To keep moths away, instead of placing moth balls or camphor among woollen goods, sprinkle oil of cinnamon on small pieces of cotton wool and place among clothes. If the washing copper is dirty after becoming hot rub well with a kerosene rag and all will be well and the kerosene will not harm the clothes. This recipe of Monte Carlo biscuits was given by Mrs. L. Fisher by special request, and the secretary can thoroughly recommend same as she tested them at Mrs. Fisher's home:—

Monte Carlo Biscuits (Mrs. L. Fisher).—1lb. plain flour, 3ozs. sugar, $\frac{1}{2}$ lb. butter, 2 tablespoons water. **Method**—Rub butter and sugar well together with fingers, mix in water, and shake flour in gradually. Rub all together, roll out on floured board to biscuit thickness, cut into shapes (I use a $\frac{1}{2}$ lb. mustard tin) and mark with the back of a fork. Bake in a quick oven until light brown. **Filling**—Make a paste of the following mixture: $\frac{1}{2}$ lb. icing sugar, 2 tablespoons butter, $\frac{1}{2}$ to 1 teaspoon of vanilla or pineapple essence. When biscuits are cold, spread generously with paste and lightly press another biscuit on top. These biscuits will keep a long time in airtight tin. (Secretary, Miss M. Kemp.)

SADDLEWORTH (Average annual rainfall, 19.54in.).

July 4th.—Attendance, 12.

BISCUIT RECIPES.—The following recipes were supplied.—**Ammonia Biscuits.**—1 pt. milk, $\frac{1}{2}$ lb. butter, 1lb. sugar, 1oz. ammonia, and flour enough to roll. **Honey Biscuits.**—6 eggs, $1\frac{1}{2}$ lbs. sugar, 1lb. lukewarm honey, 2 teaspoons each cinnamon, ginger, cloves, and carbonate soda, 2 $\frac{1}{2}$ lbs. flour. **Cream Biscuits.**—1 cup each cream and sugar, 2 eggs, 1 teaspoon c. tartar, $\frac{1}{2}$ teaspoon carb. soda, enough flour to stiffen. **Iced Currant Biscuits.**— $\frac{1}{2}$ lb. butter, 2ozs. sugar, $\frac{1}{2}$ lb. flour, 2 level tablespoons baking powder, 1 egg, 2 tablespoons milk, 2-4ozs. currants, salt. Sift flour and rising. Rub in butter, add sugar and currants, mix egg yolk and milk together and stir into flour. Roll out thin on floured baking dish. Beat the egg white and stir in 4ozs. sifted icing sugar gradually. Spread thinly over the surface of biscuit, make in finger lengths, and bake in moderate oven about 20 minutes. **Munchies.**—2 cups rolled oats, 1 cup each sugar and cocoanut, $\frac{1}{2}$ cup flour, $\frac{1}{2}$ cup butter, 2 large tablespoons honey, 1 teaspoon carb. soda, 1 tablespoon hot water (boiling). Mix dry ingredients; melt butter and add honey. Dissolve soda in boiling water, add to dough. Drop on slide; bake about 10 minutes in slow oven. **Honey Biscuits.**—1lb. sugar, $1\frac{1}{2}$ lbs. honey, 4 eggs, 4 teaspoons carb. soda, 2 teaspoons mixed spice, $\frac{1}{2}$ nutmeg. Flour enough to roll out, essence of lemon and a little ginger. This mixture makes a large quantity. **Walnut Rice or Puffed Rice Biscuits.**—Cream 6ozs. each butter and sugar, 1 beaten egg, $1\frac{1}{2}$ cups each S.R. flour and puffed rice, 1 tablespoon chopped walnuts, flavor essence of almonds. Roll into small balls, put on cold slide, and bake in moderate oven 10-15 minutes. **Biscuits.**—Pinch of salt, 2 cups S.R. flour, $\frac{1}{2}$ cup sugar, $\frac{1}{2}$ cup butter, egg. Mix dry ingredients, then make into a stiff paste with yolk of egg and a little lk, roll very thin. Beat the white of egg to a stiff froth and add icing sugar to form an icing; spread on dough. Sprinkle with cocoanut, cut in fingers. Cook in hot oven 15 minutes. **Flaked Oat Biscuits.**—6ozs. flaked oats, 4ozs. each sugar and butter, vanilla. Mix with melted butter, bake in dish, and cut into squares when cooling. **Size of dish 10ins. by 7ins.** **Sunday Biscuits.**—3 cups flour, 3 tablespoons cornflour, 3 teaspoons each cocoanut, c. tartar, $1\frac{1}{2}$ teaspoons c. soda. Beat $1\frac{1}{2}$ cups sugar and 3 tablespoons butter to a cream, add 2 eggs and 2 tablespoons milk. Mix with flour, etc., to a stiff paste. Bake 12 to 15 minutes in moderate oven. **Cornflake Biscuits.**—2 whites egg, 1 cup sugar, 1 teaspoon vanilla, 3 cups cornflakes, $\frac{1}{2}$ cup cocoanut, $\frac{1}{2}$ cup chopped almonds or walnuts, 3ozs. butter. **Method**—Beat egg whites, add sugar, vanilla, cornflakes, cocoanut, and almonds. Melt butter, and pour over mixture; mix in lightly. Put 1 teaspoon on slide and bake in cool oven. **Easy-meal Biscuits.**—4ozs. each plain flour and butter, 2ozs. sugar, 1oz. easy-meal. **Method**—Cream butter and sugar, add easy-meal, then flour. Roll out thinly and cut to required shape. Bake in medium oven. **Jam Drops.**— $\frac{1}{2}$ cup sugar, 2 cups flour, $\frac{1}{2}$ cup butter, 2 teaspoons baking powder, 2 eggs. Beat butter and sugar to cream, add eggs, then flour. Make into stiff balls, press a hole in the middle and fill with jam. Bake in a quick oven. **Brandy-**

snaps.—7ozs. each flour and butter, 10ozs. sugar, 12ozs. golden syrup, 1oz. ground ginger. Mix well sugar, flour, and ginger. Melt butter and syrup, and pour on to the dry ingredients. Stir well until smooth. Bake in small pieces, about $\frac{1}{2}$ a teaspoon, in a moderate oven. Curl when nearly cool. *Cream Biscuits*.—7ozs. flour, 4ozs. each pounded sugar and butter, 1 tablespoon cream, 1 egg. Mix well. Roll out thinly. When cooked join together with any desired filling. *Crisp Nutties*.—1 cup each plain flour, flaked oats, dessicated cocoanut, 1 tablespoon golden syrup, 2 tablespoons boiling water, 1 teaspoon C. soda, $\frac{1}{2}$ lb. butter, 1 cup chopped nuts. Mix dry ingredients together. Dissolve syrup, butter, and c. soda in boiling water, and mix all together. Drop teaspoonful on slide and bake. *Cocoanut Biscuit*.—1 cup S.R. flour, $\frac{1}{2}$ cup sugar, 1 tablespoon butter, 1 egg. Roll out, spread with jam, and then spread mixture of $\frac{1}{2}$ cup sugar, $\frac{1}{2}$ cup cocoanut, and 1 egg on top. (Secretary, Miss G. Frost.)

WARRAMBOO.

June 23rd.—Attendance, 10.

THE KITCHEN GARDEN.—Miss E. Steer read the following paper:—"Every home should have a small garden growing vegetables for kitchen use and a few flowers to make the home bright. Not every district has water to use on a garden, but during winter such vegetables as turnips, carrots, cabbages, cauliflowers, onions, lettuces, silver beet, red beet, herbs, a small bed of shallots, thyme, mint, and parsley are a great asset to the kitchen. These can be grown around the tank or in tins where the waste water from the tap can run on them, and there will be plenty all the year round for flavoring soups, sauces, &c. In summer a few tomatoes, cucumbers, melons, and different kinds of marrows in well-worked beds can be grown; these do not need an abundance of water. Of the flowers, geraniums, daisy bushes, and carnations take very little water and always provide a few flowers for the table. The sandy soil will grow almost any kind of vegetables and flowers with care and a little work. Do not forget to have a strawberry and tomato patch for the hot days; they are the daintiest of dishes and very easy fruits to grow." (Secretary, Mrs. M. Steer.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Warcowie	11/7/33	7	Address—J. O. Hatter ..	Mrs. A. Crossman
Warcowie	22/7/33	10	Address—Miss E. Campbell	Mrs. A. Crossman
Warcowie	9/8/33	12	Annual Meeting	Mrs. A. Crossman
Eurelia	20/7/33	34	Address—Matron Pomeroy	Mrs. I. Wall
Penola	2/8/33	45	Annual Meeting	Mrs. F. Kidman
Williamstown ..	2/8/33	8	Annual meeting	Mrs. A. Cundy
Clare	5/8/33	32	Annual Meeting	Mrs. M. McKendrick
Belalie	8/8/33	33	"Hand-made Rugs," Mrs. E. Orchard	Mrs. A. Cummings
Taplan	12/6/33	—	Address—F. C. Richards	Mrs. P. Flynn
Taplan	7/8/33	27	Address—Miss E. Campbell	Mrs. P. Flynn
Taplan	16/8/33	21	Annual Social	Mrs. P. Flynn
Nelshaby	3/8/33	21	"Rugmaking," Mrs. L. Orchard	Miss T. Franks
Mundalla	8/8/33	20	Annual Meeting	Miss M. Kemp
Gladstone	15/8/33	50	Demonstration—Mrs. Wienert	Miss M. Sargent
Warramboo ...	18/8/33	12	Demonstration—Mrs. Chilman	Mrs. H. Steer
Coonawarra ...	16/8/33	24	Annual Meeting	Mrs. F. Skinner
Eurelia	19/8/33	11	Paper from <i>Journal</i>	Mrs. Ewan
Parilla Well ...	18/7/33	21	Annual Meeting	Mrs. J. Johnston
Parilla Well ...	15/8/33	—	Annual Social	Mrs. J. Johnston
Pinnaroo	4/8/33	20	Annual Meeting	Mrs. F. Atze
Parilla	25/7/33	22	Formal	Mrs. R. Welden
Parilla	16/8/33	17	Annual Meeting	Mrs. R. Welden
Auburn	25/8/33	29	Annual meeting	Mrs. T. Dennison

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All communications to be addressed:

"The Editor, Journal of Agriculture, Education Building, Adelaide."

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A. P. BLESING,
Minister of Agriculture.

AGRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Agricultural Bureau Conferences.

Branches of the Agricultural Bureau have been advised that a District Conference will be held as follows:—

Non-Irrigated Fruit Areas, at Nuriootpa, Tuesday, November 7th (Secretary, Mr. C. A. Verrall, Light's Pass).

The Conference will commence at 10.30 a.m.

Kybybolite Field Day, November 10th.

Grafting Affinity of Tokay on Shiraz.

The Viticultural Instructor at Roseworthy Agricultural College (Mr. J. L. Williams), in replying to a query from the Koonunga Branch of the Agricultural Bureau as to the advisability of grafting Tokay on Shiraz, says:—"There is no definite information regarding the grafting affinity between the two varieties mentioned, but so far as my personal observations are concerned, the Shiraz as a stock for grafting purposes is nearly always successful, and the union should prove quite satisfactory. It is advised that the grafting be done some 4-6 inches below the surface soil, providing the stems of the vines will permit the grafting to be carried out at this depth, and also that the soil is comparatively light in texture. It is essential, however, to graft on a portion of the stem which permits a clean placement of the scion variety (Tokay). For very heavy soil it would be best to do the grafting 3-4 inches below the surface soil and to fill in the hollow with a lighter textured soil, forming a complete mound over the graft to a height of 4 ins. above the surrounding soil.

Method.—Tokay cuttings are best buried in a sandy soil for at least a week before use for best results. Grafting is a long and tedious job and demands fairly careful work, so that I should advise not to attempt too much in one season—say 1-2 acres at the outside. This would depend, of course, upon the time and labor one is prepared to give the job. The best time for performing the operation would be about the middle of September or just about the period of bud burst. Saw the stocks off at a spot on the stems where clean unions can be made. Split the stocks down the centre with a grafting chisel provided with a fairly thin blade (can be conveniently made out of an old chaffcutter blade) and hold the cleft open far enough with a narrow wooden hard wedge, to allow two scions to be inserted, one on either side of the stem and flush with the smooth inner bark. Scions should be prepared as follows:—Use average-sized Tokay cuttings and prepare scions, carrying two buds in the form of a double wedge, and commencing the sloping section close to the lower bud and make same about 1½ ins. long. Push two scions in each cleft, one on either side of the stem and flush with the inner bark, and remove the wedge to hold scions firmly in place. Cover the cut surface with a piece of waxed paper to exclude moisture and cover the whole with a mound of earth 3-4 ins. above the normal soil level. Waxed paper can be made by dipping sheets of newspaper in molten grafting wax, made up as follows:—Beeswax 2 lbs., resin 4 lbs., fat 1 lb., linseed oil 1 pint. Melt all together in a suitable container.

Stock shoots or suckers must be periodically removed during the growing season, replacing the mound each time. The mound can be removed at the end of the season or as soon as the scion growth is satisfactory.

Cherry Tree Fungus.

A fruit tree fungus submitted by the Ramco Branch of the Agricultural Bureau to the Chief Horticultural Instructor (Mr. G. Quinn) has been identified as the fructifying stage of the common wood destroying fungus (*Polystictus cinnabarinus*, Fr.), which is

so destructive on stone fruit trees, particularly the cherry and apricot. Mr. Quinn says this fungus almost invariably finds an entrance into the trunk of limbs through unhealed wounds, made by pruning off branches or bruising the bark. In wet districts it frequently enters by reason of bruising made by fruit pickers or pruners standing on the top surfaces of horizontal limbs. In hot districts where bark is killed by sunscald on the top side of a limb, the spores find an entry. When the vermilion-colored bracket is seen protruding through a crack in the bark considerable damage has already taken place. If the dead surface bark be removed, it will be found that the wood beneath has been killed and decomposed into a soft puffy mass.

If seen soon enough, a valuable limb may be saved by excavating out all of the dead decomposed tissue right into the healthy wood, painting the wound with Bordeaux paste, and filling the cavity with cement smoothed to shed water when rain falls.

This is a fungus which may largely be prevented from gaining an entrance to the trees, if bruising be avoided, all pruning wounds be smoothed well, and thickly coated with white lead paint soon after they are made so as to stave off moisture and infection. Where these precautions are observed, and the trunks and limbs of trees are sprayed very thoroughly with Bordeaux mixture or some copper spray each autumn or spring, this fungus seldom obtains a serious foothold.

Algerian versus Early Burt Oats.

Replying to the Secretary of the Butler Branch of the Agricultural Bureau, who asked which oat has the better feeding value for horses, Algerian or Early Burt, the Deputy Director of Agriculture (Mr. W. J. Spafford) says the analyses of hays made of Algerian and Early Burt Oats give the following results:—

	Algerian Oats. Per cent.	Early Burt Oats. Per cent.
Moisture	6.25	6.20
Ash	6.04	5.89
Protein	6.74	5.10
Fat	2.90	2.99
Nitrogen-free extracts	49.27	48.97
Fibre	28.80	30.85
Digestible protein	5.06	3.83
Digestible fat	2.06	2.12
Digestible carbohydrates	31.04	30.85
Digestible fibre	17.28	18.51
Starch equivalent	40.3	39.1
Nutrient ratio	1 to 10.4	1 to 14.1

The figures show that these two hays are very similar in nature. As fattening food-stuffs they are almost identical, the starch equivalent figures being 40.3 for Algerian and 39.1 for Early Burt; but for the production of work, as is required from horses, the Algerian oat hay should be the better of the two because its nutrient ratio is only 1 to 10.4 against a ratio of 1 to 14.1 for Early Burt hay.

Lice in Horses.

Replying to a member of the Geranium Branch of the Agricultural Bureau who reports trouble with lice in horses, Mr. A. H. Robin, B.V.Sc., of the Stock and Brands Department, suggests the following treatment:—“Choose a warm, sunny day (which will bring the lice out more on to the surface of the coat) and wash the affected animal all over thoroughly with warm water to which has been added 2 per cent. lysol or 2 per cent. Cooper's milk oil fluid. Apply the wash with an old scrubbing or body brush so that it can be worked well in through the coat to the roots of the hairs. Then dry out as thoroughly as possible with an old towel or rag. Repeat the washing two or three times at intervals of 9-10 days. If the animals are stabled, so that these premises are liable to be also infested, they should be thoroughly cleaned of all manure

and litter, and then the floor, walls, and fittings well sprayed with kerosene solution. To make this take:—Hard soap, 1lb.; kerosene, 2galls.; water, 4galls. Dissolve the soap in the water, and then add the kerosene, shaking thoroughly till the whole is emulsified. Use 1 part of this emulsion to 8 parts of water. The lysol or milk oil fluid wash will kill off the free lice when brought into contact with them by its application to the animal's coat and skin, but it will not destroy the 'nits' or eggs—no dressing will. It is necessary, therefore, to re-apply the dressing at intervals as above stated in order to kill off each brood of young lice as they hatch out of the 'nits' before they mature and start laying further lots of 'nits'."

VETERINARY INQUIRIES.

[Replies supplied by Veterinary Officers, Stock and Brands Department.]

Clarendon reports cow third calf continually belching whilst being milked.

Reply—The eructation of gas is a frequent occurrence in cattle, and is normal. The frequency and amount depends on the feed. It is more frequent of greenfeed, especially clovers and lucerne. Unless the eructation is accompanied by "bloating" there is no necessity for medicinal treatment. If bloating is present, give 6ozs. of oil of turpentine well shaken up in 2 pints of fresh milk. Give this cow a ration of long hay daily, and a little chaff and bran at milking time.

Secretary, Springton Bureau, reports young sow with scales all over the body.

Reply—Choose a bright sunny day, and give the sow a thorough washing all over with soap and warm water in which has been dissolved 1 dessertspoonful of washing soda to 1 quart of water. Apply with an old scrubbing brush. When all scales, etc., have been removed by this washing, dry thoroughly. Remove pig to fresh, clean quarters, and subsequently twice weekly apply a light dressing to the skin of flowers of sulphur 1 part, lard 4 parts. Dress only about one-third to one-half the body at any one application. Give pig once a week 2ozs. of Epsom salts dissolved in warm milk or swill feed.

Hon. Secretary, Saddleworth, asks why do cows eat bark off trees when they receive an abundance of licks?

Reply—The condition of "pica" or depraved appetite is probably due to a chronic indigestion. It is suggested that if possible a change of pasture be given. A purgative drench should be administered, followed by a course of the following mixture:—Carbonate of iron, 4ozs.; sweet ground bonemeal, 1lb.; powdered gentian, 4ozs.; salt, 8ozs.; powdered fenugreek, 4ozs. One heaped tablespoonful of this mixture should be given three times daily. It should be noted that this mixture contains bonemeal and salt, therefore the administration of these medicaments by other forms (such as licks, &c.) should for the time being be discontinued. In addition to the above mixture give 2 tablespoons of powdered charcoal mixed in with damped feed 3 times daily.

Weavers Agricultural Bureau asks if a calf running with a cow that has mammitis would be affected.

Reply—The calf would not be upset unless the milk from the affected quarters was very bad. Allowing the calf to suckle the cow would, however, very likely serve to spread the trouble to the other quarters of the cow's udder.

Brentwood Agricultural Bureau reports mare 12 years old, paws ground with front legs, and is alternately scoured and constipated.

Reply—The symptoms are those of an indigestion. Give the following drench:—Raw linseed oil, 1½ pints; turpentine, 4 tablespoons; lysol, 1 teaspoon. Failing this give 1lb. honey or 1 pint of new milk. Subsequently give 1 level teaspoon of powdered



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nux vomica on back of tongue three times a day for a few days. Feed lightly on easily digested feed, and give 1 tablespoon of Fowler's solution of arsenic in damped feed night and morning for a fortnight. If possible, also have animal's teeth examined and attended to if necessary.

Palabie Agricultural Bureau has horses with cough, slight discharge from nose, and offensive breath.

Reply—The trouble may be due to an infection of the sinuses of the head, to a diseased tooth, or to a piece of diseased bone at the back of the nose. There is little that can be done in the way of treatment except to control the offensive smell to some extent by steaming the nostrils with steam medicated with eucalyptus or turpentine.

Gawler asks treatment for mares which have not been bred from for some time and are difficult to get in foal.

Reply—The following procedure should be tried:—(1) "Flushing" of the mare by giving better (more nourishing) food. (2) Putting the mare to the stallion towards the end of the heat. (3) One hour prior to service the outer passage should be douched out with a solution of bicarbonate of soda (1 dessertspoonful to each pint). Use solution at blood heat. At the same time rake out any mucus present in the passage. (4) Keep mare quiet (no work) both before and after service. If standing after service, throw cold water over loins and hindquarters. (5) If it is possible to let the mare run in the paddock with a young stallion, there is a much better chance of getting her in foal.

Nunkeri reports:—(1) Horse with persistent cough and discharge from nose and mouth, rough coat, and sluggish at work. (2) Pigs 7 months old making no headway.

Reply—(1) The persistent coughing is probably due to a chronic indigestion. Throw the animal out of work for a few days. Starve for 24 hours, and then place on back of tongue 1 dram calomel and $\frac{1}{2}$ dram aloin. If these drugs are not obtainable, as an alternative give a drench of raw linseed oil, 1 $\frac{1}{2}$ pints; turpentine, 4 tablespoons. Subsequently feed on well damped bran and chaff with a daily allowance of greenfeed. Get a 1lb. bottle of Fowler's solution of arsenic, and give 1 tablespoon in damped feed night and morning until it is all used. See that rock salt is constantly supplied in the feed manger. (2) Wheat, chaff, and water is not an adequate diet for young growing pigs. Cut out the chaff ration and substitute grazing on greenfeed in lieu of it. If skim milk is available feed it liberally, but if not add 5 per cent. linseed meal or meat meal to the diet. One teaspoon of sweet ground bonemeal should be also fed per pig daily mixed in with the trough feed.


Weavers Agricultural Bureau reports 3-year-old gelding lame in hind leg, fetlock swollen.

Reply—Try the following treatment:—Obtain the following lotion from a chemist:—Take lead acetate, 1oz.; zinc sulphate, $\frac{1}{2}$ oz.; water, 2 pints. Dissolve the lead salt in 1 pint of water, the zinc salt in the other pint, mix together, place in a bottle, and shake before use. *To use.*—Have a pad of wool sufficient to go round the fetlock joint and swelling; pour a little of the solution on it; apply to the joint, and bandage fairly tightly, removing once daily and replacing. For a week keep the animal at rest in a stall.

Narridy reports difficulty in getting cows in calf.

Reply—The failure to breed on part of the cows may be due to vaginitis, which disease is very contagious, and readily spread from one cow to another through service by the bull. Try the following treatment:—Douche breeding passage of cows every third day with 1gall. of warm Condry's solution (strength, $\frac{1}{2}$ level teaspoon of crystals to 1gall. water). Continue this treatment until the animals come "in season" again. Then douche with 1gall. of warm baking soda solution $\frac{1}{2}$ hour before service. (Strength of solution, 2 heaped teaspoons of baking soda to 1gall. water.)

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Perdriau
DOUBLE TOUGH
TRUCK TYRES

RESUME OF 12 YEARS PASTURE EXPERIMENTAL WORK AT KYBYBOLITE.

(Paper read by Mr. L. J. Cook, R.D.A., Manager Government Experimental Farm, Kybybolite, at the 44th Congress of the Agricultural Bureau, September, 1933.)

The situation of the work is in our mid South-East, within the 20in. rainfall zone (average falls have been 20½in. per annum for the 12 seasons, 1921-32, inclusive) on soils typical of large areas, rather poor in natural fertility, particularly in regard to the minerals—lime and phosphorus.

Poor physical conditions of soil cause difficulty in growing cultivated crops. Uncertain maturation of cereals, combined with the necessity to build up the organic content of the soils, led to the adoption of livestock as the main farm project.

Pasture being the most important and economical food for livestock, primary attention has been given to pasture development, and our principal experiments have dealt with fertilising of grasses and clovers.

In 1919 our first work of this nature was commenced by top dressing six plots of natural pasture, and to these, 11 plots have been added at various times, and we have complete grazing results from all of these plots during the past 12 seasons, and for the immediate past four years we have studied the development of Comeback ewes, the breeding of lambs, and the production of wool from these variously fertilised natural pasture plots.

Early in this decade we realised the importance of Subterranean Clover, demonstrated by our neighbor, Mr. S. Shepherd, and in 1924 a manurial test was set out on 15 plots of this clover. Recognition of the fact of balancing the pasture ration was observed and Wimmera Rye Grass was sown with all plots of Subterranean Clover in 1924 and in most fields since.

Small trials of all known introduced species of grass, deemed possibly suitable, have been made at different times. *Phalaris tuberosa* has persisted and thrived against all weed competition and grazing conditions for eight seasons. The only other introduced perennial grasses to persist for six or more seasons have been Kikuyu and *Paspalum* grasses, but these only make growth in the warm months of the year; the former quite an appreciable amount, which may lead to its future use on small areas, but the latter makes insufficient growth to warrant consideration.

In carrying out our pasture experiments, reasonable size of plots was adopted, areas from 3½ to 5 acres each, so that each could be treated more or less as a practical field of the farm. Therefore, over a course of years, a true stock carrying capacity can, and has, been obtained, and moreover, we have been able to run sufficiently large flocks to study the development and production of livestock. Also plenty of scope is available for obtaining analytical samples of both soil and plants.

RESULTS OF PASTURE WORK.

THE VARIATION OF PLANT SPECIES AND PERIOD OF GROWTH.

Our virgin soils carry a sward of principally isolated plants of Wallaby (*Danthornia* species), interspersed with a few plants of Spear Grass and tiny plants of naturalised clover. A fair quantity of *Juncus*, moss, and other useless plants are also present. During wet and cold conditions of winter this pasture becomes very dejected; the grass browns off, and is very sickly. Whilst the grass is growing and green sheep gain weight, and produce a fine quality wool, but the dry stalks of summer period are not relished by stock.

When such pasture is improved by top-dressing with phosphates, or with phosphates and lime, there is a gradual alteration on the pasture growths. There is an immediate brightening in appearance, and a fairly quick development of annual naturalised clovers. By the third or fourth season of applications annual clovers will be dominant, and the field covered by a complete sward, consisting of annual clovers and grasses with the rooted Wallaby Grass. The *Juncus*, moss, and other useless plants become subjected, and gradually disappear. In later seasons the annual grasses become more dominant, and the percentage of clovers recedes back to approximately 20 per cent. to 30 per cent. The *Danthonia* plants persist, and increase in health and vigor. The period of growth is earlier, a very quick response being gained from autumn and early winter rains. Although growth is checked in mid-winter, on well-fertilised pasture this check is of much shorter duration, and plants quickly recover and maintain better health. The annual grasses tend to earlier maturity in the spring, and the type of dry feed available in the late summer is not good for maintaining stock in condition. Of later years geranium has appeared in fair quantity on some of the heavier fertilised plots.

These soils when ploughed, cultivated, and sown to Subterranean Clover with sufficient phosphatic fertiliser will quickly establish a sward of dominant clover in two seasons. Practically all natural plants are destroyed. The dominance of clover will disappear after a few seasons, and grasses, such as Sterile and Soft Brome, Barley, and Silver Grass become plentiful. These annual grasses are restricted where Rye grasses or *Phalaris tuberosa* are grown with the Subterranean Clover.

INCREASE IN QUANTITY OF FEED.

This is instanced by the complete thickening of the sward, the greater growth, and subsequent greater carrying capacity. On all top-dressed natural pasture for 12 years there has been an increase of 1.36 sheep per acre per annum over virgin land, and for the immediate seven seasons there has been an increase of 1.58 sheep per acre. On all sown Subterranean Clover and Wimmera Rye Grass pasture plots for the immediate eight seasons there has been an increase of 2.37 sheep per acre per annum over virgin land. The above are the averages of all fertilisations. The best plots have shown increases of 2.33, 2.57, and 3.44 sheep per acre respectively.

IMPROVEMENT IN QUALITY OF FEED.

This is shown by the earlier maturity and greater development of livestock grazing on the improved pastures, the higher lambing percentages, greater wool production of sheep, and the greater milk production of cows. As regards maturity Comeback ewes grazed on virgin land were three years of age before they reached an average live weight of 100lbs. each. Similar type ewes grazed on top-dressed virgin land reached 100lbs. live weight at 27 months of age, whilst others grazed on well-fertilised Subterranean Clover and Wimmera Rye Grass pasture were 100lbs. live weight at 14 to 15 months of age.

With reference to greater development, ewes grazing on sown pasture for three seasons (two-tooths) have shown 16 per cent. greater average live weight than similar ewes grazing improved natural pasture; for two seasons four-tooth ewes have shown 23 per cent., and for one season six-tooth ewes have shown 21 per cent. greater average live weight. Hence it is definite that on sown pasture ewes show 20 per cent. better development than on top-dressed natural pasture. Comparing similar type ewes for two seasons on virgin land and improved top-dressed virgin land, we find that six and eight tooth breeding ewes have maintained 10 per cent. better average live weight (106.22lbs.) on the latter, against 96.88lbs. on unimproved pasture.

As regards lambing, for two seasons the percentage of marked lambs has been 19½ per cent. better from sown pasture than top-dressed natural pasture, and for three seasons the percentages from top-dressed natural pasture have averaged 40 per cent. greater than from virgin land. The weights of lambs at weaning from sown pasture have been 24 per cent. greater than from improved natural pasture. Those from improved natural pasture, however, were 7 per cent. lighter than those grazed on unimproved land. This is undoubtedly due to the rapid ripening of annual naturalised grasses and clovers, and their poor nutritional qualities when dry. The lambs were all dropped in the spring.

The wool production from sown pasture has been 21 per cent. greater per head from two-tooth ewes (three years average), 14 per cent. greater from four-tooth ewes (two years average), and 3 per cent. greater from six-tooth ewes (one year only) than from ewes on improved natural pasture. This is an all round average increase of 12½ per cent. per head in weight of wool. The production per head from top-dressed natural pasture compared with unimproved pasture has not been great. During a three-year period the difference has been only 4 per cent. in favor of top-dressed land.

Comparative figures are not available for milk production, as virgin land is not at all suitable for cattle, and top-dressed natural pasture would be suitable only for a short period of the year. Sown pastures of Subterranean Clover, Rye Grass, and *Phalaris*, however, are proving very good for the carrying of milking cows, and some high production figures are being produced from these pastures.

IMPROVEMENT IN SOIL TEXTURE AND PHYSICAL CONDITION.

This is obvious, as the vast extra amount of root growth produced in the soil from the complete swards of pastures is gradually binding the soil and increasing the organic content so that stock can graze over the land at practically any period of the year, irrespective of the amount of rainfall. The soil becomes a better medium for life, consequently bacteria and living organisms are vastly increased in the improved soils. Further, the improvement enables cultivation of the soil to be done earlier in the spring and later in the autumn without risk of breaking down the soil texture.

RESULTS OF VARIOUS FERTILISERS ON THESE PASTURES.

SUPERPHOSPHATE.

Superphosphate is undoubtedly the most important fertiliser. Improvements can be obtained with various clovers and grasses, but without liberal dressings of phosphatic fertilisers results will be small, and water soluble phosphate is the best as it is most economical for quick returns. Quantitative test on both natural and sown pasture are being carried out with the following results up to date:—

Fertiliser per Acre.	Natural Pasture. (4yrs. average.) Sheep per Acre.	Fertiliser per Acre.	Sown Pasture. (5yrs. average.) Sheep per Acre.
51lbs. super. (10½lbs. phos. acid)	2.88	45lbs. super. (9½lbs. phos.)	2.91
90lbs. super. (18½lbs. phos. acid)	3.25	90lbs. super.	4.42
180lbs. super. (37lbs. phos. acid)	3.45	180lbs. super.	4.98
No manure	0.92	No manure	1.15

These results have been compiled from figures obtained during the immediate past four and five years, that is, the first few years of development have not been considered, so that the figures show the results obtained when various quantities of 45 per cent. superphosphate have been applied to established pastures. The figures decisively show that the more water soluble phosphate applied the

greater has been the return in feed. The most economic amount to apply at present prices would appear to be 90lbs. 45 per cent. superphosphate per acre annually. They also show that much greater return is secured from this superphosphate when used on Subterranean Clover sown pasture.

The next table shows the increase in sheep carried and money value when 90lbs. 45 per cent. superphosphate has been applied to both pastures for nine seasons in succession. Figures have been taken from the year of commencing. The annual cost of superphosphate has been averaged at 5s. 6d. per acre to cover cost of freight and application to the land, and sheep have been valued at the low average price of 10s. each per annum.

	Natural Pasture.				Sown Pasture.			
	Increase above No Manure. Sheep per Acre.	Value.			Increase over No Manure. Sheep per Acre.	Value.		
1st year	0.01	1d.	Loss	5/5	Crop—no grazing	—	Loss	5/6
2nd year ...	0.37	3/8	"	1/10	0.99	9/11	Profit	4/5
3rd year ...	1.14	11/5	Profit	5/11	1.77	17/8	"	12/2
4th year ...	0.97	9/8	"	4/2	1.11	11/1	"	5/7
5th year ...	1.80	18/-	"	12/6	2.70	27/-	"	21/6
6th year ...	1.41	14/1	"	8/7	3.36	33/7	"	28/1
7th year ...	1.97	19/8	"	14/2	3.03	30/2	"	24/8
8th year ...	2.76	27/7	"	22/1	3.98	39/9	"	34/3
9th year ...	2.85	28/6	"	23/-	3.30	33/-	"	27/6
%increase ..	207%				172%			
Total profit				83/2				152/8
Profit per year per acre				9/3				16/11

If an allowance of 25 per cent. is made for the size of fields the profits would still show at approximately 7s. and 12s. 8d. per acre per year. Further, the above does not take into account the increased individual value of sheep and wool produced, so that actually the profit would be greater. With sheep on virgin land valued at 10s. each those on sown pasture would be easily worth 12s. each. The next table shows the production of Comeback ewes for the first three years of life, comparing Flock A (nine ewes) reared on unfertilised clover and natural pasture, with Flock B (26 ewes) reared on natural pasture fertilised with superphosphate, and with Flock E (20 ewes) reared on clover pasture fertilised with superphosphate:—

	Flock A on Unmanured Pastures.	Flock B on Natural Pastures Fert. with Super.	Flock E on Clover Pastures Fert. with Super.
Average monthly live weight of ewes from 8 months to 3 years old	87.80lbs.	90.91lbs.	106.88lbs.
Average yearly wool production per head	8lbs. 2ozs.	8lbs. 4ozs.	9lbs. 5ozs.
Average lambing percentage (2 years)	55%	74%	83%
Sheep carried per acre annually.....	1.09	3.19	4.20

The sheep in the above flocks have been wholly grazed on their respective types of pasture, and have received no other feed or licks. They have been grazed under a rotational system, and only for short periods during the mating seasons have they grazed elsewhere than on the plots assigned to them.

The wool production per acre per annum of the three flocks has been as follows:—

	8lbs. 14ozs. from unmanured pasture.
	26lbs. 5ozs. from natural pasture plus superphosphate.
	39lbs. 2ozs. from Clover and Rye pasture plus superphosphate.

LIME AND SUPERPHOSPHATE.

Lime has been used at the rate of 1 ton per acre on pastures every 10 years and combined with usual applications of superphosphate. One plot (P3) of natural pasture was dressed with lime in 1919 and 1929, and has received 1cwt. 36 per cent. superphosphate annually. Another plot (P10) of natural pasture was dressed with lime in 1924, and has received 1cwt. 45 per cent. superphosphate annually. One plot (C7) of Subterranean Clover and Wimmera Rye Grass was dressed with lime in 1924, and has also received 1cwt. 45 per cent. superphosphate annually. The grazing results from these are summarised as follows:—

	Sheep Carried per Acre per Annum.	Increase Over No Manure.	Increase Over Super. only.
Plot P3, 12-year mean.....	3.15	2.33	0.82
Plot P10, 7-year mean.....	2.81	1.92	0.17
Plot C7, 8-year mean	4.36	3.47	0.36

Results show a large improvement over no manure, but only a comparative slight increase over superphosphate dressed plots. The feed, however, on these limed plots has been earlier, and has contained a higher percentage of grass to clover than phosphate only dressed plots. More feed has been provided during the winter months where lime has been applied. Particularly has this fact been evidenced on the sown pasture, where annual grasses have grown more strongly and in greater dominance. The following two graphs show an interesting comparison of the effect of lime and superphosphate with superphosphate only on Subterranean Clover pasture.

Graph 1 shows a greater production of feed from superphosphate only during the early years of application, but the steady and continued increase of feed from lime and superphosphate shows a greater production during the last four seasons.

Graph 2 shows the average monthly grazings received for eight seasons from the two fertilisings, illustrating the better carrying capacity of the lime and superphosphate dressings during the months of June, July, and August.

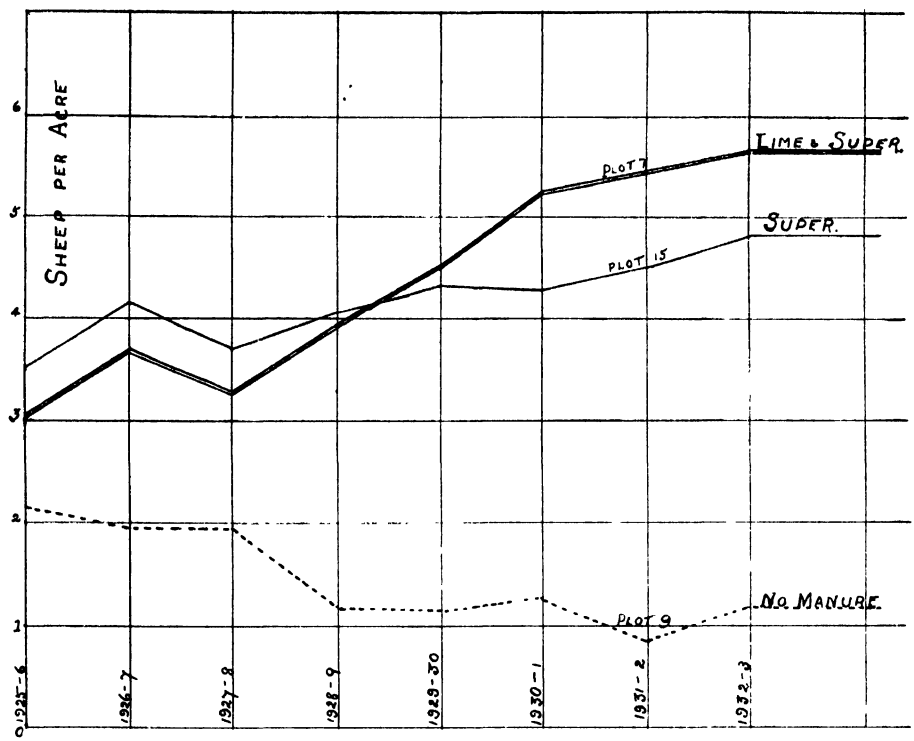
The next table shows the production of Comeback ewes for the first three years of life, comparing Flock A on unmanured pasture with Flocks C and I reared on natural and clover pasture respectively, both fertilised with lime or gypsum and superphosphate.

	Flock A on Unmanured Pastures.	Flock C on Natural Pastures Fert. with Lime and Super.	Flock I on Clover Pastures Fert. with Lime and Super.
Average monthly live weight of ewes from 8 months to 3 years old	87-80lbs.	93-18lbs.	107-84lbs.
Average yearly wool production per head	8lbs. 2ozs.	8lbs. 7ozs.	9lbs. 3ozs.
Average lambing percentage (2 years)	55%	80%	76%
Sheep carried per acre annually.....	1.09	3.45	4.92

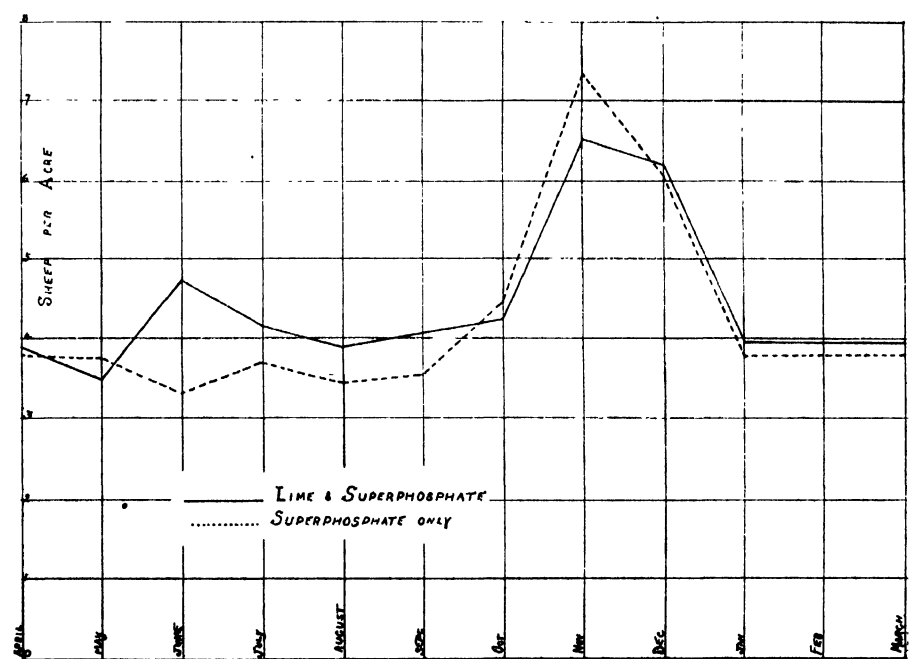
When these figures are compared with the similar table given under heading of superphosphate, it will be noticed that there is not much variation individually between ewes reared on lime and superphosphate fertilised land with those reared on land fertilised with superphosphate only. On account of the extra sheep carried per acre, however, the yield of wool per acre is greater from lime and superphosphate dressed pasture as shown by following figures:—

26lbs. 5ozs. super only.	29lbs. 1oz. natural pasture plus lime and super.
39lbs. 2ozs. super only.	45lbs. 3ozs. from clover pasture plus lime and super.

These small increases of 2½lbs. and 6lbs. respectively show that unless a cheap source of agricultural lime is available the expense of its use is not at present warranted on these sheep pastures.



Graph 1.—Showing Comparison of Sheep Carrying Capacity on Subterranean Clover and Wimmera Rye Grass Pasture Fertilised with Lime and Super and Super only, 1925-32.



Graph 2.—Showing Sheep per Acre Carried Monthly for 8 Years, 1925-1933 on Subterranean Clover and Wimmera Rye Grass Plots, Nos. 7 and 15.

CRUSHED ROCK PHOSPHATE.

Local low-grade rock phosphates of both aluminium and calcium phosphates have been tested from six to 10 years on natural pasture, and the 82 per cent island phosphate has been tested on both natural and sown clover pastures.

Comparing the results of the two low-grade rocks over a 10-year period aluminium phosphate carried 1.83 sheep per acre, and over the same period a similar dressing of calcium phosphate carried 1.87 sheep per acre. A small difference from which it is apparent that phosphorus is the all-important substance, and that the base with which it is combined has only a small if any effect.

In using this acid soluble form of phosphate as it occurs in rock phosphates it is necessary to apply fairly large quantities initially, and either follow with large quantities at comparatively long intervals or follow with small applications annually. The effect of these dressings on natural pasture so far favors the former, as the greatest return has been received from large applications applied every 10 years, as the following figures show:—

	Sheep Carried per Acre. (12yrs. average.)	Increase over No Manure.	Per Cent. Increase.
Calcium phosphate rock—			
Two applications, 10 years apart—420lbs. phos. acid per acre each application	1.98	1.16	141
The same fertiliser—232lbs. phos. acid applied initially and 21lbs. applied annually since	1.85	1.03	125
Check plot—No manure	0.82	—	—

These results show good improvement but not nearly as much as given by water soluble phosphate. As a definite comparison of water and acid soluble phosphates consider Plots Nos. P2 and P4. From 1919-25 these had received approximately the same amount of phosphoric acid in the acid soluble form, namely, 351lbs. to P2 and 359lbs. to P4, and both had carried approximately the same stock, 1.73 and 1.76 sheep per acre per annum. Commencing in 1926 an application of 51lbs. water soluble, that is 10½lbs. phosphoric anhydride, has been given annually to Plot P2 whilst P4 has continued to receive 56lbs. island phosphate, that is 21lbs. acid soluble phosphoric anhydride annually, just twice the quantity of phosphorus. The grazing for the subsequent seven seasons shows P2 1.65 sheep per acre better than the check plot, and P4 1.03 sheep per acre better, which is a 60 per cent. increase in favor of water soluble phosphate even when applied in half the quantity.

The results of applying island rock phosphate to Subterranean Clover and Wimmera Rye Grass pasture are as follows:—

	Sheep per Acre. (8yrs. average.)	Increase over No Manure.	Per Cent. Increase.
Rock phosphate (two plots) equal 28.7lbs. phos. anhydride annually	3.28	1.81	123
Superphosphate (three plots), 26lbs. phos. anhy- dride annually	4.05	2.58	175

These results show that the sown pasture responds better to phosphatic fertiliser in the water soluble form.

EPHOS PHOSPHATE (61 PER CENT. PHOSPHATE).

In 1924 two five-acre plots were dressed with this fertiliser, one of natural grass, and one of sown clover and rye grass. Each plot received a 6cwts. per acre dressing, approximately 188lbs. phosphoric anhydride, 82 per cent. of which would be in the acid soluble form, about 16 per cent. citrate soluble, and 1½ per cent. to 2 per cent. water soluble.

Grazing figures are available from 1925, and are as follows:—

	Sheep per Acre, 8 Years Average.	Increase Over No Manure.
Natural Pasture	2.02	1.14 (130%)
Sown Pasture Subt. Clover and Rye Grass	4.00	2.53 (172%)

These returns show this fertiliser to have yielded almost equal to superphosphate on sown pasture, but only slightly better than rock phosphate on natural pasture. The average of the two, therefore, shows that the yield from the fertiliser is somewhat commensurate with the availability of its phosphate content.

CRUSHED LIMESTONE AND SUPERPHOSPHATE.

In 1926 one five-acre plot of natural pasture was dressed with 1 ton crushed Mount Gambier limestone per acre, and has received 1cwt. superphosphate annually since. The mean sheep carried per acre for seven seasons has been 2.78, which is 1.89 more than check plots over the same seasons, and only 0.14 more than superphosphate dressed plot. The yield is slightly less than that from lime and superphosphate, and future yields will be noted to see whether the limestone will have the same lasting and increasing benefit secured from lime.

GYPSUM AND SUPERPHOSPHATE.

Also in 1926 a dressing of 1 ton gypsum per acre was applied to a plot of natural grass, which has also received 1cwt. 45 per cent. superphosphate per annum. The mean sheep carried for seven seasons has been 2.42 per acre or 1.53 more than check plot of no manure but less than superphosphate only plot.

In 1928 a plot of sown clover and rye was dressed with gypsum and super, resulting in a mean yield over five seasons of 4.65 sheep per acre, compared with 4.97 for lime and superphosphate, and 4.42 for superphosphate only. So far as results show at present gypsum is not as productive as agricultural lime.

POTASH.

Potash has been tested on sown pasture for eight seasons, applying 37lbs. 90 per cent. sulphate of potash per acre per annum to two five-acre plots, one solely dressed with potash, and the other dressed with rock phosphate as well. The grazing results from these have been:—

	Sheep per Acre per Annum.	Increase Over No Manure.	Increase Over Rock Phosphate Only.
Potash-dressed plot	2.32	0.85 (58%)	—
Potash and Phosphate dressed plot	3.54	2.07	0.48 (16%)

These results show increases of $\frac{1}{4}$ to $\frac{3}{4}$ sheep due to potash, which would cover cost of fertiliser, but nevertheless the same money spent on superphosphate would bring in much greater return.

NITROGEN.

Of recent years work has been commenced with artificial nitrogen fertilisers in conjunction with the Nitrogen Fertilisers Pty., Ltd. For two seasons on Subterranean Clover and Wimmera Rye Grass pasture on a series of eight four-acre plots, nitrogen and superphosphate have been tested against superphosphate only. Both sulphate of ammonia and calcium nitrate fertilisers were used, and a noticeable difference in quickness of growth was caused by the nitrogen, although no variation could be detected between the effects of the ammonia and the calcium nitrate. The pastures on all eight plots were good, well established some five seasons earlier, and cattle were used to graze them. For the two seasons the nitrogen and phosphate dressed plots average nearly $\frac{1}{2}$ cow per acre (0.48), and the four phosphate only plots carried 0.41 cows. This gain of 0.07 cow per

acre per year (17 per cent. increase) scarcely covered cost of fertiliser even when allowance was made for the slightly better feed available in the winter months. Further work with these fertilisers is being carried out on sown pastures of certified Perennial Rye Grass, *Phalaris tuberosa*, and Clover.

PERENNIAL GRASSES.

The foregoing shows that fertiliser and Subterranean Clover have greatly improved the growth of grass and livestock. The naturalised grasses that have benefited are principally Sterile Brome, Barley, and Silver grasses. These provide useful winter and early spring feed, but mature early, providing dry feed in the summer, which is not of best quality, and has objectionable seeds that trouble livestock. By judicious use of the mower a lot of this growth can be conserved in a nutritional and palatable state, as ensilage or hay. By sowing Wimmera Rye Grass in the fields, a strong competitor against the naturalised grasses is available, and the objectionable seed trouble can be reduced.

Perennial grasses have a better ability to compete and subject annual plants, and some work has been done to find types or strains of perennial grasses able to produce the quantity of food, and persist under present fertility and climatic conditions. They respond quicker to summer and autumn rains, and provide a useful bite of green when much needed; but it is important that this be not provided at the expense of subsequent winter feed. From trials so far, only two perennials appear to be suitable, namely, *Phalaris tuberosa* and Perennial Rye Grass.

PHALARIS TUBEROSA.

Phalaris tuberosa has proved exceptionally persistent in small trials, and in 1930 a five-acre plot was established to give it proper field trial, and indications show great promise of it providing, with Subterranean Clover, the good quantity of feed, persisting well, and keeping the annual grasses somewhat in subjection.

The grazing result for the three seasons has been:—

1930-31	1.64 sheep per acre
1931-32	3.52 sheep per acre
1932-33	3.82 sheep per acre

These results, obtained from bare fallowed virgin land, show as quick production of good class pasture as yet obtained. Plants were well established by using only 2lbs. seed per acre, and up to date there has been no noticeable death of plants. They have lived through three summers and four winters quite successfully. This winter there was only a slight browning of a small portion of leaves of the plants. Subterranean Clover is growing well amongst the plants of grass, and providing ample nitrogen for their use. The field has received 1cwt. 45 superphosphate annually. It is important to mention that thorough soil preparation is necessary to establish this grass, the soil needs to be clean and in good condition, and seed sown on a well-prepared bed.

Wimmera Rye Grass sown under similar conditions as above plot has not given greater quantity of feed.

In fact, the results compare equally favorable with the best returns secured from Wimmera Rye and Subterranean Clover established on old cultivated land.

PERENNIAL RYE GRASS.

Perennial Rye Grass has given some useful results. It makes quickest response from summer and autumn rains, but does not maintain the healthy winter growth of *Phalaris tuberosa*, or the annual grasses. Trials in the past with commercial seed have shown a lack of ability to persist after the third season. Of recent seasons certified New Zealand seed has been used, and it is hoped that by the aid of clover growths to keep sufficient nitrogen supply up to the Perennial Rye

plants, and enable them to make longer life. The browning off, and, in extreme cases, the death of Perennial Rye grass plants during the winter months, is a serious matter under our conditions, and emphasises the necessity for readily available organic nitrogen. Factors most apparent at the present stage of our work are:— Firstly, the strict importance of growing clover with Perennial Rye; and secondly, the obtaining of comparatively thin stands of plant, with seedings of 2lbs. to 4lbs. certified seed per acre.

Work is in hand in conjunction with the Australian Dairy Council, trying out many strains of Perennial Rye and *Phalaris*, and it is anticipated to make careful selection of strains that are highly productive and persistent.

TEMPORARY PASTURES.

Some work on temporary pastures of one, two, three and four years' duration is being carried out amongst our various rotational cropping tests, but little of a definite nature has yet been finalised.

Ploughing and cultivating soil has its sweetening action, that is, aerates the soil, and deepens the medium for growth of roots, and for the work of the bacterial life of the soil. Just how much, and how often cultivation is necessary for the best continuous production of our pastures is a matter needing a lot of further investigation, and will probably vary with the type of plants used in the pastures.

So far as our Kybybolite work has gone, we can definitely state that under our present state of fertility, at all events a one-year temporary pasture is not warranted. A number of types of plants have been tried as one year leas, such as Red Clover, Crimson Clover, and King Island Melilotus, and of these the latter where lime has been applied to the soil has given best results but not a substantial one.

Similarly a two-year pasture has not up to the present indicated satisfactory results. Plants tried under this system have been Subterranean, Alsike, Yellow Trefoil, and White Dutch Clovers, Sheep's Burnet, Italian and Perennial Rye Grasses, and of these Subterranean Clover and Perennial Rye have given greatest growth, but not nearly as much feed as when left for longer leas. Better initial soil preparation, with subsequent longer pasture duration, is warranted.

A three-year lea of Subterranean Clover has been tested for a number of seasons on 30-acre fields, with the following grazing results:—

	Sheep per Acre per Annum.
First year after crop (9 years mean)	2.53
Second year after crop (8 years mean)	2.59
Third year after crop (7 years mean)	2.76
Continuous grazing, Field 18 (8 years mean).....	2.70
Continuous grazing, Field 12 (7 years mean).....	2.78
Continuous grazing, Field 20 (5 years mean).....	2.55

The above results are approximate, as it has not been possible to maintain complete grazing of larger fields, similarly as we have done with experimental plots of five-acre areas. However, the figures indicate rather plainly that whilst Subterranean Clover fields have not been greatly reduced by breaking up the land for cropping after three seasons lea, the yields most certainly have not been increased. It is noticeable that the yield of pasture has been greatest during the third season after cropping in five seasons out of seven. Fields such as Nos. 12 and 18, which are of comparative size, and have received approximate equal fertiliser dressings and somewhat similar grazing conditions, have, under continuous grazing, maintained a greater annual carrying capacity.

We can conclude, therefore, that so far as Subterranean Clover pasture is concerned, provided it is top-dressed and handled well, there is no advantage to be gained in breaking up the soil at comparatively short intervals.

HEALTH OF STOCK.

Before concluding remarks on pastures, something relative to the health of livestock is perhaps appropriate. No definite work regarding the prevention or treatment of disease in stock has yet been undertaken on the farm, but of recent years a record of the losses of sheep on the pasture plots has been kept. Incidentally, the sheep grazing on these plots have been managed under the system of rotational grazing during the growing period of grass and clovers. This is essential both as an aid to the maintenance of health of both livestock and pastures.

Considering ewes that have been born and reared on the Subterranean Clover and Wimmera Rye Grass pasture plots and who have received no other feed than that obtained from these pastures, the losses for the past three seasons have been:—

		%
1930	2 deaths in flocks of 54 ewes	3.7
1931	7 deaths in flocks of 90 ewes	7.78
1932	4 deaths in flocks of 129 ewes	3.10
Average loss for 3 years		<u>4.86</u>

Of the above, the losses occurring amongst 1929 spring drop ewes have been 4.5 per cent., those amongst 1930 born ewes 7.7 per cent., and from the 1931 born ewes there has been no losses. All of these deaths occurred in the late winter and spring of the year, and the majority were apparently due to entero-toxaemia.

Considering ewes that have been reared on improved natural pasture, and who have received no other feed since eight months of age, the losses have been as follows:—

		%
1929	1 death out of 78 ewes	1.28
1930	0 deaths out of 89 ewes	0
1931	0 deaths out of 93 ewes	0
1932	2 deaths out of 101 ewes	1.98
Average loss for 4 years		<u>0.82</u>

Two of these deaths occurred in the spring and one in the summer, and were accounted to digestive disorder.

From the above results it appears that sheep grazed on natural pasture are the more healthy, but in general appearance of the sheep this is not so apparent. The loss of less than 5 per cent. on clover land is not great, and from an economic point does not much detract from the value of the pasture. When allowance is made for these losses, our results show increases of 28 per cent., 39 per cent., and 15 per cent. for 1929, 1930, and 1931 ewes respectively in wool production per acre for sown pasture over improved natural pasture.

MISCELLANEOUS PASTURE MATTERS.

PASTURE HARROWING.

Although some pasture harrowing, principally in cow paddocks, has been done, no definite experimental data has yet been collected.

ROTATIONAL GRAZING.

Some rotational grazing of plots by the milking herd, and a good deal by sheep, have been carried out during the past eight seasons on growing pastures, but no definite test has been set, or data collected.

MEADOW HAY AND ENSILAGE.

Ensilage and meadow hay have both been made from the pastures by modern methods, but, except for yield per acre over a few seasons, no data is available. In 1932 fields closed from livestock for three months of spring cut 9 tons 6½cwts. greenstuff per acre, which made a really first-class ensilage.

The average yield of meadow hay over the immediate past six seasons has been 1 ton 16cwts. 78lbs. per acre. In two seasons the yield has been over 2 tons per acre, and in only one season has the return been less than 32cwts.

DAIRYING.

One of the principal results of our pasture work has been the definite development of ¼ sheep per acre land into good dairying conditions. Good pasture makes first-class ensilage, and this enables succulent feed to be provided for milking cows during the whole of the year. Meadow hay, when properly made, is a very nutritious food, and provides necessary dry feed during the winter months. Oats and barley grains can readily be grown on the clover leas, and, with the possible exception of bran, all feeds necessary to produce a constant supply of milk all the year can be produced at comparatively cheap cost.

Under official test, our Ayrshire herd has produced the following figures during the past five seasons in connection with the State Gold Medal Competition:—

1928-29	24 cows	312-32lbs. butterfat per cow
1929-30	25 cows	308-68lbs. butterfat per cow
1930-31	28 cows	341-75lbs. butterfat per cow
1931-32	27 cows	327-92lbs. butterfat per cow
1932-33	29 cows	338-66lbs. butterfat per cow
Mean for 5 years		325-87lbs. butterfat per cow

These figures prove the suitability of present conditions for dairying, and as our herd of approximately 40 milkers only use 90 acres of sown pasture areas, it is significant that land which previously carried ¼ to ¾ sheep per acre is now producing from 100 to 150lbs. butter fat per annum.

FAT LAMB PRODUCTION.

A preliminary experiment has been commenced this season, testing the production of lambs from our Comeback ewes, mated with rams of the Suffolk, South-down, Dorset Horn, and English Leicester breeds.

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GRASS SEED PRODUCTION.

Trial of a comprehensive collection of strains, principally of Rye grasses and *Phalaris tuberosa*, was commenced in 1932. Details of their growths are being made, and subsequently selection and isolation of the best productive and persistent strains will be made. This work has been made possible through the grant made to us by the Australian Dairy Council.

The Waite Research Institute commenced work in conjunction with us in 1929, and various experiments dealing with pasture species and mixtures, manurial, sheep and wool production are in hand.

SUMMARY.

1. Top-dressing with phosphates causes a dominant growth of clover for a few seasons; subsequently grasses thrive, and the pastures become more balanced.
2. Phosphatic fertiliser greatly increases both the quantity and quality of feed.
3. Sheep mature earlier on top-dressed natural pasture, and earlier still on well fertilised sown clover and Wimmera Rye Grass pasture.
4. Sheep maintain 20 per cent. better development on clover and Rye Grass pasture.
5. Lambing percentages have averaged $19\frac{1}{2}$ per cent. greater on these pastures.
6. Wool production has been $12\frac{1}{2}$ per cent. greater per head on sown pasture than on top-dressed natural pasture, and $16\frac{1}{2}$ per cent. greater than on unimproved land.
7. Continued applications of 90lbs. 45 per cent. superphosphate per acre per annum have proved the most economic phosphatic fertiliser dressing, increasing carrying capacity 200 per cent. over period of nine seasons.
8. Superphosphate has increased the wool production from 8lbs. 14ozs. per acre on unmanured pasture to 39lbs. 2ozs. per acre on clover and rye pasture.
9. Lime with superphosphate has further slightly increased the carrying capacity, and causes more growth in the colder months of the year, and has increased the wool production a further 6lbs. per acre.
10. Rock Phosphate has increased carrying capacity 120 and 140 per cent.
11. Ephos Phosphate has increased carrying capacity 130 and 170 per cent.
12. Potash has increased carrying capacity 37 per cent.
13. Artificial Nitrogen fertiliser has increased carrying capacity 17 per cent., and caused slightly more winter growth.
14. *Phalaris tuberosa* is proving a most persistent and prolific perennial grass.
15. Perennial Rye Grass gives quick response to summer and autumn rains, but fails somewhat in winter feed.
16. Subterranean Clover pastures, provided they are well fertilised and managed correctly, are not improved by breaking and cropping the land at short intervals.
17. On Subterranean Clover and Wimmera Rye Grass pastures the average loss of sheep for three seasons has been 4.86 per cent.
18. On improved natural pasture the average loss of sheep for four seasons has been 0.82 per cent.
19. Pastures benefit by mowing, and the average yield of meadow hay over six seasons has been 1 ton 16cwts. 78lbs. per acre.
20. Improved clover pastures are proving suitable for dairying.

THE MEAT EXPORT TRADE.

(An Address delivered by MR. H. J. COPLEY, Chairman Stock Salesmen's Association, at the 44th Congress of the Agricultural Bureau, September, 1933.)

COMMENCEMENT AND DEVELOPMENT.

The meat export trade of Australia has been carried on in the past with varying success. The principal outlet has always been the markets of Great Britain, and the enterprise has had to meet strong competition and often superior organisation. The building up of a large stable and permanent trade has been the desire for many years.

The primary cause of the retarding of the progress hoped for has been the lack of proper organisation so essential to the success of a great undertaking of this nature. However, there is now an opportunity presented to the Commonwealth to establish a permanent and extensive industry with Great Britain on lines which have not previously been possible.

Export of meat has been carried on by many countries for a long time past, and as we all know, it is no new idea. We can go back to the days of the great Francis Bacon, who had a prophetic glimpse of what the chilling of foodstuff might do to make human life more agreeable. His fatal illness in 1626 was brought on by stuffing a fowl with snow to see how long decay could be prevented.

But it is only just more than half a century ago that large scale refrigeration made it possible to bring over the first cargo of frozen meat from the Antipodes to Great Britain.

Much progress has been made in the carrying of meat overseas, and science has come to the rescue with an astonishing degree of success which is opening up a new era for Australia's meat export trade. In addition to this we have other great factors which ally themselves to make up the opportunity which is now presented to this country.

OTTAWA AGREEMENT.

There has been an ever-increasing movement fostered to increase trade within the Empire, and this great thought has been crystallised by the Ottawa Agreement, whereby it was agreed between the delegates from Great Britain and the Dominions to restrict the imports of foreign meat into Great Britain, and at the same time to give preference to Empire meat on the quota system and allow for reciprocity in trade within the Empire generally. The opportunity came with the meat glut last year in the English market, which was the climax.

The quota allowed to Australia is admittedly liberal, and England to-day is scrupulously fulfilling her undertakings, and the obligation is now upon Australia to do her part.

Up to June 30th, 1933, 1,713,523 carcasses have gone, with 2,586,477 still to be sent if available. The quota for 1933 is 4,300,000 carcasses of mutton and lamb, which would be the highest ever shipped, but it is very unlikely that this total will be reached. This is not vital, as it must be borne in mind that the quota system was introduced to assist home-killed meat in England, and if we are short in delivery it will benefit the British producer, which is one of the objects. After June 30th, 1934, there will be no quota so far as Australia is concerned—we can ship all we produce. It can be safely assumed that from now on the Agreement will be a great help to Australian stock values. The progressive restrictions upon foreign imports are now becoming effective. These are as follows:—

	Per cent.
For quarter ending March, 1933	10
For quarter ending June, 1933	15
For quarter ending September, 1933	20
For quarter ending December, 1933	25
For quarter ending March, 1934	30
For quarter ending June, 1934	35

Are we going to respond to the invitation and seize the opportunity offered us in a reciprocal spirit? For I say definitely "that a tariff that does not foster the true spirit of reciprocity is uneconomic and will not succeed."

It is acknowledged that our efforts can be centred almost wholly in this market. Great Britain has to import half the meat which is consumed. Practically none of it could reach there if it were not for cold storage. It is for this reason that Britain leads the world in refrigeration research. The consuming power of Great Britain can be gathered from the following figures, which show the amount of meat used (per annum):—

An examination of these figures shows that England produces more than 50 per cent. of the total. On the other hand, some extent of the market can be estimated from the foregoing.

An effective organisation in Australia is essential for success and the appointment of a Commonwealth Meat Export Board is imperative. The personnel should be selected from those directly interested in all spheres of the industry and should be conducted independent of political control.

(c) Levy on export carcasses for publicity purposes.

Whilst the Crossbred ewe mated to British breed rams is ideal, it is recognised that sufficient numbers of the former are not available in this State, and the substitution of large-frame station Merino ewes is the only course. These should be carefully selected for the purpose. When exporting, all Merino lambs should be placed in a separate class to British breeds.

The market to-day shows a preference for light-weight lamb, which is the reverse of a few years ago when the heavy class was in favor. That we can produce the types is beyond doubt. The lambs shipped in 1932 were the finest ever sent by any country to Great Britain from this State.

PORK.

There is undoubtedly a large field for development in the export of pork, and growers are strongly urged to take active steps to enter this trade, but it is necessary to follow closely the requirements of the English market. The advice given by the Trade Commissioner in a letter dated July 27th gives a constructive criticism on the recent consignment to England. The comments, if closely studied, convey very valuable advice to growers. It will be noted that the heavy fat pig is not wanted. Breeders must get down to a type as in the lamb trade and carefully watch conformation, which is so necessary.

The pork trade is a business which can be maintained continuously throughout the year, and the objective of growers should be to accomplish that task.

UNITED KINGDOM IMPORTS OF PORK PRODUCTS.
Statistics Published by Ministry of Agriculture, England.
 Volume LXVI., Part II.

	1929.		1930.		1931.	
	£	cwts.	£	cwts.	£	cwts.
Pork .	4,171,000	970,000	4,603,000	1,074,000	4,155,000	1,160,000
Bacon	43,742,000	8,278,000	41,152,000	9,191,000	33,130,000	11,134,000
Ham	5,473,000	1,029,000	4,960,000	1,003,000	3,217,000	831,000
Lard .	7,807,000	2,621,000	6,853,000	2,505,000	5,911,000	2,549,000
	£81,193,000	12,898,000	£57,568,000	13,773,000	£46,413,000	15,674,000
		(6,449,000 tons)		(6,886,500 tons)		(7,837,000 tons)

January to April, 1933—

Imports of pork into—

	Cwts.
United Kingdom (total)	248,000
Australian	23,000
Other countries	225,000
1932.	
Total imports	603,000
Australia	603,000
Other countries	557,000

Reference: "Monetary and Economic Conference, British Delegation, 1933," page 51.

COOPER CUP.

Retailers in Great Britain are showing willingness and enterprise to assist in developing trade with Australia. The practical example by Mr. Cooper, of Portsmouth, who has presented a Cup to Australian producers, and has further shown his sincerity by offering to give distinct preference to Australian meat, is highly commendable, and we owe a debt of gratitude to Mr. Cooper for such assistance.

MUTTON.

Possibilities for mutton export trade are improving, and it is hoped this may be possible before long. An outlet would improve future prices and leave behind the unpayable values which have been ruling.

BEEF.

Frozen beef is now a thing of the past, and it is necessary to concentrate on the export of the chilled product to obtain a share of the trade.

The possibilities in this direction are showing great promise in the light of experimental shipments which have been made, and so far given very encouraging results. Chilled beef is the only avenue through which success will be obtained. The experimental results of well-known meat firms have established the fact that the export of chilled meat is possible. Shipping companies have willingly given every assistance by making the necessary provisions to enable the carriage of the cargoes.

Credit for this important development is largely due to the efforts of the Cambridge Research Institute who have led the way in providing the methods of preservation by use of carbon-dioxide, a gas that prohibits growth of moulds on the beef. Moulds cause decomposition, which has been the difficulty in the past.

Australia would be well advised to turn attention to the class of beef required, and growers have an urgent and important duty to perform in supplying the requirements of the trade, which is the breeding of young steers of good quality representing a dressed weight of 650lbs. to 725lbs. at the age of 2½ years.

EXPORT SEASON, 1933.

The 1933 season has opened with much improved prices for growers, and at present is one of the most profitable lines. Prices, compared with last year, have doubled, and there appears to be no reason why values should not remain payable, thus giving justification for full development of lamb production in the rainfall areas.

In order to establish a definite trade we must persevere in spite of variation of prices in the overseas market. By doing so our meat products will establish a reputation and ensure the market on merit. It has been the policy of the Meat Export Board to pursue this course, and we feel there is ground for encouragement in the progress which growers have made in developing the type of carcass. This reflects credit upon producers for the manner in which the enterprise has been taken in hand.

HANDLING LAMBS.

A word of warning in regard to the handling of lambs I feel is urgent. Bruising has been all too prevalent, and it is impressed upon owners that rejection is actually the owners' loss, as the buyer must make allowance when purchasing. Whilst there are many causes, such as wool pulls, sticks, and dog bites, I would stress the dangers of road transport unless the motor conveyance is carefully driven to avoid surging. Construction of the carriage is also important. From the experience of the Meat Board this year we are convinced that the motor lorry is a serious offender in cases of vehicles not properly constructed.

THE STATE'S FLOCK.

State's Flocks and Where Grazed.

Division.	Sheep. Year 1932.
Central	1,501,929
Lower North	1,232,763
Upper North	1,005,608
South-Eastern	1,306,586
Western	935,778
Murray Mallee	558,074
Total Counties	6,540,738
Outside Counties	1,172,498
Total State	7,713,236
Increase	1,104,255

This year constitutes a record for sheep, the figures being 7,713,236, and it will be noted that there are outside Goyder's Line 2,909,508 sheep, whilst inside the numbers total 4,803,728. This shows the carrying capacity of the inner areas, due allowance being made for cultivation at the same time. Some idea of the possibilities of the lamb trade can be gained from these figures. The outside areas, of course, will always remain for wool production.

FINAL.

I feel that, with aid of top-dressing for the development of pastures in the rainfall areas, our meat export industry is only in its infancy, and there is a great field for development. That the market is available has already been stressed heretofore, and it now rests upon ourselves to make a success of the enterprise which is within our grasp. The opportunities of this trade must not be overlooked, for in this section of the industry there is offering one of the most profitable avenues for producers.

THE STATE'S EQUIPMENT.

There is available to producers a complete organisation to render any assistance or advice in connection with meat production for the export trade.

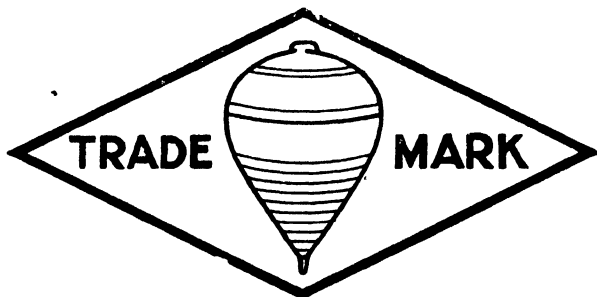
PASTURES.

The Waite Research Institute is always ready to give its valuable knowledge on the production of the most suitable pastures. In the Agricultural Department we have a well-equipped organisation, with competent officers, who are in direct touch with the producers on all matters. The Agricultural Instructors are posted in all divisions throughout the State.

The Produce Department will always give information through the Trade Commissioner in London in regard to the market there. It will therefore be seen that all information is available, and it is up to us to "deliver the goods."

The co-operation and effort of everyone interested is most strongly urged.

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SALIENT POINTS IN THE PRESERVATION OF FRUIT.

(Paper read by MR. E. F. WARD (*Stanley Flat*) at the 44th Congress of the Agricultural Bureau, September, 1933.)

The problem of storing produce for a period between the time it leaves the hands of the producer and the time it reaches the consumer occupies to-day a pivotal position in the general economy of the world's food supplies. This fact is well illustrated in the case of fresh fruit and vegetables. The great developments which the last half century has witnessed have largely depended upon progress in the efficiency of cool storage and transport. The changes which are taking place in the organisation of the industry may be summarised as follows:—

- (1) The location of mass production, without regard to centres of population, whenever the best conditions of climate, soil, and labor are to be found.
- (2) Concerted action in the marketing of produce aiming at the adjustment of supplies to foster a steady demand.
- (3) An increase in the variety of supplies available on all markets at all seasons.
- (4) The adoption of uniform grading and the use of standard packages, tending to create standard products.

These changes, which make for increased efficiency, depend directly or indirectly on our ability to preserve perishable food products out of season in good condition for periods sufficient at least to allow of their transport over long distances.

COOL STORAGE.

The object of cool storage as applied to fresh fruit is to retard the life processes which continue after the fruit is picked, and so by lengthening the life of the fruit extend its marketing period. Research work in fruit cool storage may be divided into two parts—the first dealing with the way in which pre-storage factors affect the subsequent behavior of the stored fruit, the second dealing with the actual life processes of the stored fruit and how these are affected by the cold storage conditions of temperature, humidity, and atmospheric composition. Pre-storage factors affecting the subsequent keeping quality are numerous.

Firstly, there is climate to be considered. G. B. Tindale, B.Sc., Melbourne, states:—"We have made the general observation over several seasons that William pears grown in the warm Goulburn Valley keep much longer than the same variety of pear grown in the cooler southern districts."

I. S. Calwell has conducted in the United States of America an elaborate test on various fruits to test the effect of climate on the keeping quality, and has found that in years of most sunshine the greatest quantity of sugar is stored in the fruit, and the fruit stores longest.

Orchard operations such as cultivation, manuring, irrigation, and pruning all have a decided influence on the size and texture of the apple. Over-sized, soft-textured fruits do not store well, and cultural activities should be directed towards producing firm-fleshed, medium-sized fruits.

Dr. Barker, of the Cambridge Research Station in England, who has examined several shipments of Australian fruits shipped to London, says:—"There is a markedly greater wastage among the large-sized apples," and he raises the question whether it would not be better to restrict the export of large-sized apples. I take it that he means 2½ in. to 2¾ in., which is the most popular size demanded by overseas buyers.

IRRIGATION AND RAINFALL.

With regard to irrigation there is evidence that late watering causes apples to break down rapidly in cool store. Tests were made in Victoria at Ringwood with Jonathan apples so well known in this State. The apples were picked at

weekly intervals; owing to dry weather, the first two pickings resulted in very small apples. Between the second and third pickings bounteous rain fell. The apples filled out rapidly, the next pickings being of very large sizes. It was found that the fruit gathered after the rain—especially the final picking—suffered from breakdown and fungal rots, while the former pickings kept excellently.

PHYSICAL DAMAGE.

I cannot stress too greatly the necessity for careful handling of fruit in all the processes through which it passes from orchard to consumer. This fact should be so apparent that it should not require mentioning. Unfortunately, however, the largest share in the wastage of fruit through cool storage at the present time may be traced directly or indirectly to rough handling.

Damage to the skin during picking, packing, and transport causes juices to ooze out, and these provide an excellent medium for the development of fungal rots. It is scarcely too much to say that almost all fungal attack commences on abrasions on the skin of the fruit. It is, therefore, impossible to over stress the necessity for treating *all fruit* as it really is, a *very fragile commodity*, and to handle it with such care that it enters into its period of senescence in the best condition possible, and not partially maimed and open to attack by disease before it even enters into its storage period.

CORRECT TIME AND MATURITY FOR PICKING.

"One of the most important pre-storage factors," says R. C. Palmer, of the Summerland Experimental Station, British Columbia, Canada, "which influence the subsequent storage life is the correct stage of maturity at the time of picking." Undoubtedly there is a correct time to pick fruit for storage. In the course of the preparation of this article I found much literature on this subject, and will later give the general verdict on this matter.

Apples picked too green shrivel and lack size and quality. Apples left on the trees too long become soft, and subsequently suffer from breakdown in store. They should therefore be picked at an intermediate stage of maturity. As fruits vary from year to year in their time of ripening, it is not possible to specify the best date or month for gathering.

The color of the unblushed side of the apple forms a reliable guide. As the apple ripens the color on the side of the fruit changes from a green, through a green-yellow, to a yellow. The fruit should be picked when the unblushed side is green-yellow. The most general verdict comes from R. C. Palmer, whose name has been mentioned earlier. He says:—"I have carried out tests extending over several seasons with Jonathans, picking them at three stages of maturity,

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i.e.—(1) When the unblushed side is green; (2) green-yellow; (3) yellow. My experiments have definitely proved that where Jonathans were left on the tree too long—*i.e.*, when the unblushed side had turned yellow—the percentage of breakdown was very high. By picking the apples at the intermediate stage of maturity the apples were of good quality, average size, and suffered little from subsequent breakdown.”

In order that orchardists may readily recognise the correct stage of maturity for picking Jonathans, Mr. Palmer has devised a very simple color chart. On it are pasted the three colors, each color being perforated by a large hole. By placing the apple against the hole the color can then be very quickly matched. Mr. Palmer's system of testing the stage of ripeness for apples by color card is very widely used in Western Australia, Victoria, and Tasmania, the biggest centres of export of this fruit in Australia. Those States are in exact agreement with Mr. Palmer's results, and orchardists are advised to give the matter of maturity at picking time much consideration.

For the iodine test for ripeness obtain commercial iodine and dilute to 2 parts iodine to 1 part water, or $66\frac{2}{3}$ per cent. iodine and $33\frac{1}{3}$ per cent. water, and place in a saucer. Immediately after cutting the apple or pear dip smartly in the solution. When the fruit is immersed the sugar shows out white and the starch dark. When black and white blotches appear evenly spread over the whole surface of the cut portion the fruit is ready to pick. If even blotches are only to be found just around the core or around the circumference the fruit is just as well left on the tree until a uniform test is obtained. The iodine test is very unreliable and practically out of use, because it has been found that with the green or hard variety of apples such as Cleopatra, Granny Smith, Dunn's Seedling, and Stone Pippin all test very well and form a reliable guide as to maturity, whereas the colored or soft varieties—Rome Beauty, Jonathan, Scarlet Pippin, and others—on account of their softness cannot be tested very reliably by this method. Varieties of pears differ in that respect also.

STORAGE PERIOD OF FRUIT.

Research workers are investigating the life processes which continue after the fruit is picked, and how the storage conditions of temperature, humidity, and composition of the atmosphere affect these processes.

When the fruit is stored it continues to take in oxygen and give off approximately equal quantities of carbon dioxide. At the same time the sugars, starch and acids which were formed while the fruit was growing are gradually used up, heat being evolved in the process. When these supplies are exhausted rot and decay set in, and the fruit is no longer fit for human consumption. By measuring the rate of production of carbon dioxide one obtains a measure of the rate of living of the fruit.

This line of research has been carried out by the Low Temperature Research Station, Cambridge, with results of great practical and scientific value. It was found that with the apple the respiratory activity steadily increased after being placed in store. In one case with apples stored at 54° Fahr. there was a steady increase in respiratory activity for 25 days, after which the activity greatly diminished. At the point of greatest activity—called the climateric—it was found that flavor and aroma were developed to a maximum. After the climateric is reached, *i.e.*, when the respiratory activity slows down—that is, when the sugars, starch, and acids are almost exhausted—the apple is definitely on the down grade, and quality suffers. The apple becomes mealy, and the flavor poor. Just before the death of the fruit the respiratory activity slightly increases, then the production of carbon dioxide ceases; the apple then ceases to live. It is found that even though the apple be dead there still remain some sugars and acids.

It may be of interest to growers to know just how long fruit may be kept in cold or air storage. The following varieties of pears may be kept for the following periods:—

Varieties.	Days.
Williams's Ben Chretien	30—40
Williams' Bartlett	30—40
Howell	90—120
Beurre Bosc	90—120
L'Inconnue	100—110
Winter Pear (Nelis)	180—210

APPLES.

Varieties.	Days.
Jonathan	100—130
Dunn's Seedling	150—180
Rome Beauty	110—130
Stirling Castle	90—120
Lane's Prince Albert	190—210
Cleopatra	90—110
Peaches of the yellow flesh variety	14
Peaches of the white flesh variety	21
Tomatoes	14

Plums are not kept in cool store for export from this State. South Africa supplies most overseas demands, and the following varieties exported from that country may be kept as follows:—

Varieties.	Days.
Coe's Golden Drop	35
White Washington	21
Japanese Plums (usually)	21

Quinces can usually be kept from 6—8 weeks.

The storage life of plums, peaches, and grapes is, in general, much shorter than that of pears and apples, and for this reason their transport over the longer distances presents serious difficulties. Thus while these fruits are now imported with considerable success from South Africa to England and Canada—a voyage of about three weeks—the journey of five to six weeks from Australia to England is but rarely attempted with peaches and plums, and in the case of most varieties of grapes it is attended with uncertainty. With regard to wastage of the various varieties of plums, peaches, and grapes in cool store, the literature examined afforded me surprisingly little information of the nature I required, and of the best conditions for their storage. My description, therefore, will be largely confined to the types of wastage commonly found in apples and pears exported under cool storage.

WASTAGE DISEASES.

There are several physiological disorders of the apple occurring while still on the tree, and others which are only revealed by a period in cool store. Of the disorders which occur while still unpicked there is the well-known disease "bitter pit."

This, I might say, is one of the most serious disorders occurring in Australian apples. The trouble first develops in the orchard, but becomes more obvious and commercially more disastrous during the storage life of the affected fruit, although there appears to be no evidence of its appearance in the case of fruit quite sound when gathered from the tree.

The flesh of the affected apples shows small masses of brown, spongy tissue, usually confined to the outer part just under the skin. Sometimes more deep-seated tissues are affected, and when, by coalescence of several small masses or otherwise a moderately large patch of brown tissue is produced in the heart of the fruit, the appearance simulates that of Brown Heart to some extent.

Hollow Core is another disease which forms while the fruit is yet on the tree. It is found almost exclusively in the Cleopatra, and is termed an abnormality, brought about by the splitting of the top of the capillary chamber and the extension of this split through the flesh of the apple, sometimes almost to the skin. The tissue lining this cavity becomes brown and woody, and the interior of the apple in extreme cases assumes a most unsightly appearance in consequence, although externally a misshapeness is the only sign of this abnormality. The condition is seldom met with, however, in this advanced form.

There are several other disorders which may be noticed on fruit unpicked, namely, "scald," which is marked by the browning of the skin on one side of the apple. Fruit suffering from sunburn and *Fusicladium* should be discarded before storage and export.

STORAGE DISEASES.

A condition of the fruit known as Internal Breakdown is the most commonly met with. It is a storage trouble associated with the senility of the apple, and is the typical cause of wastage of fruit stored for over-long periods at low temperatures. It is normally characterised by a vague browning of the outer part of the flesh.

Core Flush and Flesh Collapse are names given to similar browning noticed in the core region, which occurs in storage under similar conditions.

Brown Heart.—In apples affected by Brown Heart a ring of browned tissue is often present midway between the core and the skin. In mild cases the browning may be restricted to isolated areas in the flesh, while in severe cases the whole of the flesh may be brown. The sharp definition of the brown flesh from the healthy tissue is especially characteristic of the disease. Brown Heart caused disastrous losses in the Australian apple trade in 1922, entire shipments arriving in an almost valueless condition. The cause of this disease is said to be inadequate ventilation of the ship's holds, and the added accumulation of carbon dioxide during the voyage allows this condition to take its toll.

Jonathan Spot is chiefly confined, as its name suggests, to the Jonathan variety. It is characterised by black or brown spots in the skin of the fruit. It is extensively found in Western Australian apples of this variety. No reliable methods of control have as yet been established for the storage diseases mentioned.

Fungal Rots, as the name implies, refer to the fungus variety of spores which set up and bring about rotting of fruit. The rotting is caused by the germination and growth of fungal spores on the surface of the skin or, occasionally, in the cavity of the core; the affected tissue becomes soft and discolored, and is often water-soaked and clearly delimited from the sound flesh.

Since the fungus usually spreads through the tissues at roughly the same rate in all directions, the shape of the lesions is a useful criterion for distinguishing between fungal rotting and the breakdown due to various physiological diseases.

Fungal rotting is seldom extensive in fruit at the markets which receive exported fruit, but observation has shown that fruit which is fairly mature on arrival may be seriously affected during marketing and distribution. The information with regard to wastage and diseases occurring in fruit in cool store are extracts from articles written by J. Barker, M.A., Ph.D., who is conducting experiments at the Research Station, Cambridge, and the Covent Garden Laboratory, London.

The assistance rendered by the Department of Agriculture in placing the literature referred to at my disposal is gratefully acknowledged.

EGG PRODUCTION ON THE FARM.

(Paper read by Mr. F. WORMALD (Gawler River) at the 44th Congress of the Agricultural Bureau, September, 1933.)

Do fowls on a purely egg production basis pay the man on the land living away from the metropolitan area, who has to depend almost solely on egg production for all his income from poultry? I have established this side line on my farm and am of opinion that if one has the patience and capital there is more profit in fowls than cows if one has to depend solely on the cream cheques for profits. Selling milk, of course, is a different matter. To start off it is necessary to decide whether it is cheaper to buy day-old chicks or purchase an incubator and hatch them. Unless one has good fowls worth breeding from, it would be the wisest plan to purchase say 200 from a reputable breeder of well bred stock. Obtain stock from proved good layers; if it is intended to hatch on the farm, then secure a good laying pen of say, six hens and a rooster. One sound argument in favor of breeding your own chicks is that you know what size eggs go in the machine.

INCUBATION.

I prefer a 2½oz. egg for incubation, and certainly nothing under 2ozs. Also see that they are not rough shelled, mis-shapen, or ridged. If the eggs are dirty they should be washed, this does not harm the egg. The pores of a dirty egg are blocked, and this will prevent a good hatch. Be very particular about the freshness of the egg; if it is over six days old reject it. It is a good plan to turn the eggs at least once a day, preferably twice a day; this prevents the embryo from sticking to the shell. Before placing the eggs in the incubator see that it is properly regulated to obtain a regular heat of 103° for about 24 hours.

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When the eggs are put in the temperature will drop considerably; it will again rise to 103° if the machine is working properly. If the machine is not fitted with automatic egg turners, it is a good plan to mark one side of the egg with a red pencil and on the opposite side mark with blue pencil; this simplifies matters when turning the egg. Never use an indelible pencil. Clean the lamp every day, so that it will not smoke; the latter is fatal to chicks.

TESTING EGGS.

Do not turn the eggs until they have been in the machine for 48 hours. On the seventh day they should be tested to ascertain if they are fertile or not; if in doubt about some of the eggs, allow them to remain and test again on the tenth day. To make a simple tester, procure a piece of cardboard or tin about 8 in. square; in the centre cut a hole the shape of an egg, but not quite so large, otherwise the egg will slip through it. By passing this over an electric light or before a bright lamp, one can easily see the embryo. It is not unlike a spider with a black spot about the size of a sweet pea seed. Eggs that show a streak of blood running around the egg must be rejected; this is a broken yolk. When turning the eggs for the first few times, only leave them out of the incubator as long as it takes to turn the eggs; the second week they may be left out longer, and the third week for 15 to 20 minutes. At all times take into consideration the weather, and do not chill the eggs. Do not turn eggs after the eighteenth day. Always see that the bulb of the thermometer hangs or rests on a level with the top of the eggs and over a fertile egg.

MOISTURE.

This is an important, yet complex, question. In incubation, if there is too much ventilation, and if the atmosphere is too dry, there will be excessive loss of moisture from the eggs. The various constituents of the egg are intimately associated with water. The growth of the embryo depends upon a definite proportion of water at all times of incubation. The egg contains on an average 70 per cent. of water, held in chemical and mechanical combination, and is in the egg to that amount for very definite purposes. The carbon dioxide and water given off by the embryo are associated with the important work of slowly altering the structure and composition of the shell. The action of the respired carbon dioxide and moisture on the carbonate and phosphate of lime in the shell results in dissolution, and finally a brittle, easily fractured shell, from which the chick easily emerges. Watch the air space in the egg; if it is too small this indicates that the chick is developing too quickly by the presence of too much moisture; on the other hand, if the air space is very large, this indicates that the chick is not developing sufficiently because there is not enough moisture in the incubator. When the chicks are chipping the eggs, do not open the door of the incubator, because the cold air entering the machine may chill the eggs and prevent a good hatch.

BROODING.

When removing the chicks from the incubator room to the brooder house, protect them from any wind; they easily catch a chill and much loss from bowel troubles is due to this. Brooders are made in many styles, both heated and unheated. The general practice, when chicks are hatched in winter or early spring, is to house them under a heated brooder for about three weeks, then transfer them to a cold brooder; be very careful not to overcrowd the chicks at all times. A brooder that will hold 100 chicks at birth cannot be expected to hold them in three weeks' time, because as the chicks grow they require more room and more fresh air, but not draughts. See that the chicks do not crowd in corners; the corners must be rounded off with tin or preferably wire netting and then the chicks are not likely to trample one another to death. Watch them in the evening when they are going under the brooder because some of the chicks crowd in the corners.

FEEDING CHICKS.

Dry mash for two weeks at least is the general rule and bran three parts and pollard one, with about 6 to 8 per cent. of dried buttermilk powder, is good. I also have cracked wheat, maize, and peas in containers. See that the chicks cannot get into these, otherwise they scratch out the grain on to the floor, and much is wasted. Also always have finely crushed charcoal in the food, enough to turn the bran and pollard a greyish color; shell grit also should be provided. After a couple of weeks, finely chaffed green feed may be fed, but it must be fresh; avoid stemmy feed, such as old lucerne; fowls cannot digest fibre. Lettuce, rape, and silver beet are ideal chick green feeds. Do not use spices or nostrums. Sunlight and good food with plenty of greenstuff will result in good, strong, healthy chicks.

REARING PULLETS.

As the chicks are growing keep an eye open for the cockerels and separate them from the pullets at once. When they are about six weeks old and the weather is good they may be transferred to portable or larger sheds out in the open and allowed free range. This method saves a lot of food, because they practically live on grass, &c., but always have food for them if they wish to partake of it. Always provide clean drinking water; this should have a wire guard over it to prevent the chicks falling into it. After a couple of months, feed the same way as is intended when they are laying. By this means they do not get a setback or go into a false moult after laying a few eggs. The principle is to so feed pullets coming on to lay that they may have a good reserve stored up; if they have not this reserve, they lay a few eggs then go into a moult.

FEEDING FOWLS FOR EGG PRODUCTION.

When the pullets are put into their permanent quarters, which must face north or north-east to allow the maximum amount of sunlight to shine into the sheds in the winter, reckon out the number of birds a house will accommodate. This is ascertained by multiplying the length by the depth in feet and dividing by 3; thus a shed $12 \times 10 = 120$, divided by $3 = 40$ fowls will be its capacity. The floor should be covered with cocky chaff or short straw 4in. to 6in. deep to make the birds scratch for their grain. Some prefer loose dirt or sand for litter; in either case they should always have a dust bath provided. The dust allows the birds to rid themselves of any vermin, and during the moult, the casting of old feathers, and the growth of new plumage will be assisted. Charcoal and shell grit should always be available for the birds to help themselves. By using kerosene tins for nests and half filling these with shell grit, the eggs will be kept clean, and the birds will help themselves whilst sitting on the nest. There are two methods in common use—(1) wet mash and grain, (2) dry mash and grain. In both methods, green food should be used freely and plenty of clean water always available.

WET MASH.

The usual practice is to give this in the morning, followed by green feed alone at midday and grain in the evening. See that when the grain is fed it is covered by the litter to make the birds scratch for it, and at daylight the birds are at work again. The good layers are out first in the morning and are the last to go to the roost at night. A good mixture is bran one part by measure, pollard two parts by measure, chaffed green feed five parts by measure. Scald the bran with hot soup made of meat meal, allowing $\frac{1}{2}$ lb. to each 100 adult birds and 1oz. of salt. Allow this to soak and swell. The scalding is to provide heat to burst the starch grains; cold water will not do this, the hot water starts the process of digestion. Whilst hot add green feed and dry off with pollard. Mix it well until it is rather dry and flaky. The daily allowance is $\frac{3}{4}$ oz. of bran and 1oz. of pollard per bird. On no account throw this food on the ground; feed it in food troughs, thoroughly clean, and to prevent the birds from stepping in it or scratching it out on to the ground, fix some pieces of fencing wire across the top

of the troughs. At midday give them as much green food as they will clean up. This must be palatable. About an hour before sundown throw their grain to them, allowing about 1½ozs. to 2ozs. per bird—wheat for preference.

DRY MASH.

Dry mash is fed in hoppers and the method is certainly saving in labor. I have adopted both methods of feeding, and claim just as good egg production as from wet mash. As fowls cannot swallow dry mash until it is moistened by saliva, this is a great point in favor of this method. My practice for mixing the dry mash is equal parts by measure (not weight) of bran and pollard, 10 per cent. meat meal, with one handful of charcoal to a kerosene bucketful of the above. I leave the feed hoppers open until 2 p.m.; then they are closed, but green food is supplied twice a day. An abundance of green feed means the cutting down of costs of other foods, and green feed is the cheapest. It is surprising what a lot of it they will eat if it is succulent; it also supplies invaluable mineral salts, in the absence of which no stock can thrive for any length of time. Fowls are like other producing animals on the farm; you will only get out of them according to how you feed them, *i.e.*, it is only the rich man that can afford to starve his stock.

GUIDE TO PICK THE BEST PRESENT PRODUCERS.

Laying Hen.

Vent, large, dilated oblong.
Pubic bones, flexible, wide apart.
Comb, large, red, full, glossy.
Wattles and lobes, prominent, smooth, soft.

Non-Laying Hen.

Vent, small, contracted.
Pubic bones, rigid, close.
Comb, small, pale, scaly.
Wattles and lobes, inconspicuous, rough, dry.

HOW TO JUDGE PAST PRODUCTION.

Long Period Laying Hen.

Vent, bluest white.
Eye, thin white.
Ear lobes, pearly white.
Beak, pearly white.
Shanks, white, flat, round.
Plumage, worn, soiled, lifeless.

Short Period Laying Hen.

Vent, flesh colored.
Eye, thick yellow.
Ear lobes, yellow, tinted.
Beak, yellow tinted.
Shanks, yellow, round.
Plumage, signs of moulting, loose feathered.

A FEW COMMON COMPLAINTS IN POULTRY.

The most common is tick fever. Prevention is the only cure. The tick is a fowl parasite, and if the birds are allowed to go anywhere on the farm to roost, the tick will be there with them. If the birds are properly housed or only shut up at night, then tick is easily controlled by flooding the joints, all crevices and cracks in the timbers, and especially the perches, with old oil and kerosene in the proportions of two to one; the perches should be movable. Symptoms of tick fever are easily detected—loss of leg power, manure of a greenish color, and wings drooping. Feed lightly on soaked bread and milk; mix one teaspoonful of ginger, one teaspoonful of Epsom salts, one pint of boiling water, and when cold, bottle, and give birds one teaspoonful twice a day. Birds that recover from tick fever never contract it again.

Chicken-Pox is easily cured if close watch is kept on the flock, and affected birds picked out early. Pen them off, as it is very infectious, and paint sores with a small stencilled brush dipped in iodine.

Soft-shelled eggs are generally due to overfeeding, also lack of lime, salts, etc.; see that such birds have plenty of shell grit.

Wheat is now about 8s. to 9s. per bag, bran and pollard £5 2s. 6d. per ton. Whilst these prices rule, I find it costs about 1d. per week to feed each bird, and on the average farm eggs can be produced for 4d. per dozen; this is reckoning on food only, not housing and chick raising.

TWO DISEASES OF SHEEP OF ECONOMIC IMPORTANCE IN SOUTH AUSTRALIA.

(Paper read at the 44th Congress of the Agricultural Bureau, September, 1933.)

[By C. T. McKenna, B.V.Sc., M.R.C.V.S., Government Veterinary Officer,
Stock and Brands Department.]

PARASITIC GASTRO-ENTERITIS OF SHEEP.

During the spring, summer, and autumn of the 1932-1933 season, reports were received from many areas of the State of a disease in lambs, the main features of which were failure to thrive, loss of condition and weakness, followed by heavy mortalities. Field investigations on many of the affected farms and the examination of material from a number of affected flocks have shown that the disease is due to a severe infestation with internal parasites.

The effects of parasitic invasion are well known to sheep owners in the high rainfall areas of South Australia, but during the season under review the losses were much heavier than usual, the disease was more widespread, and further appeared in parts of the State previously considered to be "clean."

Parasitic Gastro-Enteritis is probably the most serious disease of sheep in this State, not so much on account of the actual losses, but because affected sheep show loss of condition, fail to thrive, their fleece is under normal weight, and the wool is tender.

A good deal of experimental work has been done, mainly in New South Wales, by Clunies Ross and also by Seddon, Belschner, and Edgar, and a resumé of this and of our investigations locally should be of importance to sheep owners.

Some common names for the disease amongst sheepmen are "Coast Disease" (a term which not only includes parasitism, but other obscure diseases of sheep in coastal areas as well), "Stomach Worm Disease," and "Black Scour of Lambs."

THE PARASITES WHICH CAUSE IT.

Those which have been found on examination of the digestive canal contents are, briefly:—

(1) THE "HAIR WORMS".—There are several varieties of these, but by far the commonest and most important is the *Trichostrongyles*. These are fine hair-like worms a little over $\frac{1}{4}$ in. in length which are found in great numbers in the small bowel and to a lesser extent in the fourth stomach. Their presence is only demonstrated with difficulty, but the most likely place to find them in the small gut is from 3-15ft. from its junction with the last stomach.

(2) THE LARGE "STOMACH WORM" (*Haemonchus contortus*).—This parasite can easily be recognised in the stomach and sometimes in the first part of the small bowel on account of its comparatively large size ($\frac{3}{4}$ -1 $\frac{1}{4}$ in. long) and the red and white spiral markings of the larger worms.

(3) "TAPEWORMS" (*Moniezia expansa*).—The worm is white and flat in appearance and made up of numerous segments. It may attain a length of 15ft. or more. Tapeworms inhabit the small bowel, and as many as 10 or more may be found in a single lamb.

(4) WORMS OF THE CAECUM AND LARGE BOWEL.

The following points are emphasised:—

(a) The infestation is invariably a mixed one, but one variety usually predominates.

- (b) That parasitic gastro-enteritis is due mainly to "hair worms" (*Trichostrongyles*) and to a lesser extent to the "stomach worm" (*Haemonchus contortus*).
- (c) It would appear that *Trichostrongyles* are much more widely distributed in the State than the *Haemonchus*, and that the former can withstand the effects of dryness and cold better; it appears in drier areas and infests sheep earlier in the spring than the latter.
- (d) Tapeworms do not appear to cause many losses in sheep. They do, however, affect them. They are a common parasite of lambs in this State.
- (e) The large bowel worms are believed to be capable of causing serious effects.
- (f) The female "hair" and "stomach" worms lay eggs which are passed out in the faeces. The eggs hatch out in the paddocks and ultimately develop into larval forms which settle on the grass and so are taken in by the sheep when feeding.

HOW THEY AFFECT THE SHEEP.

The parasites must look to their host, the sheep, to sustain them, and they either obtain their nourishment by piercing the bowel wall and sucking the blood, or by ingestion of the food in the canal. Further, they wound and irritate the bowel wall and cause digestive disturbances.

When their great numbers is considered, it is evident that they must weaken the sheep. A count of the "hair worms" in one lamb showed that 30,000 were present, and if they were placed end to end they would stretch a distance of at least 200yds.

SEASONAL INFLUENCES BEARING ON THE INFESTATION.

It is common knowledge that the effects of parasitic infestation vary considerably in different years. The disease is much worse during some seasons than others, and in this State the 1932-1933 season was a bad one. The years 1930-1932 were good years, and as a consequence the growth of feed was good and the soil was kept damp for considerable spells. This was particularly so during 1932. Now it is just these conditions—moisture and warmth—which are suitable for the development of the parasites outside the sheep's body, and it is no wonder that sheep became infested in greater and greater numbers until during 1932-1933 a maximum of losses was experienced. This run of good years probably accounts for the appearance of the parasite in areas previously considered clean. During dry years the disease is much milder in its effects.

AGE AND CLASS OF SHEEP AFFECTED.

(a) The "hair worms" (*Trichostrongyles*) chiefly affect hoggets, especially from 5 to 12 months old. Weaners and even sucker lambs may show the disease, but it is not commonly seen in older sheep unless such sheep have not previously suffered from the trouble as hoggets. The history usually is that once the sheep are 12 to 18 months old they are not again affected. It would appear that with age, a natural resistance to this parasite is developed. The period of the year that it affects sheep extends from early spring through summer and autumn.

(b) The "stomach worm" (*Haemonchus contortus*) causes serious trouble in both lambs and grown sheep, the latter often severely. Generally speaking, it is a complaint of late spring, summer, and early autumn.

(c) Tapeworms affect young lambs mainly.

SYMPTOMS.

From what has been said it is evident that there are two types of Parasitic Gastro-Enteritis, and from now on they will be described as:—

(a) *Trichostrongylosis*—"Hair worm disease."

(b) *Haemonchosis*—"Stomach worm disease."

The symptoms of *Trichostrongylosis* are as follows:—

The history is that the owner is having trouble in his young sheep. Though they are on good pasture and apparently receiving ample nourishment, they are not doing well. They are lacking in size and general development. A *dark-colored diarrhoea is invariably present*. When driven they appear sluggish, and can easily be caught. As the disease progresses they lose weight and become emaciated. In one district which I visited practically 100 per cent. of the hoggets in the various flocks examined were affected; the average losses were about 30 per cent. (75 per cent. on one property), and it was estimated that at least 3,000 young sheep had died in the area. In other districts the losses have varied from 10 per cent. up to 33 per cent.

In flocks in which the disease is not so severe there are marked gradations in size, and a "tail" is developed, *i.e.*, a percentage of the sheep are markedly undersized and in poor condition. On examining the sheep it is found that in badly affected ones the body is emaciated, the skin is pale, and "pot belly" is present. When the sheep is turned up, fluid can be heard in the belly. In less severely affected sheep, the skin appears pink and the belly is not distended; the owner in these cases rarely suspects worms and considers it is "something to do with the feed."

Haemonchosis, on the other hand, is more rapidly fatal. Scouring is variable and is sometimes absent. Anaemia (paleness of the skin) is invariably present. The affected sheep show swellings under the jaw ("Bottlejaw") and distension of the belly ("Pot Belly").

POST-MORTEM EXAMINATION.

The outstanding feature is the extremely emaciated condition of the carcase. There is very little internal fat present. On opening up the belly cavity a considerable amount of watery fluid is seen there. This fluid may, however, be absent in early cases of *Trichostrongylosis*. Where *Haemonchii* are present they can easily be seen in the fourth or last stomach, where they are found mixed in the ingesta or attached to the lining wall of the organ. In the case of *Trichostrongyles*, preliminary examination of the stomach and intestines gives the idea that no parasites are present, and in order to demonstrate that they are there, it is necessary to carry out the following procedure. After slitting up the small bowel and drawing out the contents, scrape the material off the bowel lining at a point about 6ft. from the fourth stomach. Put the scraping on a clean piece of sheet glass, mix with a little water, and spread out. If a piece of light or dark paper is now put under the glass and the mass is examined in a good light with a magnifying glass, the "hair worms" can easily be seen.

In view of the difficulty of finding these worms and the importance of knowing what type of worm is responsible for the trouble, it is strongly recommended that material be forwarded to the Stock and Brands Department for examination. A sick sheep showing typical symptoms could be brought on sent for *post-mortem* examination; in the latter case it should be sent direct to the Bacteriological Department, Adelaide Hospital, and this Department should be advised.

If bowel contents are forwarded scrapings from small bowel and stomach walls, together with a little of the fluid contents should be put in a clean bottle and mixed with an equal quantity of 10 per cent. formalin (1oz. of formalin with enough water added to make $\frac{1}{2}$ pint, equal 10 per cent. solution). Full details of the symptoms observed and type of sheep affected should be forwarded at the same time.

FACTORS WHICH PREDISPOSE TO INFESTATION.

1. **THE CONDITION OF THE ANIMAL.**—This is an important factor in determining whether the parasites will gain the upper hand or not. If the nutrition of the sheep is good they may carry quite considerable numbers of parasites without showing ill effects. It is when the nutritive value of the pasture falls off that the worms start to increase and affect the sheep. In this respect it is important to note that the high luxuriant growth of pasture of good seasons is much lower in nutritive value than the short, leafy type, and is quite inadequate for the grazing requirements of weaners.

2. **AGE.**—Young sheep have not only to maintain themselves, but they also have to grow, so they require plenty of good nourishing feed. As is well known, they are very susceptible to checks, *e.g.*, if they are put on to poorer feed. For this reason, young sheep are more susceptible than older ones to invasion by parasites.

3. **WEANING.**—This tends to cause a check if good feed is not available.

4. **OVER-STOCKING.**—This limits the supply of nutrition and makes re-infestation of the flock with worm larvae much easier.

TREATMENT.

I.—MEDICINAL.

(a) *The treatment of Trichostrongylosis ("Hair worm" disease) by medicinal means is almost ineffective.* However, it does some good, as it has been found that, although the disease was not checked, treated sheep running on natural pasture gave a much better wool quality than untreated sheep. Again, worm infestation is a mixed one, and medicinal treatment is effective against "stomach worms" (*Haemonchus*) and tapeworms. For these reasons it should be persisted in. The following medicinal treatment is suggested:—

(1) Where the disease is diagnosed:—Drench all hoggets at once with the standard copper sulphate solution. Repeat this drench seven days later. Subsequently drench monthly with either the copper sulphate solution or the carbon tetrachloride mixture.

(2) In areas where the disease is known to exist:—Weaners should be drenched monthly from the beginning of September onwards with either of the above drenches (preferably copper sulphate solution). The first dose should be just before separation from the mothers.

(b) **STOMACH WORMS (*Haemonchus*).**—They can be effectively controlled by drenching with carbon tetrachloride mixture. Less effective than this mixture is the standard copper sulphate solution, but it has the advantage that it is cheaper, easily administered, and very safe. A plan of treatment is:—

(1) Drench all sheep during July.

(2) Drench all young sheep and lambing ewes in September.

(3) Drench young sheep and lambing ewes at monthly intervals from November to May.

(c) **TAPEWORMS.**—Standard copper sulphate solution is an effective drench. The carbon tetrachloride mixture does not remove them.

Standard Copper Sulphate Solution.

The solution is prepared as follows:—

Dissolve 8ozs. of bluestone in 3galls. of water, and of this give the following doses:—

	Ozs.
Adult sheep	2
Two tooth's	1½
Lambs, 6 to 12 months	1
Lambs, 3 to 6 months	½

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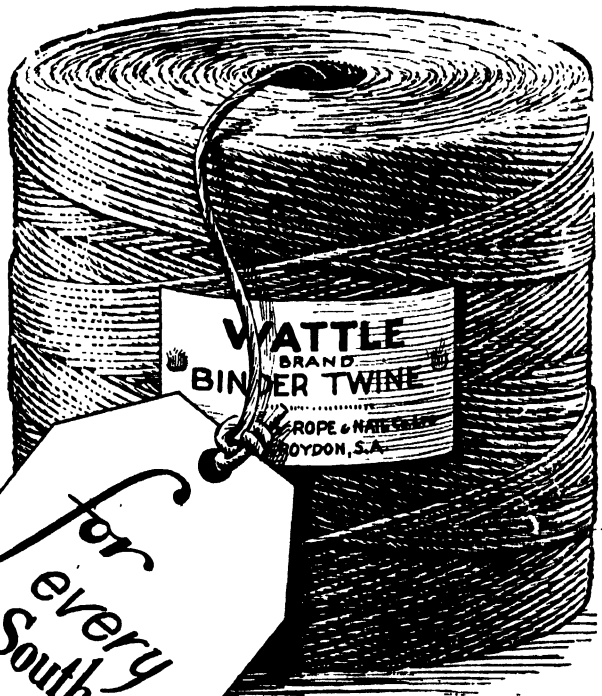
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In preparing the solution use only hard, blue lumps of the drug, and discard all lumps which are white and powdery. Break up the large lumps, and dissolve in a little boiling water, then add cold water to make up 3galls. of solution in an enamel bucket. Do not use an iron vessel for the solution, as it will act on the metal and become less active. A small glass bottle with a hole filed in the side in such a position that when plunged in the solution it will fill up with the exact dose, is suitable for drenching.

Carbon Tetrachloride Mixture.

This consists of:—

	Parts.
Carbon tetrachloride	1
Liquid paraffin	4

The dose of the mixture is:—

	Cubic Centimetres.
Lambs	5
Adult sheep	10

The mixture is sold prepared for use in 1gall. tins, and this quantity is sufficient to dose 900 lambs or 450 adult sheep. The cost is approximately $\frac{1}{4}$ d. per dose for an adult sheep.

Reliable all metal dosing syringes fitted with a long, slightly curved nozzle and adjustable by a screw on the handle for doses of 5c.c. or 10c.c. are available. For large flocks a reliable automatic drenching gun is on the market.

Owing to the fact that carbon tetrachloride evaporates quickly only a small quantity at a time should be poured from the container into a suitable vessel. The container should be well shaken before pouring out, and kept tightly stoppered at all times.

Precautions to be Observed when Dosing with Carbon Tetrachloride.

(1) In certain rare instances the drug though absolutely safe for normal sheep in doses five and 10 times the size of that recommended may cause some mortality. The reason for this is obscure, but one factor known to influence the toxicity of the drug is mineral deficiency (calcium particularly) in the pasture.

(2) Again, sheep grazing on soursobs should not be dosed with carbon tetrachloride. Sheep grazing on this plant do suffer from a deficiency of available calcium (lime).

(3) A precaution to be observed is to try the effect of the drug on a small percentage of the sheep of different classes (ewes, lambs, &c.). If no ill effects are observed in two days the rest of the flock can be drenched.

Drenching.

Before the administration of either copper sulphate solution or carbon tetrachloride mixture, the sheep should be yarded overnight and dosed on the following morning before being allowed food and water. They may be allowed to feed as soon as treated. The sheep should be dosed standing, the head should be forced upwards and backwards, and the lower jaw should be left free. In the case of the tetrachloride mixture, the nozzle of the syringe should be inserted over the sheep's tongue, and the syringe emptied steadily.

II.—ADEQUATE NUTRITION.

As has been stated, medicinal treatment of "Hair-worm" disease is unsatisfactory. However, during trials with various drugs, it has been observed that young sheep infested with *Trichostrongyles* but not drenched showed improvement when given more nutritious feed and "nursed." It would appear that the provision

of good, nutritious feed and good animal husbandry will do more to control this serious disease of lambs than medicinal treatment. As regards "stomach worm" disease, improved nutrition should also go hand in hand with medicinal treatment.

PREVENTIVE MEASURES.

(1) **GOOD FEEDING.**—Weaners should be nursed and given the best feed available from the time they are weaned until they are at least 12 months old. More cultivation of some of the affected areas, the top dressing of suitable parts, and the planting of lucerne, &c., should be helpful. The sheep owner should plan ahead for the feeding of his young sheep right from the beginning of the worm season (September to May).

(2) **SUBDIVISION.**—In this way small paddocks can be held for the young sheep. The flock, however, should not be left on them for more than three to four weeks at a time.

(3) **BURNING OFF PADDOCKS.**—The burning off of paddocks wherever possible in spring and summer destroys many young worms.

(4) **THE USE OF LICKS.**—As the natural pasture of most of the worm areas is deficient in mineral matter (phosphorus and calcium) the provision of the following lick during the dry period of the year is recommended:—

	Parts.
Dicalcie phosphate (35 to 37 per cent., P_2O_5) ..	40
Salt	60

Note.—Those areas of South Australia in which parasitic gastro-enteritis of sheep is common are Kangaroo Island, the coastal areas of Eyre's and Yorke Peninsulas (*Trichostrongylosis* is particularly bad in these coastal parts), the South-East, the area south of Adelaide, the Lakes district of the Murray Mouth. It has also been observed in the Auburn, Clare, and Angaston districts and also the Hills district.

INFECTIOUS ENTERO-TOXAEMIA OF SHEEP.

Recently this disease was investigated in Western Australia by Bennetts, and later in Tasmania by Oxer, and the results of their investigations have been published in the Council for Scientific and Industrial Research's Bulletin No. 57 and Pamphlet No. 35.

There is little doubt that the Western Australian disease is identical with that disease of sheep in South Australia known as "Braxy-like Disease" and "Stink-wort Poisoning," and also with that disease in lambs called "Pulpy Kidney."

As this disease is a common one and is the cause of serious losses amongst sheep and lambs in this State, a summary of the results of this work should be of interest.

Infectious entero-toxaemia can be described as a rapid poisoning by a powerful toxin (poison) manufactured under certain conditions in the small bowel of the sheep by a special germ, the *Bacillus ovitoxicus*, during its growth there.

DISTRIBUTION.—The disease is widespread in the agricultural areas of South Australia. It appears to be confined to the cultivated areas and districts where top dressing of pastures has been carried out. It is common in the old settled wheat areas of the Mid-North.

INCIDENCE.—The disease is peculiar in that the mortalities from it vary considerably from year to year; it will appear in one district for one, two, or three years, and then apparently die out; again, it may appear on a certain farm whilst adjoining properties will be free from it. The following facts in regard to its liability to occur are known:—

- (1) **Seasonal Occurrence.**—The disease occurs during autumn, winter, and early spring. Losses generally follow after the first rains of the season (March-April), and at this time the disease usually makes its

appearance in the wheat areas, where the history is invariably that the sheep at the time of the occurrence of losses were grazing mainly on Stinkwort (*Inula graveolens*). In other districts outbreaks coincide with the appearance of greenfeed. The disease continues throughout the winter months and up to late October. The greatest losses usually occur at the beginning of the season and towards the latter part (spring) when lambs particularly are affected. Good seasons with a "flush" of feed are considered to be the worst. A point of importance is that outbreaks of the same disease have been observed in sheep running on dry pea stubble in the summer months, especially after a thunderstorm, presumably as a result of their gorging on swollen peas.

- (2) *Yearly Variation*.—Mortalities are greatest on farms or in districts where the disease occurs for the first time. On the other hand in those areas where the disease is well known the death rate is low except in flocks newly introduced from clean areas.
- (3) *Species of Animals Affected*.—It is naturally confined to sheep.
- (4) *Breed and Sex*.—They have no particular significance except that farmers consider that crossbred lambs, which fatten and mature more rapidly, are more frequently affected than Merino lambs.
- (5) *Age*.—Sheep of any age from three weeks old onwards may be affected; young sheep are probably more frequently affected.
- (6) *Condition*.—Sheep in good condition, particularly rapidly fattening animals, are chiefly affected. Sheep in store condition are occasionally affected.

SYMPTOMS.

In an outbreak the losses are usually spread over a considerable period (two months or more), and are never great at one time. The owner usually finds the affected sheep dead in the morning near the camp. The period of sickness is short (two to four hours), and only occasionally does the farmer notice signs of it. Sheep frequently show symptoms after being driven; they lag behind the flock, and are frequently left when camp is broken. There is a staggering gait with "knuckling over" of fore limbs. The animal soon goes down, and either lies quietly until it dies or less commonly exhibits up to the point of death more or less violent galloping movements. This convulsive type is more frequently seen in lambs than adult sheep. Salivation and champing of the jaws are common. Bloating may become marked before death.

POST-MORTEM FINDINGS.

On examining the carcass the owner finds that it is invariably that of a well-nourished animal. It is blown up, and the skin which is not covered with wool is often dark blue in color (fermentative changes). Signs of recent scouring are usually present. On opening up the carcass the rumen and small bowels are noticed to be full of gas, and contain less solids than normal. There is a variable amount of fluid in the belly and lung cavities and in the heart sac. On opening up the small bowel the lining appears redder than usual. The kidneys are extremely soft and "pulpy."

PREDISPOSING FACTORS.

The germ (*Bacillus ovispastus*) has been found in the soil of affected properties. It thrives in cultivated and improved soils. Improvement of pasture usually means increased carrying capacity, and this is productive of heavier soil contamination. Healthy sheep can take the germ into their digestive canal along

with food and water, and under normal conditions they are not affected. However, there are certain factors which cause it to grow rapidly there, and in the process give off the toxin which is absorbed into the body of the sheep and so poisons it. These factors are:—

- (a) *Sluggishness of the Small Bowel.*—When fat sheep in good condition are feeding on an abundance of feed low in fibre content and taking practically no exercise, the small bowel becomes lazy in its action. In support of this there is the evidence of sheep owners who have had beneficial effects from compulsory daily exercise and the feeding of dry feed rich in fibre. Again, it is well known that turning the flock out on “scrub” country will prevent and even stop the disease. The beneficial effect is probably due to the high fibre content of the plants growing on this type of country. Again, there is evidence that the wet pasture in the early morning is “dangerous,” and that where sheep are shut up at night and turned out to pasture late in the morning the disease does not occur. The wet feed may cause bowel sluggishness.
- (b) *Bowel Injuries.*—When sheep are grazing on stinkwort it is known that the barbed hairs of the pappus attached to the fruits of the plant enter the lining wall of the small bowel. The injury caused evidently provides conditions favorable for the growth of the germs.
- (c) *Soil Factors.*—Cultivation, increased stocking, and the presence of decaying sheep carcasses on a property all make for a heavy contamination of the soil with the bacillus. It has been observed on some properties that sheep feeding close to the ground and for some time taking in with the feed, soil presumably containing large numbers of the germs, can develop the disease. Under these conditions sheep in store condition may become affected.

RESISTANCE TO THE DISEASE.

On those farms where the disease has occurred for a number of years, it is found that the death rate in flocks which are bred on these properties shows a steady decline, and losses may cease entirely. It would appear that such sheep develop a tolerance to the disease. The heaviest losses are usually experienced in flocks brought into affected districts from localities where the disease is unknown.

TREATMENT.—Owing to the nature of this disease, *i.e.*, a short illness followed by sudden death, treatment is not practicable.

METHODS OF CONTROL.

(1) **PREVENTIVE INOCULATION WITH VACCINE.**—The production of a tolerance to the disease by means of vaccination is proving successful. The vaccine has not yet been made available for general issue. It should be used only under the directions of a qualified veterinary surgeon. The Stock and Brands Department will be pleased to discuss any outbreaks of this disease with sheep owners, and advise on whether vaccination would be a practicable measure. The vaccine would cost about 1½d. for the treatment of one sheep.

(2) **FEEDING OF FIBRE.**—Feeding with chaff is recommended. With abundance of greenfeed available, it might be necessary to yard sheep in order to induce them to eat the dry feed, but in flocks where heavy losses are experienced this would be worthy of a trial. The value of “scrub country” where this can be obtained has already been indicated.

(3) **EXERCISE.**—Compulsory exercise should be beneficial, and some sheep farmers claim to be able to prevent the disease by "dogging" the sheep around the paddock each morning. Enforced exercise should begin before the disease appears, or right at the commencement of an outbreak. Where conditions are suitable, travelling the flock may be very helpful.

(4) **THE AVOIDANCE OF CLOSE GRAZING.**—This is advisable as far as possible on farms where the disease is prevalent.

(5) **DISPOSAL OF CARCASSES.**—The germ increases in carcasses of sheep which have died from this disease, and heavy contamination of the soil results from this source. All such carcasses should, therefore, be destroyed as soon as possible. This also applies to the bodies of all other animals (including rabbits) which die on the area. It is quite probable that they may be carriers of the germ. Carcasses are best destroyed by fire. If this is impracticable they should be buried deeply in an area set apart for the purpose. (*Note.*—The proper disposal of carcasses is a part of good farm management, and should be carried out on all farms.)

(6) As it is very probable that sheep continually exposed to the disease can acquire a tolerance to it, sheep owners in affected districts should avoid as far as possible the introduction of sheep from districts where the disease does not occur. It should be the aim to breed from the flock already on the property. The vaccination of new purchases (rams, &c.) could be tried after their introduction to affected properties.

SOME NOTES ON "INFECTIOUS ENTERO-TOXAEMIA" (PULPY KIDNEY) OF SUCKING LAMBS.

1. The disease affects unweaned lambs which are in high condition and running on rich pasture. The greatest losses are found to occur on pastures having a large proportion of clovers in their composition. Under these conditions the ewes are giving a copious supply of milk, in addition to which the lambs are eating a high protein grass diet, and it is evident that these conditions help to bring about the disease. It is while the pastures are still young and succulent that the greatest mortality occurs.

2. The disease has been observed in lambs three to 13 weeks old.

3. Ewe lambs are mostly affected. It is considered that the castrating and tailing of the male lambs causes a greater check than the tailing of the ewe lambs, and that this explains the greater occurrence of the disease in the latter after marking.

4. Twin lambs appear to be very rarely affected.

5. The greatest mortality occurs in the mutton types.

6. **MEASURES FOR CONTROL.**—Very little can be suggested beyond what has already been advised, but the following can also be tried:—

(a) Yarding of the ewes and lambs for 24 hours once a week has given very good results, and it has this advantage that it does not cause any noticeable check. The principal difficulty is that on most farms the ewes are not drafted into mobs as they lamb. It is but rarely that the size of the paddocks precludes this. The preventive measure here advocated can only be properly applied where this system of drafting has been carried out.

(b) *Tailing and Marking.*—These cause a check in the lambs. Further work on this disease should, however, result in more effective means of preventing its occurrence in sucking lambs.

THE FLAX INDUSTRY.

The Director of Development recently published a report of the investigations of his department on the possibilities of developing the flax industry in Australia. The investigations were conducted by the Director (Hon. J. Gunn) in co-operation with Mr. E. W. Robinson (Agricultural Adviser) and Mr. C. V. Lohan (Investigating Officer) at the instigation of the Federal Minister in control of development, who asked that particular regard should be given to the following points:—

The present position of the industry; the possibilities of stimulating production; the effects of the Flax and Linseed Bounties Act of 1930 upon the industry; the extent of the home market for flax and linseed, and the possibilities of developing an export trade; the economics of the industry in relation to other agricultural industries; the suitability of climatic and soil requirements for flax and linseed production; the possibilities of stimulating production by means of organised educational propaganda carried on in conjunction with the respective States; costs of production, market prices, including world prices and marketing arrangements.

The report deals in detail with various points raised in the above terms of reference, and ends with the appended summary and conclusions arrived at from the investigation.

SUMMARY.

Russia produces considerably more than half of the world's requirements of flax fibre, and in combination with the Baltic countries of Latvia, Lithuania, Estonia, and Poland supplies more than 80 per cent. of the demand. The supply of the world's fibre has always come from countries where wages are low. In the last three years, although there has been a severe shrinkage in world production, Russia continued to increase its area under cultivation, and in 1930-31, with a record of 536,800 tons of fibre, greatly exceeded its pre-war output. Figures for 1931-32 are not available, but a still further increase in production is predicted.

Attempts made to stimulate and expand the industry in Great Britain, Northern Ireland, Canada, and the Kenya Colony since the war have been successful. In Belgium, where the world's best fibre is produced, cultivation has steadily declined during recent years, and in France, Holland, and Germany, as well as in the Baltic countries, the area under cultivation has decreased.

For many years cotton has been usurping the place of flax fibre in the manufacture of such widely used articles as canvas and duck, and owing to the severity of this competition Belfast and Scottish mills are concentrating more and more on the manufacture of fine linens. A feature of the enormous decline of British imports of fibre for manufacturing purposes is that, whereas low-grade eastern European supplies have decreased by more than 73 per cent. since pre-war years, Great Britain's trade with other countries, notably Belgium and Holland—the home of the best fibres, shows a decrease of only 22 per cent.

For upwards of 30 years flax has been grown in small quantities in parts of Gippsland, Victoria, but there has been no sustained production in any other portion of the Commonwealth. For 18 out of the past 26 years production has been assisted either by bounties or guarantees of a fixed price, but despite this encouragement the industry has failed to expand or even strengthen its position. Production was stimulated during the period 1918-21 by guaranteed prices and bonuses which enabled growers to obtain from £5 to £9 per ton for their flax. When the special circumstances which gave rise to the phenomenally high prices of fibre had disappeared there was an immediate contraction in the acreage sown. Except for the special circumstances during the war, Australia has never been able to produce

fibre at a cost which would make export profitable. Even now, after all these years, there is nothing to justify the hope that Australia will be able to grow fibre on a competitive basis with other countries, particularly Russia.

The immediate effect of the Linseed and Flax Bounties Act of 1930 was to increase the area sown to flax in Victoria from 703 acres in 1929-30 to 1,216 acres in 1930-31. Tasmanian farmers also planted some hundreds of acres, but the anticipated large sowing did not take place owing to the complete failure of the Tasmanian Flax and Canvas Co., Ltd. This company was formed in 1927, and was an applicant before the Tariff Board for a bounty on fibre and linseed. Farmers in both States were either guaranteed or led to believe they would be paid from £5 to £6 per ton for all the straw they produced. These undertakings were not fulfilled, and many farmers received no payment at all but, in addition, lost the capital which they were induced to invest in some of the newly-formed companies. Flax is no longer grown in Tasmania, and in Victoria the area has receded to about 800 acres.

The promise of the successful development of the industry in Victoria as implied by the increased acreage in 1930-31 has not been fulfilled. The bonus payable on both fibre and linseed is paid direct to the millers, and, in the case of the Drouin district, there can be no doubt that, were it not for this assistance, the growers would have been compelled to accept less for their crops. Nevertheless, up to the present the crop has not been grown in quantities sufficient to keep the Drouin mill working to its full capacity.

In the section dealing with milling costs, the operations, in detail, of the Drouin mill have been analysed. Present-day world conditions have created an artificially high price for fibre in Australia, and so long as these continue it appears probable that locally produced flax will command a high price. The company contends that, on the basis of an intake of 1,500 tons of crop a year it could show a return on capital and, without the aid of the bounty, continue to pay growers £3 14s. 11d. per ton. It cannot be too strongly emphasised, however, that this would depend upon the company's products commanding the prices expected this year, viz., fibre £65 per ton, tow £7, linseed £18.23, and chaff £2, but it is impossible to express any opinion on this point other than to stress the fact that these prices are largely dependent on the continuance of the present rate of exchange, and the continuance of the high price of linseed.

Even if the claims of the Drouin Company, as set out in the preceding paragraph were realised, they would still fail to provide satisfactory evidence that the industry could be expanded to any considerable extent. The uncertain and restricted nature of the local market for fibre, and the danger of over-production, are matters for serious consideration. Furthermore, if linseed were produced on a large scale, the bulk of it would have to be sold to the oil manufacturers in competition with the Indian and Argentine seed, which is imported free of duty. Linseed imported for purposes other than the manufacture of oil, the feeding of stock, or for sowing is dutiable at the rate of 2s. British preferential and 2s. 6d. general per cental, hence the strictly limited market for the local product at £18 per ton. Last year was the only year in which the company made a profit, and this was possible only because of the bounty. This year a further improvement is anticipated, but only because the high prices realised for linseed, plus the bounty, are sufficient to more than offset the loss incurred on fibre production, even at £65 per ton.

All the evidence tends to show that on the average the general quality of Australian fibre can only be ranked as from medium to poor. Doubtless good samples are obtained, but the general suitability of the fibre for textile purposes, apart from twines and cordage, cannot be determined except by large-scale commercial tests. Up to the present this proof is lacking. Unfortunately the investigation officers were handicapped by their inability to discover persons who had been

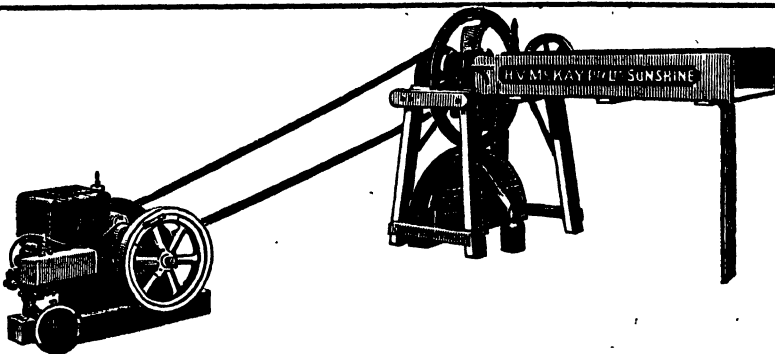
trained in the various technological branches of flax fibre, and who might discuss the problems of the Australian industry from a sound practical knowledge of cultural requirements processing methods, and textile suitability. If, as appearances indicate, the relatively poor quality of Australian fibre results from one or a combination of all the following factors, then the prospects of the ultimate success of the fibre industry are most discouraging:—

- (1) Unsuitability of climatic conditions during the growing period.
- (2) Growing a crop both for linseed and fibre.
- (3) Cutting the crop with a reaper and binder instead of pulling it by hand or machine.
- (4) Unsuitability of the climate owing to its variability for the dew retting of the straw.

It seems highly probable that the practice of dew retting may be a potent cause not only of the variability of quality of Australian fibre, which was so strongly emphasised by the twine and cordage manufacturers, but also of the low ratio of fibre to tow. Obviously there can be no control of the climatic conditions during the process of retting, and the possibility of under-retting or over-retting is apparent. There is an absence of data upon which to judge between the climatic conditions of Russia and the Baltic countries, where dew retting is partially practised, and certain parts of Australia. Furthermore, dew-retted fibre in Europe does not rank amongst the highest-grade qualities. If a textile industry were to be contemplated, the first step to be taken should be the testing in bulk of the Australian fibre to ascertain whether the fibre possesses the necessary spinning qualities for the particular textiles proposed to be manufactured.

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It would appear that Australian straw, while returning a higher percentage of seed per ton than European straw, yields a much lower percentage of fibre per ton. According to Professor F. Bradbury, Municipal Institute, Belfast, 100 tons of crop should yield about 31 tons seed and chaff, leaving 69 tons of straw for retting having a retted weight of 55.2 tons from which 9 tons of fibre and 3 tons of tow should be obtained. The average recovery of fibre at the Drouin factory during the seasons 1929-33 per 100 tons of crop was fibre 5.93 tons and tow 8.47 tons.

There is insufficient evidence that the decorticating machine invented by Mr. N. C. Grigg will obviate the necessity of retting the straw, and that its general adoption will place the industry on a sound footing. The only satisfactory test that can be applied to an invention of this kind is the commercial test, and it must be left to the manufacturers who use the fibre processed in this fashion to determine its suitability and value for their particular purposes. There is this to be said also, that any machine which would abolish retting would not confer its advantages on one country only, but would be quickly adopted by all countries where fibre is produced. Experiments are being made in other countries with machines designed for a similar purpose, and some of these are now being tested commercially.

The examination of growing costs indicates that the growing of flax for linseed might prove a profitable industry during this period of depressed prices, for farmers in certain areas of Gippsland whose usual operations include the growing of cash crops. It is difficult, if not impossible, to arrive at the exact costs of the production of any crop, as this is dependent upon so many variable factors. The main items of expenditure on cultivation and the operations, and on rent would amount to about £4 12s. per acre. There is, as has been pointed out, a limited market for linseed at £18 per ton, and an unprotected and capacious market at £14 per ton. The average yield in the Drouin district amounts to 12 bush. per acre.

CONCLUSIONS.

From the facts and from the evidence obtained in the course of the investigation, the following conclusions are arrived at:—

(1) Flax has been grown in small quantities in selected areas in Australia for upwards of 30 years, but it was impossible during that period to establish a profitable export industry for the sale of fibre. The world's price of flax expressed in gold currency is at present close to the pre-war level, and little improvement, if any, can be expected pending a solution of the present crisis. The development of a profitable export trade in fibre, therefore would appear to be out of the question unless more economical methods can be devised for handling the crop and increasing the recovery of fibre per ton of retted straw treated.

Efforts that have been made in this direction are not encouraging. Revolutionary methods of treating the straw which would substantially decrease the cost of the fibre have been suggested, but until manufacturers endorse the claim made in respect of the machines which have been invented by their willingness to utilise this particular fibre, it would be idle to pass any comment.

(2) Linen goods are not manufactured in Australia, and the only local market available is that provided by the soft fibre requirements of the rope and cordage manufacturers, the limitations of which can best be appreciated from the fact that imports of Italian hemp have averaged only 383 tons for the last three years. On the basis of the results obtained in Gippsland during the past four years, the production of 383 tons of flax fibre would necessitate the cultivation of approxi-

mately 4,000 acres of crop, but even this restricted area would probably exceed the present limit of economic expansion, for it must be remembered that Italian hemp, even if largely displaced by Australian flax, would still be a necessary requirement of the rope and cordage manufacturers. There does not appear to be any likelihood of a linen industry being undertaken in Australia but, even if it were, there would be no guarantee that Australian flax fibre would measure up to the quality demanded by the trade.

(3) Whilst the flax fibre continues to command its present price in competition with Italian hemp there may be possibly some expansion of the present acreage. In the whole of the circumstances, however, with the prospective development of an Australian flax industry definitely restricted to the narrow dimensions already indicated, and aggressive policy of expansion should be avoided.

(4) Experience has shown that climatic conditions render a great part of Australia's farming territory unsuitable for the production of linseed. Heaviest yields are obtained from certain districts in the south of Victoria and from Tasmania. Nowhere in Australia, however, is flax grown solely for seed. As flax growing is opposed to the declared policy of the Tasmanian Department of Agriculture for the economic development of the farming industries of that State, little if any, production may be expected in Tasmania.

The replies of the Agricultural Departments of the other States show that unsatisfactory results have attended the efforts to grow linseed, and until it can be demonstrated that the crop is profitable it would be useless to endeavor to interest farmers in its cultivation. Estimates of the cost of the production indicate that a yield of 12bush. of linseed per acre at a price of £14 or £15 per ton would, at the present time, just about provide wages and pay expenses. From the data available in Victoria it appears that this yield, although it has been obtained from a restricted acreage, is considerably higher than the average annual production per acre in those districts which have been tested for flax growing. In the circumstances it would be a highly questionable policy to encourage radical departures from existing farm practices, particularly where they would involve the breaking up of valuable pastures in order to devote them to the growing of linseed. Moreover, should it be actually shown that the growing of linseed is, under the conditions of the moment, more profitable than the growing of cash crops such as oats, potatoes, or hay, this fact would furnish no ground for the belief that its cultivation would become a permanent feature of farm management. The history of the industry proves that other crops are favored under normal conditions. There is no evidence, therefore, to justify the hope that the growing of linseed will become an important and stable industry in Victoria.

(5) It has been submitted that consideration should be given to the stimulation of production by means of organised propaganda carried on in conjunction with the respective States. Obviously, in view of the conclusions already expressed, propaganda is not to be commended. Even were the prospects of the industry brighter than they appear to be to-day the success of any attempt to stimulate production on a large scale would depend upon the farmers' co-operation. Many growers in Victoria and Tasmania are still smarting under the unhappy memory of their recent experiences, and until this is effaced the task of the educationist will be a difficult one.

(6) In view of conclusions in paragraph 1, 2, 3, and 4, no suggestion can be made whereby the money set aside under the provisions of the Flax and Linseed Bounties Act of 1930 can be successfully utilised for the further development of the industry.

THE DRAUGHT STALLIONS ACTS, 1932-1933.

The July number of this *Journal* (page 1371) contains a summary of the Draught Stallions Act, 1932. This Act was amended in Parliament during the present session by the Draught Stallions Act Amendment Act, 1933, which is now in force, and which makes the following amendments:—

1. Draught stallions which were three years old and over and which were within the State on July 1st, 1933, are permitted to travel notwithstanding that they do not possess a Government certificate of soundness. This exemption does not, therefore, apply to draught stallions which were two years old on July 1st, 1933, or to draught stallions which were introduced into the State subsequent to July 1st, 1933. The exemption referred to remains in force only until June 30th, 1938.

2. With regard to age, a draught stallion born in any calendar year will be deemed to be one year of age on July 1st of the next calendar year, and thereafter the age of the stallion will be computed from July 1st.

3. After the 1st day of July, 1934, no Government certificate will be issued unless the draught stallion conforms to a reasonable standard in respect of type, breeding, and conformation. No draught stallion for which a certificate of soundness has been issued during the present season will be refused a certificate at any subsequent examination except on the grounds of unsoundness.

4. Appeals against the decision of the examining officer for the refusal of a certificate for a draught stallion which is below a reasonable standard in respect of type, breeding, and conformation may be made in the same manner as appeals against unsoundness except that in this case the Appeal Board is constituted by the Chief Veterinary Officer and two members who are competent judges of draught stock.

5. After July 1st, 1938, the owner of a four or five year old draught stallion which is refused a certificate on the grounds of unsoundness, and where the stallion had been issued with a certificate the preceding year, may apply to the Minister for compensation.

6. The amount of compensation is based upon the market value of the draught stallion on the 30th June preceding the examination when the stallion was refused a certificate and is assessed by a Valuation Board consisting of the Chief Veterinary Officer and two members who are appointed from a panel of competent judges of draught stock, one of the members being nominated by the owner of the stallion. The amount of compensation in the case of a draught stallion which is four years old is one-half the market value and in the case of a five-year-old stallion is two-thirds the market value on June 30th preceding the examination. The decision of the Valuation Board as to the market value is final.

7. The Minister may, upon proof of the castration of a draught stallion, pay the whole or any part of the amount of the compensation assessed by the Valuation Board, and the decision of the Minister in this regard is final.

8. On and after the 1st July, 1938, the exemption provided in the case of draught stallions which were within the State on July 1st, 1933, and the exemption of draught stallions which are used only for the service of mares which are the sole and exclusive property of the owner of the stallion terminate. The Act then comes fully into force, and all draught stallions two years old and over must possess a Government certificate of soundness and approval.

NOTE.—The provisions of the Principal Act as summarised in a previous issue of this *Journal* remain in force with the exception of the above amendments, and should be read in conjunction with them.

THE "LUCERNE FLEA" PROBLEM IN SOUTH AUSTRALIA.

[By J. DAVIDSON, D.Sc., The Waite Agricultural Research Institute,
University of Adelaide.]

(Paper read at 44th Congress of the Agricultural Bureau, September, 1933.)

INTRODUCTION.

The lucerne flea is the most serious pest of clover and lucerne pastures with which the South Australian farmer has to contend; in favorable, wet seasons it may be also troublesome on other crops.

The pest is a small, primitive insect belonging to a group of insects known as "springtails," which chiefly inhabit the soil surface. This particular species, *Sminthurus viridis*, is widely distributed in Europe; in Australia it occurs in various parts of the southern States. It is able to increase in numbers to a remarkable degree when food-plants and weather conditions are favorable.

Mr. W. L. Summers (*Journal of Agric. and Indus.*, S.A., 1900, p. 18) refers to the insect as occurring in numbers in lucerne around Morphettville about 1884. The species is now an economic pest throughout the better rainfall districts of the State. Experimental work on the biology of the insect, carried out at the Waite Institute, has shown that the climate of South Australia, as is also the case with Western Australia, favors the occurrence of the species in large numbers during certain months of the year.

In 1927, Mr. F. G. Holdaway (Pamphlet No. 4, Coun. Sci. and Ind. Res.) published a concise account of his investigations on the lucerne flea, which were carried out at the Waite Institute. The writer has made a detailed study of the problem during the past two years, and the results of these investigations will be published in detail as a bulletin. In addition, the Division of Economic Entomology of the C.S.I. Research has been investigating the problem in Western Australia. Officers of the Departments of Agriculture in the States where the pest occurs have been also investigating certain aspects of the problem.

In Europe, certain investigators, notably W. M. Davies and D. S. MacLagan, have added considerably to our knowledge of the habits of the insect. In 1928, Professor E. Malenotti referred to this species as damaging young, growing wheat near Pisa in Italy (*Atti dell'Accad. d'agricoltura, sc. e lettere di Verona*, vol. 5, p. 5).

1. LIFE HISTORY AND HABITS OF THE INSECT.

The adult insect is about $\frac{1}{12}$ in. long; it inhabits the soil surface and feeds particularly on clovers and lucerne, also on certain broad-leaved weeds like "Cape weed." It will, however, feed on a wide range of plants, and when in large numbers grasses and young cereal crops may be seriously damaged. The insects eat out the green, central portion of the leaves (mesophyll); and damaged leaves have a characteristic, silvery appearance.

The females lay their eggs in batches on the soil; a batch generally consists of about 60 eggs, but the number may be much greater or less than this; a female will lay about 100 or more eggs during her life, in two or more batches, with an interval of about 10 days between the laying of each batch. Each egg, as it is laid, is covered with a brown fluid excreted by the female. For this purpose the female takes in by the mouth, free moisture and soil during the oviposition period. The excreted fluid, therefore, consists of ingested soil particles and secretions produced by the insect; it dries on exposure to the air, forming a covering over the eggs, which is the same color as the soil. This covering safeguards the eggs against egg-eating mites, &c., prevents their rapid dessication, and provides them with adequate moisture; it also serves to hold the eggs in a batch together.

When moisture is favorable, the eggs develop. At a temperature of 52° F. their development takes about 28 days; at 60° F. about 15 days. When the conditions at the soil surface are dry, development of the eggs is retarded, and may be completely arrested. Certain partially developed eggs can withstand dryness for long periods and remain viable. It is these eggs which carry the species over the dry summer months; they hatch with the autumn rains.

The newly-hatched nymphs are active, and eat small holes in the leaves of the food-plant, giving it a speckled appearance. With a mean monthly temperature about 50° F. the insects become adult in about 50 days, and at 60° F. in about 30 days.

The insects are susceptible to dryness. In warm, dry weather they die off rapidly in exposed situations, but may persist in local, moist places. During the summer months, therefore, the insect is generally absent in pastures.

Cold, wet conditions at the soil surface also increase the death rate, so that the number of insects is less in the mid-winter months, especially in the more elevated colder districts of the State.

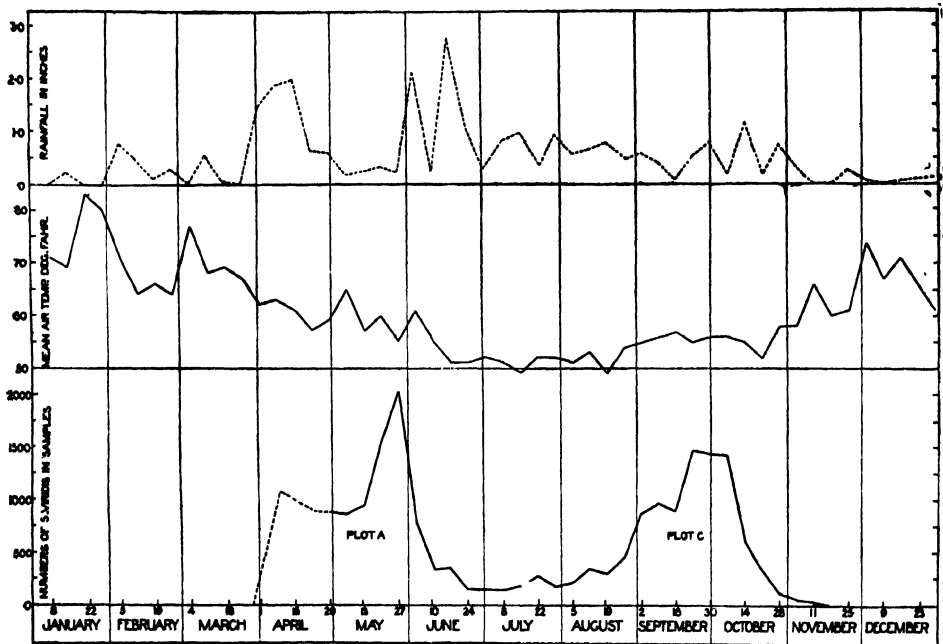


Fig. 1. Illustrating the density of the population of *S. viridis* in lucerne at the Waite Institute during 1932; the mean air temperature and total rainfall, each week, is also shown. The points on the population curve represents the numbers of the insects present each week, in a sample area of 7-10ths of a square foot.

2. WHY DO THE INSECTS INCREASE IN SUCH LARGE NUMBERS?

The economic importance of the lucerne flea in South Australia is due to the large numbers of the insects which develop during the favorable months of the year. When rainfall is adequate, mean monthly temperatures between about 52° F. and 60° F. favor increase in the population if food-plants are available. These conditions occur normally from April or May to September or October, although in some districts the insects are less active during the mid-winter period. In wet years the period is longer, in dry years shorter. It is also longer in the more elevated districts, and also in the south-eastern districts, owing to the moisture in the pastures persisting for a longer period.

A population curve is given in Fig. 1 which shows the numbers of *S. viridis* in lucerne at the Waite Institute during 1932. Three samples were taken twice each week, the area covered by the three samples on each occasion being $\frac{7}{10}$ ths. of a square foot. If we consider the insects to have been evenly distributed throughout the lucerne, the number of the insects per acre reached the high figure of 130 millions per acre in May, and dropped to 13 millions per acre during the mid-winter months. Actually, however, the high density of the population is only temporary, and does not occur throughout the area at the same time, as the insects move outwards from heavily-infested portions owing to competition for space and food.

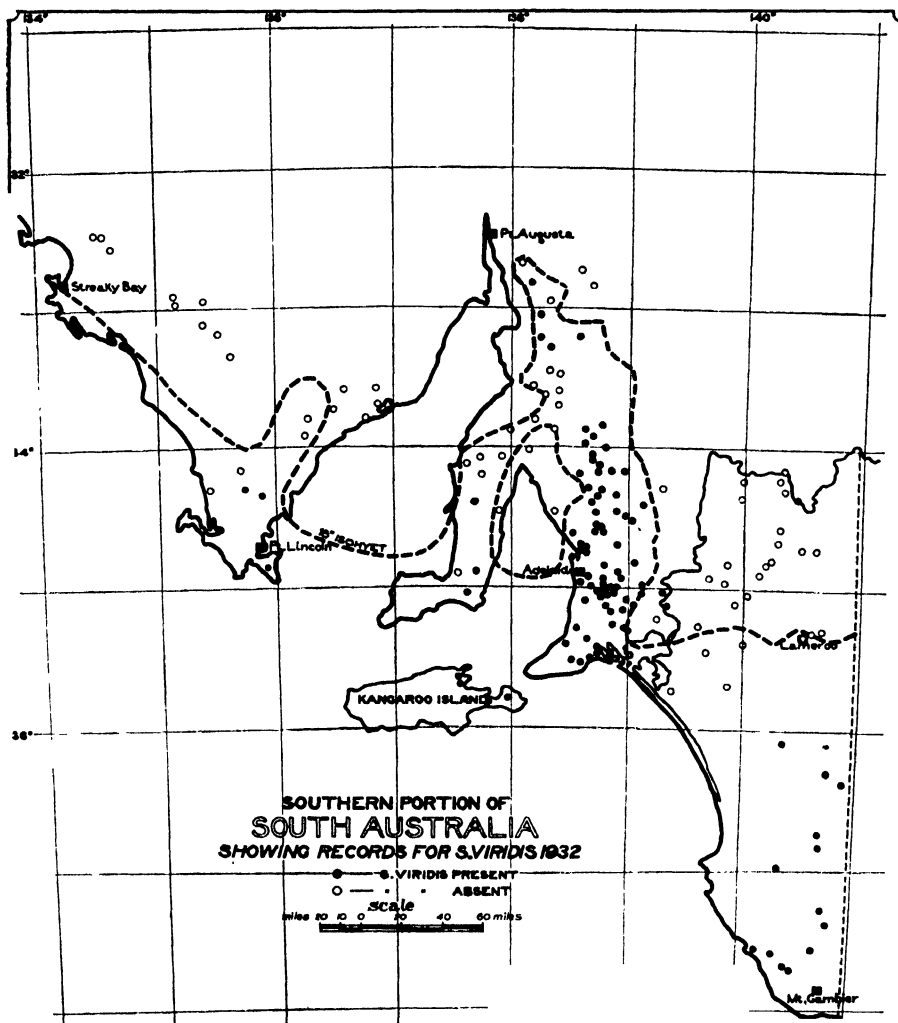


Fig. 2. Illustrating the distribution of *S. viridis* in South Australia from records taken during 1932.

It is clear from Fig. 1 that the insect disappears in the dry season, and that the over-summering eggs hatch in the autumn. There are two periods of greatest increase in the population of the insects, namely, autumn and spring. This is due to the favorable moisture and temperature during these periods. It is owing

to the steady moisture conditions and favorable temperatures during the wet season, together with the ability of the eggs to withstand the dry season, that *S. viridis* is such a serious pest in this State. Rainfall is the dominating factor; and in dry years the area of severe infestation will be much less than in wet years.

3. POSSIBLE DISTRIBUTION OF THE SPECIES IN SOUTH AUSTRALIA.

The density of the population of the insects in any district will depend upon (1) the number of generations of the insect which develop, (2) the number of successive months in which moisture and temperature are favorable, and (3) the availability of suitable food-plants.

In the Northern districts of the State, also in portions of the West Coast and in the upper South-East, the normal rainfall is not adequate to enable the species to increase in numbers. It may occur in local moist situations or on irrigated soils. Furthermore, the light, sandy soil and vegetation is not favorable for the insect.

In 1932, through the courtesy of the General Secretary of the Agricultural Bureau (Mr. H. C. Pritchard), a letter was sent to all Branches of the Bureau requesting information regarding the occurrence of the lucerne flea, and 170 definite records were obtained. These localities have been marked on the map shown in Fig 2.*

It is seen that the 15in. annual isohyet gives a fair boundary to the possible distribution of the species in South Australia. It can occur in local moist situations and on irrigated soils outside this area, but the more serious infestations will occur in the better rainfall districts within this boundary.

In the elevated eastern portion of the Upper and Lower North it will seldom occur in serious numbers owing to the cold, wet conditions during the winter months.

In the West Coast districts, the upper South-East, and Yorke Peninsula the sandy character and alkaline reaction of the soil is not favorable for the insect. The conditions are favorable in the area around Port Lincoln and Maitland, and also on the reclaimed swamps in the Murray Bridge district, owing to the character of the soil and irrigation.

In dry years the area of severe infestation will be confined to the wetter districts. When a sequence of wet years occurs, the area of infestation will be greater, corresponding somewhat to the situation as shown for the year 1932.

The species has reached its permanent limits of economic distribution. The intensity of its increase in numbers will vary from year to year in any district; it will also vary in one district compared with another. Where soil and rainfall are favorable, increase in the density of the population may be expected in favorable years in suitable pastures such as clover or lucerne.

4. HOW HAS THE SPECIES BECOME SO WIDELY DISTRIBUTED THROUGHOUT THE STATE?

We have seen that about 1884 the occurrence of the species as an economic pest appears to have been confined to a very restricted area. Owing to the wide range of food-plants on which the insects feed, its spread throughout the area climatically suitable for it would naturally be expected. This would be assisted by the spread of favorable weeds, such as Cape weed. Improvement in pasture areas in the agricultural districts, particularly the increased planting of lucerne and clovers, has undoubtedly favored the spread of the insect. In the returns

*I would like to express my thanks for the helpful co-operation of members of the Agricultural Bureau in this respect.

for 1921-22 the area under sown grasses, hay, clover, &c., was practically nil; in the returns for 1931-32 the total area was 131,710 acres. The areas under lucerne for these periods were 28,000 and 62,709 acres.*

Owing to the character of the egg batches and the resistance of the eggs to dryness, the distribution of the species from one district to another could be readily brought about by produce or containers contaminated with soil or surface debris. It is evident, for example, that Subterranean Clover seed from an infested district, if contaminated with surface soil, could be a source of infestation in another district. It is the appreciation of this fact which underlies the restrictions regarding the entry into non-infested areas of particular produce from areas infested with lucerne flea.

The insects could be carried in green fodder and readily distributed locally. The eggs, surrounded with soil, could adhere to the feet of stock or implements and be readily carried to other districts.



Fig. 3. Illustrating the effect of spraying lucerne with lime-sulphur; the portion of the plots in the foreground was sprayed on May 9th, 1933; the portion in the background was unsprayed; photograph taken June 19th, 1933.

5. RECOMMENDATIONS FOR DEALING WITH THE PROBLEM.

From what has been said about the biology of the insect it is evident that the problem offers considerable difficulty, owing to the widespread distribution of the insect throughout the better rainfall districts of the State. With any method of treatment of infested pasture the farmer is always faced with the re-invasion of the pasture from the surrounding areas.

In restricted areas palliative measures, such as spraying, will be temporarily effective. In the case of lucerne it has been shown that, by spraying with lime-sulphur, practically complete control can be obtained (Davidson, J., *Journ. Dept. Agric.*, South Australia, vol. 36, 1933, pp. 994-1006). The spraying must be thorough and carried out at the correct time in relation to the habits of the insect.

*I am indebted to the Assistant Government Statist of South Australia for these figures.

It is considered that one application in the autumn, followed by a further application if necessary in the spring, will give satisfactory control, provided measures are taken to prevent re-infestation of the crop from the surrounding area. The economics of this method will depend upon the value of the crop and the thoroughness with which the control measures are carried out.

A number of spraying and dusting experiments have been made with various materials, in co-operation with the Department of Agriculture. It is unnecessary to discuss these in detail here, but I would like to express my thanks to the officers of the Department for their helpful co-operation in the work; and in particular Mr. R. C. Scott, who arranged for the experiments to be carried out.*

With larger pasture areas, spraying or temporary mechanical methods of control are impracticable. There is, however, one aspect of the infestation in such areas which deserves attention. It is commonly observed that the lucerne flea appears in numbers earlier in the autumn in low-lying, damp situations, for instance, along a creek. As the numbers increase the insect spreads over a wider area and infests crops growing in these situations. With the onset of the wet season these situations afford centres for more widespread infestation. It would appear to be economical to treat such local areas early in the autumn.

From the detailed knowledge which has been obtained regarding the habits of *S. viridis* and the causes of its occurrence in economic numbers, there appears to me to be two broad lines of research along which future investigations could be profitably developed.

A. Modifications in the Development of Pasture Areas.

The trend of the modern development of pasture work is towards the establishment of suitable grasses mixed with clover. Grasses are lightly attacked by *S. viridis*, and where these are the only available food-plants its increase in numbers will be small. The investigations on pasture improvement at the Waite Institute show that clovers are desirable in a grass pasture; they provide the nitrogen necessary for the grasses. In such pastures the clover plants may be considerably affected by the lucerne flea, owing to preferential feeding on these plants. In the warmer months, however, when active growth occurs, the clovers will grow away from the attack; in the meantime the grasses afford adequate grazing. By the establishment of grasses with Subterranean Clover the losses due to the insect will be reduced.

There are certain natural clovers, for instance "Haresfoot" clover, which, although unfavorable fodder plants, give nitrogen to the soil, and are therefore beneficial for the growth of grasses. These clovers are unfavorable for the lucerne flea, which appears to be due to their hairy character and less succulent growth; it may also be due to difference in the quality of the sap.

A useful line of investigation would be a study of the association of clovers and the growth of grasses such as *Phalaris* and Rye grass in relation to infestation of the pasture by *S. viridis*.

Where it is possible, an autumn and early winter fallow would temporarily clear a heavily-infested area. The over-summering eggs would hatch with the autumn rains, and the young insects would die in the absence of food; some of them may, of course, wander into the adjoining area. The extent to which the fallowed area became re-infested would depend upon the measures taken to prevent invasion by the insect from the adjoining area, and also upon the nature of the crop grown.

B. Investigations on the Natural Enemies of the Insect.

It has been shown that the conditions in the pasture, particularly as regards soil type, moisture, and temperature, and the presence of clovers and lucerne, have a marked effect on the fluctuations in the numbers of *S. viridis*. The improved pasture areas in the State have increased considerably during recent years, so

*It may be mentioned that the gardener or nurseryman will find the use of a nicotine spray or dust preferable for tender garden plants.

that the insect fauna in these pastures is not so varied as would be expected in old-established pastures. Further information is required regarding the insect and allied fauna in the pastures of countries where *S. viridis* is present, but does not increase in serious numbers. With this information, together with a knowledge of the effects of local climatic conditions, we would be able to understand more clearly the part played by insect and other predators in restricting increase in the population of *S. viridis*. The Division of Economic Entomology of the C.S.I. Research is investigating this aspect of the problem. In June, 1932, Mr. L. J. Newman (Government Entomologist, Western Australia) and Mr. H. Womersley (then an officer of the Division of Economic Entomology) recorded the occurrence of a species of Snout mite (Fam. *Bdellidae*) as an active predator of the lucerne flea in Western Australia (*Journ. Agric.*, Western Australia, p. 289). In May, 1933 (*Journ. C.S.I. Research*, p. 83), Mr. Womersley (now Entomologist to the South Australian Museum), gave an account of observations and experiments with this species of mite (*Biscirus lapidarius*) in Western Australia, from the time when it was first observed (May, 1931) to the end of 1932.

About 3,000 of these mites were sent from Western Australia in July and August this year by Mr. G. A. Currie, an entomologist of the Council of Scientific and Industrial Research. They have been placed in experimental areas infested with lucerne flea at the Waite Institute and certain other centres. Observations will be made on the ability of the mites to increase in numbers in these varied situations, and the degree to which they are able to restrict increase in the population of *S. viridis*. The Department of Entomology at the Waite Institute and Mr. Womersley are assisting in the development of the work in South Australia.

There are a number of species of mites belonging to the family *Bdellidae* or Snout mites. In general, they are predaceous on soft-bodied insects. An important feature of the observations made on *Biscirus lapidarius* in Western Australia is its occurrence in relatively large numbers in three local situations. In certain instances it appears to have checked increase in the population of *S. viridis*. The mite preys on the lucerne flea, particularly on young individuals. It pierces the insect with its rostrum, and sucks out the body fluids; it also preys on allied species of spring-tails.

6. TREATMENT OF PRODUCE CONTAMINATED WITH THE EGGS OF *S. Viridis*.

It is evident that the chief source of the spread of the lucerne flea from one district to another is the contamination of produce or other materials from infested areas with the eggs of the insect. It is necessary to avoid contamination of these materials with surface soil or leaves, &c., resting on the soil surface.

A number of experiments have been carried out at the Waite Institute in order to find out the effect of certain fumigants, such as Carbon-bisulphide and Hydrocyanic acid gas, on the viability of the eggs of *S. viridis*. The effect of the fumigants varies according to the stage of development attained by the eggs and whether they are in the summer resistant stage or in an active state of development as found during the wet season. Further work is necessary on this aspect of the problem.

BREEDING AND MANAGEMENT OF LIVESTOCK.

The Library of the Department of Agriculture has received from the publishers, Messrs. Whitcombe & Tombs Limited, of Auckland, New Zealand, a copy of a book, "Breeding and Management of Livestock," by A. W. G. Lipscomb. It is an excellent work for schools and colleges where secondary agriculture is taught. The chapters on breeding and feeding dairy cattle are particularly worthy of commendation, and the section devoted to pigs should be extremely useful. At the comparatively low cost of 6s. 6d. the book is one which should be in the hands of every student and persons interested in livestock.

DEPARTMENT OF AGRICULTURE.

Bulls that are purchased under regulations of the Dairy Cattle Improvement Act, and upon which Government pays a subsidy, are available, for two years after purchase, to serve a certain number of outside cows.

The following list, compiled by the Department of Agriculture, shows the names of such bulls and of the people who own them, and indicates also the months until which the respective owners will be prepared to make the services available.

As will be noticed, the distribution of subsidised bulls is now fairly general throughout the State; hence, many of those persons, who in the past have found it difficult to get the use of a good bull, should not have much similar trouble in the future. And here let it be stated that everyone of these subsidised animals is a registered pure-bred and from a dam of proved productivity under Government official test.

The maximum service fee is 10s. per cow.

For the information of cowkeepers, it is pointed out that, although the addresses as given in the following list are those to which application should be made for the services of the bulls, the bulls themselves may, in a few instances, be located elsewhere.

Departmental Ref. No.	Breed.	Bull.	Owner.	Address.	Date when Subsidy Conditions Cease.
688	Jersey	Fernden Skipper	A. R. Johnson	Sturt	Dec., 1933
741	A.I.S.	Handsome Miller of Illawarra	H. P. McLachlan	Glenelg	Oct., 1933
776	Jersey	Para Wirra Millie's Pylon	R. J. Finlayson	St. Georges	Jan., 1934
779	Friesian	Glenowie King Sylvia	R. C. McHugh	Burnside	July, 1934
812	"	Murray Glen Netherland Griselda	D. Smith	Hectorville	June, 1934
820	Jersey	Morella Sweet Duke	S. C. Bradley	Richmond Park	June, 1934
845	A.I.S.	Klama Joffre	J. M. Irwin	Hampstead	June, 1934
899	Friesian	Murray Glen Netherland King	A. E. Press	North Adelaide	Sept., 1934
900	"	Glen Murray Pietje Pontiac	Boys' Reformatory	Magill	Oct., 1934
910	Jersey	Para Vale Milkland 2nd	F. P. Smith	Blackwood	Sept., 1934
922	"	Eudunda Damsel's Lord	D. Fitzgerald	Edwardstown	Sept., 1934
927	"	Brinkworth Myra's Repulse	R. and J. K. Goldsack	Glen Osmond	Sept., 1934
687	"	Crofton Viscount	J. T. Oates	Kangaroo Flat	Oct., 1933
1093	"	Glen Ewin Columbine's Masterman	J. C. Hagger	North Kensington	Aug., 1935
1104	"	Sweethaven Butterboy	M. B. Wright	Northfield	Sept., 1935
1131	"	Hampden Jane's Aristocrat	J. A. Bishop	Oaklands	Sept., 1935
1138	"	Burnlea Darkie	W. Harnden	Kersbrook	Sept., 1935
748	Friesian	Anama Netherland Knight	J. J. Burrows	Riverton	Dec., 1933
750	A.I.S.	Fortune of Dunleith	F. J. Nation	Brentwood	Nov., 1933
753	Jersey	Roseworthy Wiseman	T. Henderson	Hallett	Nov., 1933
758	"	Sweet Haven Prince	V. C. Williams	Salisbury	Oct., 1933
762	"	Hampden Queen's King	G. C. Cartwright	Nurloota	Jan., 1934
764	"	Pella Combination	J. S. Holmes	Williamstown	Jan., 1934
767	"	Delma Flora's Lad	F. C. Lindner	Eudunda	Feb., 1934
768	"	Pella Nobleman	C. E. Keller	Wirrabara	Jan., 1934
780	"	Para Wirra Jim	I. C. Worthley	Kangaroo Flat	Jan., 1934
783	"	Para Wirra Bob	E. H. W. Behn	Steelton	Feb., 1934
785	"	Para Wirra Jack	G. Rogers	Koorlinga	May, 1934
788	"	Scrubview Lord Twylish	R. W. King	Georgetown	Feb., 1934
789	"	Scrubview Royal	F. V. Dolling	Mundoorra	Mar., 1934
790	"	Scrubview Duke	M. H. Modystack	Wilmington	Aug., 1934
798	"	Hampden Mariposa's Noble	H. L. Foote	Mount Bryan	June, 1934
799	"	Hampden Blonde's Quality	A. J. Babbage	Brentwood	June, 1934
800	"	Hampden Olive's Aristocrat	H. Masters	Balaklava	May, 1934
801	"	Hampden Peerless King	W. F. Wurst	Laura	May, 1934
806	"	Eudunda Damsel's Lad	A. H. Marschall	Eudunda	Aug., 1934
817	"	Roseworthy Chancellor	Hicks Bros.	Clare	Aug., 1934
826	Ayrshire	Kyby, Rod	C. Whiting	Snowtown	May, 1934
827	Jersey	Para Wirra Percy	A. J. Marrett	Saddleworth	May, 1934
830	"	Para Vale Prince II.	L. W. Frost	Saddleworth	June, 1934
854	A.I.S.	Sunnybrook Flirt's Victor	H. E. Krieg	Willaston	Aug., 1934
852	"	Melvin Noble	W. P. Eckermann	Eudunda	June, 1934
853	Friesian	Anama Netherland Jahn	M. C. Bentley	Koolunga	June, 1934
856	A.I.S.	Klama Royal	J. P. Smith & Son	Tarcowie	Sept., 1934
855	Jersey	Brinkworth Repose	C. A. Ottens	Brinkworth	July, 1934
858	Friesian	Barina Matador Rocket	F. W. Kotz	Emu Downs	July, 1934

PURE-BRED BULLS—continued.

Departmental Ref. No.	Breed.	Bull.	Owner.	Address.	Date when Subside Conditions Cease.
869	Jersey	Para Glen Flashlight	C. E. Mellors	Gawler	July, 1934
874	"	Para Wirra Prince 2nd	A. H. Young	Owen	Aug., 1934
882	A.I.S.	Dunleith Lieutenant	E. A. Kelly & Son	Smithfield	Sept., 1934
883	"	Strathearn Haylo 2nd	L. J. Carman	Undalya	Sept., 1934
884	"	Strathearn Bloom's Searchlight	R. J. James	Riverton	Sept., 1934
885	"	Rivoli Hero	A. H. Frost	Lewiston	Sept., 1934
886	"	Liberton Sutala	J. McCormick	Yongala	Sept., 1934
93	Friesian	Glenowie Netherland Butterboy	L. B. Dean	Morgan	Sept., 1934
894	"	Anama Netherland Joker	E. J. H. Hoepner	Brinkworth	Sept., 1934
897	"	Anama Pontiac Mars	B. H. Hampel	Kybunga	Sept., 1934
905	Jersey	Pembroke Mischief	F. H. S. Hunt	Sandy Creek	Sept., 1934
917	"	Burnlea Echo	D. A. Agnew	Stansbury	Sept., 1934
918	"	Sweet Haven Mercedes Lord	W. G. Johncock	Narridy	Sept., 1934
920	"	Eudunda Glory's Star	M. S. Ferme	Wandearah West	Sept., 1934
923	"	Wooroora Cream Chief	H. B. Scholz	Nuriootpa	Sept., 1934
924	"	Wooroora Trumpeter	J. S. Miller	Auburn	Sept., 1934
930	"	Fernden Bullseye Combination	A. W. F. Pfizner	Eudunda	Sept., 1934
931	"	Cudlee Creek Masterpiece	T. W. Roennfeldt	Greenock	Sept., 1934
933	"	Tuela Senator	R. A. A. Thiele	Julia	Aug., 1934
934	Ayrshire	Angle Farm Richard	A. H. Hewlett	Reeves Plains	Sept., 1934
935	Jersey	Banyule Pylon	W. M. Fletcher	Lewiston	Sept., 1934
936	A.I.S.	The Bluff, The Banker	W. J. Harding	Yongala	April, 1935
946	Friesian	Balaklava Griselda Beets	P. T. Bowker	Laura	Oct., 1934
949	Jersey	Eudunda Flavia's Chief	J. J. O'Sullivan	Tarlee	Oct., 1934
950	A.I.S.	Strathearn Bloom's Cupid	J. F. Rowe	Cradock	Oct., 1934
951	"	Northfield Blossom's Line-light	M. E. Saint	Saddleworth	Oct., 1934
952	Ayrshire	Angle Farm Maxwell	D. Sellick	Templers	Oct., 1934
953	"	Angle Farm Martin	J. P. Orchard	Salisbury	Oct., 1934
955	Jersey	Hampden Carissa's Lad	J. F. Provis	Balaklava	Oct., 1934
959	"	Pella Silver Lining	H. P. Semmler	Lyndoch	Dec., 1934
960	"	Pella Graceful Lad	H. Mader	Eudunda	Dec., 1934
975	A.I.S.	Klama Wizard	T. E. Richardson	Hill Town	Jan., 1935
984	Jersey	Para Wirra Don	E. W. L. Dawkins	Willaston	Feb., 1935
672	"	Morella Sweet Duke 2nd	A. S. G. Barrett	Shoal Bay	Aug., 1933
965	"	Delma Mercedes Duke	A. M. Lodge	Adrossan	Nov., 1934
980	Friesian	Barina Konigen Lad	T. S. Bishop	Melrose	Feb., 1935
996	A.I.S.	Klama Felix	R. K. Bertram	Coobowie	Feb., 1935
1004	Jersey	Morella Belle's Chief II.	F. J. Young	Alford	Feb., 1935
1011	Jersey	Brinkworth Jewel's Star	K. S. A. Dolling	Snowtown	June, 1935
1017	"	Hampden Mayflower's Aristocrat	C. E. Mayger	Kapunda	July, 1935
1010	"	Hampden Brown Chief	G. A. Noll	Canowie Belt	Mar., 1935
1041	A.I.S.	River Glen Flower's Royal 2nd	W. G. Fidge	Bute	May, 1935
1043	Jersey	Tuela Doctor	B. F. Jenkins	Salisbury	May, 1935
1045	"	Tuela Rajah	L. W. Hansen	Farrell's Flat	May, 1935
1046	"	Tuela Sharaoh	A. G. Schunke	Manoora	May, 1935
1056	"	Fernden Double Combination	C. Denholm	Lyndoch	June, 1935
1057	"	Oakhill Master King	D. T. Angus	Clare	June, 1935
1073	Friesian	Barina Echo Beets	G. H. S. Schunke	Mintaro	June, 1935
1074	Jersey	Oakhill Lord Carlos	T. P. T'Anson	Steelton	June, 1935
1102	"	Lara Vale Prince III.	Chapman Bros.	Hoyleton	July, 1935
1107	Friesian	Anama Netherland Laddie	W. D. Price	Kadina	Sept., 1935
1112	"	Murray Glen Echo Beets	C. Cooper	Moonta	Sept., 1935
1117	A.I.S.	Klama Redman	J. Matheson	Snowtown	Sept., 1935
1127	Jersey	Sweet Haven Mercedes' Chief	F. Coleman	Saddleworth	Sept., 1935
1141	"	Morella Dandy	W. H. Thomas	Tarlee	Sept., 1935
1143	"	Morella Princella's Chief 2nd	H. C. Underwood	Balaklava	Sept., 1935
1146	"	Delma Signal	S. Weckert	Brinkworth	Sept., 1935
1150	"	Eudunda Presto	F. N. Gameau	Two Wells	Sept., 1935
1152	"	Para Wirra Dulcie Pylon 2nd	P. O'Shaughnessy	Crystal Brook	Sept., 1935
1154	"	Auldearn Damsel's Chief	M. P. Humphry	Leighton	Sept., 1935
1156	"	Hamley Admiral	W. E. Blatchford	Mintaro	Sept., 1935
686	"	Pella Majestic Duke	C. Burchett	Meadows	Dec., 1933
757	"	The Bluff Ensign	R. M. Bell	Murray Bridge	Feb., 1934
760	"	Channel View Makarini's Lad	Mrs. F. V. Wildman	Yurgo	Feb., 1934
761	"	Channel View McEwin's Boy	P. Doceff	Wellington	Feb., 1934
763	"	Balaklava Rhodesian's Repulse	G. V. Rogers	Victor Harbor	Dec., 1933
766	"	Hampden Carnation's Aristocrat	H. A. Woolley	Mount Barker Junction	May, 1934
769	"	Pella Sly Fox	H. N. Nuske	Tweedvale	Mar., 1934

PURE-BRED BULLS—continued.

Department Ref. No.	Breed.	Bull.	Owner.	Address.	Date when Subsidy Conditions Cease.
770	Jersey	Pella Masterpiece	A. L. Betteridge	Mylor	June, 1934
778	Friesian	Glenowie Netherland Triumph	A. McAlister	Jervols	May, 1934
794	Jersey	Crofton Southern Star	H. B. Kramm	Ambleside	April, 1934
795	"	Crofton Silver King	J. H. Wilhelm	Mannum	May, 1934
797	"	Alexandra's Repeater's Volunteer	J. H. Beare	Milang	May, 1934
822	"	Morella Damsel's Chief 3rd	T. M. Smee	Charleston	Sept., 1934
828	"	Burnlea Allick	S. J. Cox	Strathalbyn	Aug., 1934
835	"	Lanacona Mercedes Duke	A. B. Rowley	Meadows	June, 1934
836	"	Lallawa Master II.	Mrs. G. G. Bowman	Tallem Bend	June, 1934
846	"	Lanacona Noble Kelly	W. F. Roads	Inman Valley	June, 1934
847	"	Lanacona Nimble	Mrs. M. H. Bowman	Dashwood's Gully	June, 1934
861	Friesian	Anama Netherland Paul	K. Lawson	Padthaway	Aug., 1934
876	Ayrshire	Holly Green Queen's Jamie	T. S. Paternoster	Nairne	Aug., 1934
880	Jersey	Lallawa Chieftain 3rd	J. G. Krueger	Sedan	Aug., 1934
881	A.I.S.	The Bluff Waratah's Line- light 2nd	F. H. Rowe	Peake	Sept., 1934
887	"	Sunnybrook Primrose's Pride	H. J. Jagger	Inman Valley	Sept., 1934
888	"	Kiama Pilot	J. B. Kerber	Woodside	Sept., 1934
891	Friesian	Glenowie Netherland Duke	R. G. Magor	Mypolonga	Sept., 1934
898	"	Anama Netherland Dutch- man	S. D. Stoddart	Mundalla	Sept., 1934
904	Jersey	Hamley Alpha Prince	A. B. Herrmann	Mount Torrens	Sept., 1934
911	"	Para Vale Pilot	G. W. Woolley	Mt. Barker Junction	Sept., 1934
912	"	Delma Ballarion	W. H. Roper	Strathalbyn	Sept., 1934
913	"	Oakhill Lord Lotus 3rd	A. B. Hartmann	Palmer	Sept., 1934
914	"	Kangaroo Flat Prince	B. McGlinchey	Millbrook	Sept., 1934
919	"	Bernoota Viola's Duke	R. S. Davle	Mount Pleasant	Sept., 1934
921	"	Eudunda Roderick	A. A. Sickerdick	Tweedvale	Sept., 1934
925	"	Morella Digger	A. Anderson	Meningie	Sept., 1934
937	Ayrshire	Denbigh Advance	J. M. Robinson	Meadows	Oct., 1934
938	Friesian	Murray Glen Sylvia Griselda	R. Gugelmin	Jervols	Oct., 1934
954	"	Glen Murray King Pontiac	R. Williams	Cooke's Plains	Oct., 1934
967	"	Willowvale Knight Posch	D. Thomson	Long Flat	June, 1935
968	"	Willowvale Model Posch	C. Rowley	Myponga	Jan., 1934
969	"	Willowvale Snow Posch	W. R. Evans	Long Flat	June, 1935
972	Jersey	Ontario Marcus	T. H. Rayson	Native Valley	Nov., 1934
973	Ayrshire	Talmon Jamie	F. M. Green	North Gumeracha	Nov., 1934
980	Jersey	Alinda Noble Combination	W. A. Mueller	Ambleside	Jan., 1935
981	"	Alinda Eminent Boy	A. M. Frahn	Mannum	April, 1935
982	"	Alinda Lady's Lad	S. S. Rathjen	Mannum	April, 1935
1001	"	Woorora Rosalind's Orlando	K. M. Bowen	Flaxley	Feb., 1935
1020	"	Eudunda Whoopee	J. Hickey	Jervols	Mar., 1935
1022	"	Ontario Eclipse	A. M. Carruthers	Narrung	May, 1935
1023	"	Ontario Mak	J. Hobbs	Cherry Gardens	June, 1935
1024	"	Ontario Prince	C. C. Spencer	Clarendon	June, 1935
1026	"	Crofton Sultan	C. Weldenhofer	Ponde	Aug., 1935
1028	"	Crofton Talisman	J. Rodda	Ambleside	April, 1935
1029	"	River Glen Red Night	E. S. W. Wise	Jervols	May, 1935
1031	"	Para Wirra Daniel	H. J. Heinemann	Walkerie	Mar., 1935
1033	"	Fernden High Commander	L. H. Powell	Parilla	June, 1935
1042	"	Clarendon Eyre Eminent's Brigadeer	G. R. Nicholls	Pinnaroo	Sept., 1935
1054	"	Timbungalong Excelsior ..	A. Kelly	Milang	June, 1935
1076	"	Channel View McEwin's Dawn	Point McLeay Mission Station	Point McLeay	June, 1935
1078	A.I.S.	Strathearn Admiral	L. P. Peach and C. S. F. Paech	Tepko	July, 1935
1079	Jersey	Retford Skipper	V. T. Bartlett	Murray Bridge	Sept., 1935
1080	"	Cudlee Creek Flashlight	T. M. Smee	Charleston	June, 1935
1096	"	Cudlee Creek Jazz Boy 2nd	H. O. Hannaford	Belair	July, 1935
1110	Friesian	Glen Murray Netherland King	J. O. Kernick	Laneroo	Sept., 1935
1116	A.I.S.	Kiama Dasher	H. B. Kuchel	Murray Bridge	Sept., 1935
1122	Jersey	Gum Hill Defender	R. J. Stone	Bull's Creek	Sept., 1935
1123	"	Gum Hill Lord Grey	L. C. Mann	Milang	Sept., 1935
1124	"	Pembroke Playmate	M. N. Phillips	Strathalbyn	Sept., 1935
1125	"	Pembroke Dusk	J. M. Yelland	Milang	Sept., 1935
1126	"	Glandore Neat Lad	W. L. McDonald	Mount Barker	Sept., 1935
1128	"	Alinda Skipper	W. S. Yelland	Milang	Sept., 1935
1130	"	Hampten Blonde's Oxford	E. L. Goode	Narrung	Sept., 1935
1132	"	Scrub View Victor	D. Mundle	Gumeracha	Sept., 1935
1135	"	Lanacona Don	W. D. Whittam	Ashbourne	Sept., 1935
1136	"	Burnlea Twinkler	J. R. Chapman	Yumall	Sept., 1935
1145	"	Alexandra Dora's Signal	H. S. Stanton	Strathalbyn	Sept., 1935
1147	"	Delma Bellboy	H. J. Edwards	Mount Barker	Sept., 1935
1149	"	Eudunda Karini	S. A. Bone	Pinnaroo	Sept., 1935
789	A.I.S.	Glen Lossie's Sultan	F. D. Gower	Tantanoola	Oct., 1933
744	"	Sovereign of Kiama	A. H. Allen	Mount Gambier	Dec., 1933

PURE-BRED BULLS—continued.

Departmental Ref. No.	Breed.	Bull.	Owner.	Address.	Date when Subsidy Conditions Cease.
745	Jersey	Morella Anemone's Chief V.	A. Robertson	Struan	Nov., 1933
747	Friesian	Anama Black Prince	G. Northern	Glencoe East	Dec., 1933
752	A.I.S.	Alex. of Kiama	R. P. Wallace	O. B. Flat	Dec., 1933
755	Ayrshire	Kyby. Wallace	A. Slater	Naracoorte	Dec., 1933
756	"	Kyby. Bonnie Dandy	Mrs. A. Watson	Millcent	Dec., 1933
765	Jersey	Hampden Juanita's Aristocrat	F. L. Rees	Glencoe East	April, 1934
782	"	Para Wirra Austin 2nd	Mrs. O. C. Martin	Reedy Creek	April, 1934
863	A.I.S.	Illawarra Bonnie	A. C. Bigham	Mount Gambier	July, 1934
872	Jersey	Para Wirra Pansy's Pylon	J. M. Wray	Hynam	July, 1934
877	"	Gambler Major Twinkler	W. F. Koop	Glencoe East	Aug., 1934
878	"	Gambler Rose Chief	C. R. Davis	O. B. Flat	Aug., 1934
879	"	Selsey Royal	C. R. Kerr	Compton	Aug., 1934
895	Friesian	Anama Alcartra Rex	J. S. McElroy	Lochaber	Sept., 1934
896	"	Anama Netherland King 4th	H. L. Miles	Hynam	Sept., 1934
906	Jersey	Pembroke Majestic	F. W. Staudé	Naracoorte	Sept., 1935
947	Ayrshire	Kyby. Ivan	H. J. S. Clark	Moorak	Sept., 1934
948	"	Kyby. Bonnie Prince	M. Glynn	Kybybolite	Oct., 1934
974	Jersey	Gambler Star Bene	C. Hitchcock	Moorak	Dec., 1934
995	Red Poll	Victoria Captain	J. L. Hoggarth	Kalangadoo	Feb., 1935
1048	Ayrshire	Kyby. Oliver	G. D. Stuckey	Rendelsham	May, 1935
1119	A.I.S.	River Glen Mascot	M. Gilders	Beachport	Sept., 1935
1158	Jersey	Rivoli Prince	J. H. Williams	Naracoorte	Sept., 1935
1016	"	Hampden Winsome Boy	H. E. Davies	Uranla	Mar., 1935
1018	"	Hampden Starbright Signal	J. T. Sparrow	Curramulka	Mar., 1935
754	"	Morella Bill	H. L. Bruce	Kimba	July, 1934
781	"	Glen Valley Watchman	C. F. Jericho	Butler	July, 1934
786	"	Para Wirra Iris's Pylon	H. F. Chilman	Warramboe	April, 1934
848	"	Lanacoona Silver Noble	I. R. Preiss	Cleve	Aug., 1934
849	A.I.S.	Sunnybrook Boronia's James	F. W. A. Du Bois	Wudinna	July, 1934
854	"	Klama Starlight	W. C. & F. L. Jettner	Yandiah	June, 1934
908	Jersey	Glandore Neat Boy	G. M. McKechnie	Tumby Bay	Sept., 1934
916	"	Burnlea Dandy	A. R. Butler	Ungarra	Sept., 1934
942	Ayrshire	Angle Farm Roy	C. J. Partington	Lipson	Mar., 1935
964	"	Hampden Blonde's Count	W. Doudle	Coulta	Jan., 1935
966	"	Delma Gipsy's King	E. K. Elson	Cleve	Nov., 1934
985	Jersey	Pembroke Sylvan	J. H. Octoman	Lipson	Feb., 1935
1030	"	Ferden Bell's Combination	J. Newell	White's Flat	May, 1935
1101	"	Black Oak Pretty Mike	G. T. Frost	Alford	Aug., 1935
1108	Friesian	Anama Pontiac Crystal	J. L. Simms	Cummins	Sept., 1935
1109	"	Glen Murray Olda's Crusader	W. V. Jacobs	Edlillie	Sept., 1935
1111	"	Glen Murray Netherland Duke	P. T. Vanstone	Cummins	Sept., 1935
1151	Jersey	Eudunda Pathfinder	D. Forbes	Cleve	Sept., 1935

THE HILLS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR AUGUST, 1933.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during August.	Per Cow during August.	Per Cow July to August.	Per Herd during August.	Per Cow during August.	Per Cow July to August.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
7/E	26	14-23	9,160½	352-33	751-52	387-02	14-89	31-90	4-22
7/H	8-55	5-74	3,424½	400-63	834-75	171-42	20-05	45-48	5-01
7/K	14-71	12-45	9,757½	663-82	1,341-43	396-37	26-95	53-43	4-06
7/KK	20-52	14-87	15,424½	751-68	1,272-11	656-85	32-01	54-28	4-26
7/P	25	23-06	17,224	668-96	1,387-56	814-05	32-59	66-62	4-73
7/T	15-52	5-52	3,310½	213-30	436-13	144-15	9-29	20-43	4-35
7/Y	24	15-65	10,454	435-58	907-44	445-50	18-56	40-19	4-26
7/AA	14	9-42	5,241	374-86	695-89	234-73	16-77	31-55	4-48
7/L	32	23-23	16,250½	507-83	1,034-62	794-29	24-82	51-48	4-89
7/MM	36-77	30-71	26,643½	724-90	1,359-47	1,000-24	27-20	51-29	3-75
7/PP	19-94	11-23	9,754	459-17	899-14	510-93	25-92	47-62	5-30
7/TT	19	13-16	9,571½	503-76	969-65	420-19	22-12	43-21	4-39
7/UU	20-71	12-42	7,864	379-71	607-52	351-09	16-95	27-67	4-46
7/VV	14-26	10-48	8,618½	604-38	1,311-83	392-90	27-55	61-82	4-56
7/XX	20-97	17-94	12,999	619-88	1,243-28	672-13	32-05	63-46	5-17
7/YY	22-89	17-26	8,719	389-41	766-00	348-06	15-58	35-10	4-84
7/BB	71	62-10	42,093½	801-32	1,201-23	1,954-75	25-44	58-10	4-58
7/CC	14-68	12-29	7,017	525-68	925-36	366-03	24-93	45-64	4-74
7/DD	12	10	5,849	487-41	1,041-70	286-72	23-89	51-10	4-90
7/EE	12	10-55	5,653½	471-13	920-63	272-81	22-73	46-16	4-83
Means	22-20	16-67	11,816-48	532-25	1,040-91	531-34	23-93	47-73	4-50

NARRUNG HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR AUGUST, 1933.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during August.	Per Cow during August.	Per Cow October to August.	Per Herd during August.	Per Cow during August.	Per Cow October to August.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
5/C ..	35	28.87	22,382	639.49	5,842.17	1,093.22	31.24	299.10	4.88
5/D ..	35.39	33.45	25,534½	731.27	5,979.21	1,258.52	36.10	321.01	4.93
5/E ..	42.03	32.77	22,860	535.83	5,060.81	1,188.07	27.85	267.18	5.20
5/P ..	35.90	29.77	24,544	683.68	6,566.58	1,194.67	33.28	330.59	4.87
5/R ..	70.77	48.19	29,164	409.60	3,297.23	1,216.49	17.10	138.01	4.16
5/S ..	18	16.19	11,642	646.78	4,472.09	611.76	33.99	218.63	5.25
5/Y ..	27	21.35	11,907½	441.02	5,584.06	646.63	23.95	299.32	5.43
5/Z ..	34.58	33.06	29,885½	864.24	7,559.81	1,453.47	42.03	369.73	4.86
5/Ee ..	17.81	14.90	14,201	797.36	6,361.60	693.86	38.06	320.31	4.89
5/Gg ..	21.45	16.61	7,489	349.13	3,685.36	368.16	17.16	179.51	4.92
5/Ii ..	29	22.97	16,601½	572.47	5,896.97	867.87	29.93	296.90	5.23
5/Jj ..	24	19.32	18,643½	776.81	6,175.75	840.10	35.00	270.61	4.51
5/Kk ..	19.94	11.13	5,533	277.48	4,557.99	282.24	14.15	213.76	5.10
5/Nn ..	24.23	19.58	19,832½	818.51	5,673.14	834.80	34.45	261.85	4.21
5/Oo ..	21.55	15.81	13,237	614.24	5,353.06	597.56	27.73	242.76	4.51
5/Qq ..	21.39	16.97	8,711	407.24	5,017.25	409.40	19.14	275.76	4.70
5/Rr ..	21.48	18.68	9,847	458.42	3,967.64	510.30	23.76	217.65	5.18
5/Ss ..	21	18.65	10,460	498.09	4,712.27	474.50	22.60	221.12	4.54
5/Tt ..	11.97	8.48	7,129½	595.61	5,787.23	313.36	26.18	295.77	4.40
5/Uu ..	22.68	11.97	7,378	325.31	4,495.54	337.24	14.87	203.34	4.57
5/Vv ..	27.29	26.71	20,283½	743.26	7,050.25	808.04	29.61	301.60	3.98
Means	27.74	22.16	16,060.29	579.04	5,316.18	761.91	27.47	259.91	4.74

LAKE ALBERT HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR AUGUST, 1933.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during August.	Per Cow during August.	Per Cow December to August.	Per Herd during August.	Per Cow during August.	Per Cow December to August.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
6/B ..	18.23	15.61	13,490½	740.02	3,845.56	570.73	31.81	174.51	4.23
6/C ..	20.52	13.74	10,497	511.54	4,698.71	451.20	21.99	204.96	4.80
6/F ..	23.94	23.94	23,540	983.29	5,939.65	1,135.66	47.44	297.13	4.82
6/H ..	28	25.81	22,900½	817.87	5,124.43	1,093.62	39.05	245.68	4.70
6/Y ..	11	5	2,418	219.81	3,052.53	98.89	8.99	136.10	4.09
6/Ii ..	24	18.23	12,561	523.37	5,480.53	531.40	22.14	234.42	4.23
6/Ll ..	25	22.39	13,215½	528.62	4,921.11	506.62	20.26	187.63	3.63
6/Oo ..	23	15.87	12,881	538.30	6,734.80	526.76	22.90	299.20	4.25
6/Pp ..	15	12.77	7,893	526.20	4,844.96	373.58	24.91	245.01	4.73
6/Qq ..	23.23	17.68	17,011½	732.81	6,278.72	744.58	32.05	272.35	4.38
6/Rr ..	27.16	21.48	19,613½	722.14	5,931.78	785.13	28.91	252.13	4.00
6/Tt ..	21.55	11.58	8,394	389.51	5,033.42	368.15	17.08	223.56	4.39
6/Vv ..	23	18.52	18,560½	807.09	6,090.16	814.36	35.41	283.68	4.38
6/Xx ..	26.42	18.32	12,689	480.28	5,417.35	552.46	20.91	231.80	4.35
6/Yy ..	29.68	22.84	15,387½	518.45	3,900.10	651.84	21.96	195.35	4.24
6/Zz ..	27.61	19.32	11,726	424.70	5,228.93	571.53	20.70	238.34	4.87
6/Aaa ..	20	17.23	13,909½	695.48	2,404.25	707.55	35.38	127.64	5.09
6/Bbb ..	27.32	19.58	14,706½	538.30	5,766.11	594.61	21.76	234.61	4.04
6/Ccc ..	22.58	18.35	11,262	499.76	4,923.34	479.72	21.25	205.64	4.26
6/Ddd ..	24.13	18.19	12,059	499.75	5,380.44	535.80	22.30	238.00	4.44
6/Eee ..	27.23	25.16	23,792	873.74	7,126.56	963.33	35.38	295.73	4.05
6/Fff ..	27.68	22	17,983½	649.69	6,158.21	714.89	25.83	260.09	3.98
6/Ggg ..	23	21.52	16,668	724.69	7,150.41	654.05	28.44	284.32	3.92
Means	23.45	18.48	14,463.43	616.86	5,346.06	627.24	26.75	235.74	4.34

STATE OF SOUTH AUSTRALIA.

VARIETIES OF WHEAT SOWN, SEASON 1932-1933.

[By W. L. JOHNSTON, Government Statist.]

1. The Government Statist reports that 183 (204) varieties of wheat were reported as sown for the Wheat Crop of the season 1932-33. The total acreage sown for Grain, Hay, and Fodder was 4,274,096 (4,327,153), of which the varieties were not specified for 139,560 (159,449) acres.

2. Particulars of the 16 most popular varieties are given at foot hereof. From these it will be seen that Nabawa 22.13 per cent. and Gluyas 11.54 per cent. once again occupy the first and second place, and accounted for one-third of the total area sown. The Supervisor of Experimental Work in the Agricultural Department (Mr. R. C. Scott) states that Nabawa ripens under adverse finishing conditions, resists flag smut, and is also fairly rust-resistant. He also speaks of the variety 'Sword' as being markedly rust-resistant and as the most important new wheat in cultivation. The area sown increased from 2,922 acres in 1931-32 to 23,047 acres in 1932-33.

3. *The three leading varieties favored in each of the Divisions and their percentage to the total were—*

	1933.	1932.
Central—Nabawa 26, Gluyas 8, Waratah 7.		Nabawa 24, Gluyas 9, Ford 7.
Lower North—Nabawa 24, Waratah 7½, Gluyas 7½.		Nabawa 23, Federation 10, Gluyas 9
Upper North—Ranee, 25, Nabawa 21, Federation 18.		Federn 30, Nabawa 18, Currawa 5.
South-East—Gallipoli 50, Ford 8, Bena 8.		Gallipoli 40, Federation 10, Ford 5.
Western—Gluyas 22, Nabawa 19, Late Gluyas 16.		Gluyas 24, L. Gluyas 22, Nabawa 12,
Murray Mallee—Nabawa 24, Gallipoli 17, Gluyas 9.		Nabawa 20, Gallipoli 14, Gluyas 12.

4. *Varieties Increased.*—The following leading varieties show increases:—Nabawa, 945,869 (802,730); Gallipoli, 325,961 (234,891); Ranee, 305,966 (146,613); Waratah, 209,362 (141,939); Felix, 95,528 (89,145); Dan, 44,776 (40,871); and of the lesser: Aussie, 42,388 (24,058); Faun, 19,792 (16,696); Sword, 23,047 (2,922), and others.

5. *Varieties Decreased.*—Gluyas, 493,085 (570,696); Late Gluyas, 261,352 (324,751); Federation, 170,612 (316,266); Currawa, 130,169 (210,133); Ford, 193,035 (203,250); Sultan, 104,452 (128,976); Caliph, 70,817 (105,163); also Daphne, Sepoy, Canberra, Joffre, Bena, German Wonder, Major, and others.

6. *Sixteen leading varieties of Wheat sown, 1932-33 and 1931-32:—*

Kind of Wheat.	Total Area Sown for Grain, Hay, Etc.		Percentage to Total.		Relative Position.	
	1932-33.	1931-32.	1932-33.	1931-32.	1932-33.	1931-32.
Nabawa	945,869	802,730	22.13	18.55	1	1
Gluyas	493,085	570,696	11.54	13.19	2	2
Gallipoli	325,961	234,891	7.63	5.43	3	5
Ranee	305,966	146,613	7.16	3.39	4	8
Late Gluyas	261,352	324,751	6.11	7.50	5	3
Waratah	209,362	141,939	4.90	3.28	6	9
Ford	193,035	203,250	4.52	4.70	7	7
Federation	170,612	316,266	3.99	7.31	8	4
Currawa	130,169	210,133	3.04	4.86	9	6
Sultan	104,452	128,976	2.44	2.98	10	10
Felix	95,528	89,145	2.23	2.06	11	12
Caliph	70,817	105,163	1.66	2.43	12	11
Canberra	54,591	59,706	1.28	1.38	13	15
Daphne	54,078	65,963	1.27	1.52	14	13
Sepoy	51,872	65,426	1.21	1.51	15	14
Dan	44,776	40,871	1.05	0.94	16	17
Other and unspecified.	762,571	820,634	17.84	18.97	—	—
	4,274,096	4,327,153	100.00	100.00	—	—

ORCHARD, VINEYARD, AND MISCELLANEOUS CROP STATISTICS, 1932-33.

(Valuations of Products are subject to revision).

I. ORCHARDS.

Estimated Value of Total Products, £697,646 (£642,436).

1. *Acreage*.—29,109 (29,077) acres, increase 32 acres; trees of bearing age 25,780 (25,835) acres. Approximately 520 acres grubbed—mostly in counties Adelaide 300 acres, Hamley 75 acres, Albert 68 acres, and Frome 24 acres; also 60 acres died out. New planting, 610 acres, was an encouraging feature, chiefly in counties Adelaide 420 acres, Light 84 acres, Albert 34 acres, and Hamley 27 acres.

2. *Production*.—Generally speaking the crops were an improvement on the previous year, the most notable being:—(a) Apples 881,139 (876,328) bush., an increase of 4,811, but 471,125 bush. below the record yield of 1,352,264 bush. in 1927-28. (b) Oranges (calendar year 1932) 575,046 (574,700) bush., increase 346 bush., just surpassed the record established the previous year. Lemons 40,102 (40,258) bush. Other Citrus 4,420 (4,205) bush. (c) Pears 219,576 (199,331) bush., increase 20,245 bush., created a record, the previous best being 213,688 bush. in 1927-28. (d) Apricots 331,700 (250,013) bush., increase 81,687 bush.; this yield has been exceeded only once, viz., 347,080 bush. in 1928-29. (e) Other Fruits.—Plums and prunes 182,278 (142,308), peaches 129,908 (101,959).

II. VINEYARDS.

Estimated Value of Total Products, £2,353,049 (£2,296,042).

1. *Acreage*.—52,479 (52,498) acres, decrease 19 acres. Vines of bearing age 51,026 (50,886) acres. About 10 acres grubbed or died out, chiefly in counties Adelaide 250 acres, Light 160 acres, River Murray districts 128 acres; and this was not quite counter-balanced by new plantings—about 590 acres—chiefly in counties Adelaide 220 acres, Light 184 acres, and Hamley 116 acres.

The acreage was described as follows:—For winemaking 33,325 (33,572) acres, drying 18,668 (18,379) acres, and table 486 (547) acres.

2. *Total Grape Yield*.—139,532 (118,749) tons, increase 20,783 tons; average per acre of bearing age 2.73 (2.33) tons. For winemaking 68,500 (59,550) tons, drying 70,075 (58,529) tons, and table 957 (670) tons.

3. *Wine Made*.—12,000,000 (10,664,546) gallons, increase 1,335,454 gallons, but 170,260 gallons below the average of the previous five seasons, 12,170,260 gallons.

III. DRIED FRUITS.

Estimated value (included in Orchard and Vineyard Sections)

£748,767 (£849,441).

1. *Currents*.—127,796 (156,393) cwts., decrease 28,597 cwts.

2. *Raisins*.—Sultanas 200,872 (159,591) cwts., increase 41,281 cwts.; and exceeding the previous record 188,503 cwts. in 1929-30. Other Raisins, 47,805 (25,096) cwts., increase 22,709 cwts.

3. *Other Dried Fruits*.—Apricots 18,185 (12,881) cwts.; plums and prunes 8,540 (4,918) cwts.; peaches, pears, apples, &c., 10,268 (8,048) cwts.

IV. MISCELLANEOUS.

Estimated value of products £380,000 (£387,709).

Market gardens 1,896 (1,726) acres; pumpkins and melons 341 (338) acres, 2,031 (1,941) tons; tomatoes 496 (603) acres, 174,435 (180,492) bush.; potatoes 6,454 (5,996) acres, 24,814 (24,062) tons—heaviest yield since 1913-14; onions 429 (405) acres, 3,392 (2,994) tons; other root crops 565 (602) acres, 3,228 (3,623) tons; nurseries 158 (150) acres.

V. OVERSEA EXPORTS.

The value of the total overseas exports of the products of vineyards and orchards for the year 1932-33 was estimated at £1,446,553 (£1,562,075), decrease £115,522, the principal items being dried fruits £612,560 (£578,371), wine £704,363 (£800,587), apples £95,339 (£162,455). Complete details of interstate exports are not available, but annually about £600,000 of wine and brandy are exported to the other States.

RED COMB EGG ASSOCIATION.

OFFICIAL SINGLE TEST.

EGG-LAYING COMPETITION, 1933-34.

SECTION 1.—WHITE LEGHORNS.

Competitor.	Address.	Score to Month ending September 30th, 1933.			
		Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Totals
E. F. Ashmeade	398, Magill Road, Kensington Park	(1) 50	(2) 43	(3) 79	172
L. R. Badcock	77, Findon Rd., Woodville	(4) 47	(5) 82	(6) 69	198
C. J. C. Burton	Mallala	(7) 55	(8) 48	(9) 53	156
C. J. C. Burton	Mallala	(10) 48	(11) 34	(12) 63	145
W. A. Carter	2, Grosvenor St., Glandore	(13) 51	(14) 81	(15) 21	153
W. A. Carter	2, Grosvenor St., Glandore	(16) 76	(17) 80	(18) 26	182
B. Cooke	Kanmantoo	(19) 88	(20) 74	(21) 48	210
H. F. Cox	Samson Road, Glanville Blocks	(22) 28	(23) *	(24) 18	46
H. F. Cox	Samson Road, Glanville Blocks	(25) 49	(26) 57	(27) 70	176
L. H. Crawford	Military Road, Grange ..	(28) 30	(29) 65	(30) 58	153
L. H. Crawford	Military Road, Grange ..	(31) 51	(32) 8	(33) 42	101
R. C. Crittenden	William Street, Kilkenny North	(34) 81	(35) 81	(36) 28	190
Chas. H. Day	Box 28, Salisbury	(37) 60	(38) 36	(39) 57	153
J. H. Dowling	Glossop	(40) 74	(41) 61	(42) 54	189
T. Duhring	Mallala	(43) 66	(44) 67	(45) 47	180
T. Duhring	Mallala	(46) 47	(47) 17	(48) 36	100
H. Fidge	313, Cross Roads, Clarence Park	(49) 43	(50) 33	(51) 41	117
V. F. Gameau	Findon Road, Woodville .	(52) 28	(53) 56	(54) 59	143
W. Chas. Slape	Magill Road, Magill	(55) 68	(56) 89	(57) 75	232
G. C. Gavin	Salisbury	(58) 49	(59) 35	(60) 57	141
G. C. Gavin	Salisbury	(61) 75	(62) 57	(63) 66	198
H. H. Hefford	McHenry Street, Murray Bridge	(64) 51	(65) 40	(66) 9	100
H. H. Hefford	McHenry Street, Murray Bridge	(67) 96	(68) 53	(69) 33	182
W. H. A. Hodgson ..	Commercial Rd., Salisbury	(70) 62	(71) 62	(72) 39	163
W. H. A. Hodgson ..	Commercial Rd., Salisbury	(73) 44	(74) 53	(75) 37	134
E. A. Lamerton	Cross Roads, Edwardstown	(76) 38	(77) 27	(78) 77	142
C. H. Lines, jun. ...	Box 75, Gladstone	(79) 74	(80) 86	(81) 24	184
C. H. Lines, jun. ...	Box 75, Gladstone	(82) 71	(83) 46	(84) 61	178
V. F. Gameau	Findon Road, Woodville .	(85) 59	(86) 56	(87) 29	144
L. A. G. Pitt	24, John Street, Payneham	(88) 67	(89) 54	(90) 53	174
L. A. G. Pitt	24, John Street, Payneham	(91) 78	(92) 73	(93) 57	208
H. A. Rasmussen ...	Swan Terrace, Ethelton .	(94) 29	(95) 71	(96) 76	176
H. A. Rasmussen ...	Swan Terrace, Ethelton .	(97) 66	(98) 62	(99) 45	173
S. E. Reedman	51, Gilbert Street, Gilberton	(100) 51	(101) 93	(102) 40	184
Bruce Rowe	"St. Kevern," Two Wells	(103) 50	(104) 43	(105) 94	187
Bruce Rowe	"St. Kevern," Two Wells	(106) 58	(107) 69	(108) 54	181
H. J. Stacey	Uraidla	(109) 44	(110) 49	(111) 65	158
H. J. Stacey	Uraidla	(112) 72	(113) 73	(114) 15	160
Thomas & Elson ...	53, Clifton Street, Hawthorn	(115) 22	(116) 17	(117) 68	107
Thomas & Elson ...	53, Clifton Street, Hawthorn	(118) 48	(119) 47	(120) 51	146
H. L. Twartz	Gawler	(121) 48	(122) 71	(123) 66	185
H. L. Twartz	Gawler	(124) 55	(125) 37	(126) 64	156
F. F. Welford	1, Ludgate Circus, Colonel Light Gardens	(127) 57	(128) 82	(129) 51	190
F. F. Welford	1, Ludgate Circus, Colonel Light Gardens	(130) 91	(131) 74	(132) 12	177

EGG-LAYING COMPETITION—SECTION 1—WHITE LEGHORNS—*continued.*

Competitor.	Address.	Score to Month ending September 30th, 1933.			
		Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Totals
A. P. Urlwin	Box 80, Balaklava	(133) 45	(134) 72	(135) 67	184
A. G. Dawes	230, Portrush Road, Glenunga Gardens	(136) 98	(137) 71	(138) 58	227
Total—Section 1		—	—	—	7,535
SECTION 2—ANY OTHER LIGHT BREEDS.					
V. F. Gameau	Findon Road, Woodville (Minorcas)	(139) 64	(140) 36	(141) 25	125
M. O. and C. A. Roberts	Torrens Road, Kilkenny (Minorcas)	(142) 21	(143) 46	(144) 26	93
Total—Section 2		—	—	—	218
SECTION 3—BLACK ORPINGTONS.					
Arthur Cook ..	187, Goodwood Road, Colonel Light Gardens	(145) 86	(146) 94	(147) 44	224
B. Cooke	Kanmantoo	(148) 33	(149) 10	(150) 43	86
L. H. Crawford ..	Military Road, Grange ..	(151) 44	(152) 43	(153) 67	154
L. H. Crawford	Military Road, Grange ..	(154) 79	(155) 79	(156) 95	253
Les. Darcy	Myppolonga	(157) 90	(158) 78	(159) 65	233
Les. Darcy	Myppolonga	(160) 42	(161) 74	(162) 41	157
J. H. Dowling	Glossop	(163) 26	(164) 36	(165) 3	65
H. Fidge	313, Cross Rds., Clarence Pk.	(166) 57	(167) 46	(168) 41	144
H. H. Hefford	McHenry Street, Murray Bridge	(169) 54	(170) 15	(171) 90	159
F. J. Hudson	54, Willcox Av., Prospect	(172) 50	(173) 86	(174) 21	157
A. G. Dawes	230, Portrush Road, Glenunga Gardens	(175) 31	(176) 106	(177) 58	195
C. H. Lines, jun.	Box 75, Gladstone	(178) 66	(179) 18	(180) 33	117
C. H. Lines, jun.	Box 75, Gladstone	(181) 66	(182) 36	(183) 65	167
H. J. Mills	Edward St., Edwardstown	(184) 76	(185) 86	(186) 82	244
H. J. Mills	Edward St., Edwardstown	(187) 94	(188) 73	(189) 67	234
J. Rawe	Honeyton St., Seaton Pk.	(190) 77	(191) 36	(192) —	113
S. E. Reedman	51, Gilbert St., Gilberton.	(193) 58	(194) 43	(195) 94	195
S. E. Reedman	51, Gilbert St., Gilberton.	(196) 3	(197) 80	(198) 75	158
H. L. Twartz	Gawler	(199) 37	(200) 80	(201) 65	182
A. G. Dawes	230, Portrush Road, Glenunga Gardens	(202) 100	(203) 91	(204) *	191
N. F. Richardson ...	60, Beaufort St., Wood- ville Park, Kilkenny	(205) 101	(206) 81	(207) 88	270
W. H. L. Wittenberg	3, Rushton St., Goodwood	(208) 76	(209) 17	(210) 32	125
W. H. L. Wittenberg	3, Rushton St., Goodwood	(211) 36	(212) 71	(213) 90	197
W. Woodley	Tailem Bend	(214) 23	(215) 40	(216) 46	109
W. Woodley	Tailem Bend	(217) 59	(218) 34	(219) 39	132
Total—Section 3		—	—	—	4,261
SECTION 4—ANY OTHER HEAVY BREED.					
H. Fidge	313, Cross Roads, Clarence Park (Rhode Is. Reds)	(220) 33	(221) 43	(222) 34	110
V. F. Gameau	Findon Road, Woodville (Rhode Island Reds)	(223) 63	(224) 32	(225) 64	159
V. F. Gameau	Findon Road, Woodville (Rhode Island Reds)	(226) 37	(227) 56	(228) 68	161
H. J. Mills	Edward St., Edwardstown (Rhode Island Reds)	(229) 85	(230) 84	(231) 49	218
W. R. Williams	28, Avenue Rd., Frewville (Rhode Island Reds)	(232) 60	(233) 60	(234) 40	160
W. R. Williams	28, Avenue Rd., Frewville (Rhode Island Reds)	(235) 61	(236) 28	(237) 81	170
Bruce Rowe	"St. Kevern," Two Wells (Barnevelders)	(238) 60	(239) 34	(240) 28	122
Bruce Rowe	"St. Kevern," Two Wells (Welsumers)	(241) 25	(242) 50	(243) 1	76
Total—Section 4		—	—	—	1,176

Red Comb Egg Association—Official Egg-Laying Competition.

Conducted at the Parafield Poultry Station under the supervision of the Department of Agriculture.

LEADING SCORES TO WEEK ENDING SEPTEMBER 29th—FIRST GRADE EGGS ONLY.

WHITE LEGHORNS.			Eggs Laid.	Bird No.
<i>Singles</i> —	A. G. Dawes	98	136	
	H. H. Hefford	96	67	
	B. Rowe	94	105	
<i>Trios</i> —	W. C. Slape	232	55—57	
	A. G. Dawes	227	136—138	
	B. Cooke	210	19—21	
<i>Teams</i> —	L. A. G. Pitt	382	88—93	
	B. Rowe	368	103—108	
	F. F. Welford	367	127—132	
MINORCAS.				
<i>Singles</i> —	V. F. Gameau	64	139	
	M. O. and C. A. Roberts	46	143	
BLACK ORPINGTONS.				
<i>Singles</i> —	A. G. Dawes	106	176	
	N. F. Richardson	101	205	
	A. G. Dawes	100	202	
<i>Trios</i> —	N. F. Richardson	270	205—207	
	L. H. Crawford	253	154—156	
	H. J. Mills	244	184—186	
<i>Teams</i> —	H. J. Mills	478	184—189	
	A. G. Dawes	428	175—177 & 202—204	
	L. H. Crawford	407	151—156	
ANY OTHER HEAVY BREEDS.				
Rhode Island Reds.				
<i>Singles</i> —	H. J. Mills	85	229	
	H. J. Mills	84	230	
	W. R. Williams	81	237	
<i>Trios</i> —	H. J. Mills	218	229—231	
	W. R. Williams	170	235—237	
	V. F. Gameau	161	226—228	
<i>Teams</i> —	W. R. Williams	330	232—237	
	V. F. Gameau	320	223—228	

EXPERIMENTAL FEEDING TESTS CONDUCTED AT PARAFIELD POULTRY STATION.

[By C. F. ANDERSON, Poultry Expert.]

A series of feeding tests are being conducted at Parafield Poultry Station with a view to ascertaining if suitable foods which are obtainable on the majority of our farms can be satisfactorily fed to poultry. The tests are each of 50 White Leghorn pullets, and commenced on April 1st, 1933.

The feeding is as follows:—

No. 1 Test.—Morning—Wet mash composed of 1 part crushed barley, 2 parts wholemeal (by weight), $\frac{1}{2}$ lb. meat meal, 40 per cent. chaffed greenfeed.

Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 2 Test.—Dry mash composed of same proportions as No. 1 Test.

Midday—Green feed. Evening—Wheat.

No. 3 Test.—Morning—Wet mash composed of 1 part bran, 2 parts pollard (by weight), $\frac{1}{2}$ lb. meat meal, 40 per cent. chaffed greenfeed.

Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 4 Test.—Morning—Wet mash composed of 1 part bran, 2 parts wholemeal (by weight), $\frac{1}{2}$ lb. meatmeal, 40 per cent. chaffed greenfeed.

Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 5 Test.—Morning, 2oz. wheat per bird.

Evening—2ozs. wheat per bird. Greenfeed in season.

The following are the numbers of eggs laid by each pen from April 1st, 1933, to September 30th, 1933.

Definite conclusions, however, cannot be given at this juncture with regard to the various methods of feeding. It is necessary for the tests to complete the 12 months before any satisfactory opinions can be formed.

No. 1 Test .. .	3,391	No. 4 Test .. .	3,223
No. 2 Test .. .	2,968	No. 5 Test .. .	1,356
No. 3 Test .. .	2,730		

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

FORTY-FOURTH ANNUAL CONGRESS.

The Forty-fourth Annual Congress of the Agricultural Bureau was held in the Way Hall, Adelaide, on Monday, Tuesday, and Wednesday, September 11th, 12th, and 13th, 1933.

DELEGATES.

The following delegates were appointed by their respective Branches, and the figures indicate the number of sessions for which attendance cards were recorded:—J. Y. Hudd (2), J. R. Hewland (3) (Adelaide); A. J. Pengilly (4), T. B. Flint (5) (Alawoona), W. C. Parish (6), J. L. Laslett (5) (Allandale East); W. Patching (4), W. Sibley (3) (Angaston); G. S. Wurst (0), E. H. Wurst (0) (Appila); R. H. Burns (5), H. D. Noble (5) (Artherton); C. J. Pitt (1), H. H. Pitt (1) (Ashbourne); H. Rollbusch (4), E. W. Mattner (4) (Balhannah); H. Schaefer (4), R. S. Goldney (4) (Balaklava); P. Curtin (0), J. Fradd (0) (Beetaloo Valley); H. D. Eckert (0), J. Vivian (0) (Belvidere); E. R. Moss (5), E. J. Johnson (5) (Berri); H. Paech (4) (Blackheath); G. N. Clark (2) (Black Rock); R. Turner (5), A. Mickell (4) (Black Springs); L. Ashenden (2), F. Berrill (2) (Block E); R. H. Eime (2), E. O. Eime (2) (Blyth); A. S. Just (0), M. A. Cockshell (0) (Bowhill); E. Yelland (4), C. Yelland (3) (Boor's Plains); E. H. Huxtable (3), R. G. Bonython (4) (Borrika); G. Tucker (4), J. Boundy (3) (Brentwood); A. T. Fairchild (5), P. A. Kilderry (6) (Boothorowie); H. H. Martin (4), E. W. Pearson (5) (Brinkley); G. E. Ottens (1), H. Snow (6) (Brinkworth); F. W. Rooke (0), A. Treager (0) (Brownlow); S. Norris (5), W. Norris (3) (Balumbah); R. Durdin (3), L. V. Bell (1) (Buchanan); M. J. Cronin (4), C. C. Cooper (0) (Bundaleer Springs); E. H. Ebsary (5) (Bute); N. G. Stewart (6), D. B. Butler (5) (Butler); J. Murphy (0), D. Cash (0) (Calca); W. H. Todd (2) Caliph; C. Dahl (5), P. Meffert (5) (Chandada); A. R. Haseldine (5) (Charra); M. G. Basey (1), C. G. Terrell (1) (Cherry Gardens); A. Cochrane (6), A. Cox (6) (Chilpuddie Rock); J. Spencer (1), T. Brooks (0) (Clarendon); H. Shipard (6), H. H. Gray (4) (Collie); F. E. Ballard (4), J. C. Wilson (5) (Coomandook); W. L. Redman (4), R. Childs (4) (Coonawarra); J. McCallum (3) (Copeville); K. A. Trigg (5), E. A. Pfeiffer (5) (Cummins); A. A. Voumard (5), A. E. Forbes (6) (Cungena); J. W. Marsh (4), M. B. Telfer (4) (Dudley); W. T. Cooper (5), J. A. Wildman (4) (Elbow Hill); W. Canny (1), E. P. Wall (0) (Eurelia); G. Ashby (3) (Farrell's Flat); M. M. Llewellyn (0), L. A. Dunn (6) (Finniss); P. W. Chittleborough (4), R. Holmes (3) (Frances); H. B. Scheer (0), L. Wachtel (0) (Frayville); K. F. Roediger (1), F. Wormald (2) (Gawler River); R. C. Jacob (5), R. F. Eylward (2) (Geranium); K. L. Blesing (4), J. S. Fisher (4) (Gladstone); B. A. Linke (4), F. Handtke (5) (Goode); C. Whillas (5), H. Reschke (6) (Green Patch); H. Helbig (5), H. Lange (6) (Greenock); R. J. Laing (1), I. E. Randall (3) (Gumeracha); T. E. Goodridge (4), A. Hermes (3) (Hanson); R. H. Cross (3), J. Brook (3) (Hartley); C. F. Kightley (4) (Hindmarsh Island); C. H. Fisher (5), S. Coad (5) (Hope Forest); A. M. Fuller (0), W. F. Roads (3) (Inman Valley); L. Simms (3), O. E. Ely (2) (Jervois); R. G. Messenger (5), A. W. Paltridge (5) (Kalangadoo); A. H. Woodhead (4), W. Gregor (3) (Kanni); J. H. Lawrence (0), T. N. Wright (1) (Kapinnie); H. K. Freeman (4), J. A. Freeman (4) (Karcultaby); A. Hawkes (0), R. H. Harrold (1) (Karoonda); A. M. Densley (4), T. A. Dickson (4) (Keith);

I. Grund (2), E. H. Eatts (5) (Kelly); W. Goodall (6), C. Stevens (4) (Ki Ki); F. H. Koch (4), C. E. Heinrich (0) (Kilkerran); T. Gratwicke (0), H. Gordon (0) (Kongorong); H. Spencer (2), E. T. LePage (1) (Koolunga); R. Gallasch (4), A. Hermann (4) (Koonunga); V. W. Gardner (5), M. T. Gardner (5) (Koppio)[†]; H. H. Jericho (0), J. Guthleben (0) (Kulkawirra); E. A. Kelly (6), A. J. Simmons (6) (Kyancutta); H. L. Miles (4), J. M. Wray (4) (Kybybolite); J. H. Spratt (6), R. A. Jenkins (0) (Lameroo); N. S. Wheller (0), P. H. Nurse (2) (Langhorne's Creek); E. Pech (5), C. Amey (3) (Laura); A. J. Howell (5), P. S. Morrison (6) (Laura Bay); T. W. Roenfeldt (1), C. Verrall (6) (Light's Pass); E. J. Barraud (3) (Lipson); S. Turnbull (0), E. Fromm (0) (Lone Pine); K. Hocking (1), G. Barnes (0) (Lone Gum and Monash); F. C. Copping (1), W. O. Smith (3) (Lucindale); W. H. Lawes (2), E. C. Filsell (4) (Lyndoch); B. Fry (1) (Macelesfield); E. C. Seager (2), J. N. Wood (4) (MacGillivray); V. B. Schwarz (6), M. J. Martin (5) (Maltee); R. J. Turner (3), W. F. Munday (4) (Mangalo); A. Rogers (4), W. S. Gray (6) (Marama); G. Connor (2), F. B. Wilson (2) (McLaren Flat); C. D. Schubert (3) (Meribah); A. Mathieson (6) (Milang); H. J. Hutchesson (5), L. Watson (5) (Millieent); J. P. Story (4), G. E. Smith (2) (Miltalie); S. C. Billingham (1), W. H. Chartier (4) (Minnipa); A. E. Hein (5), C. F. Altman (4) (Monarto South); C. Stock (4), M. Herbert (4) (Moorlands); G. W. Vercoe (3), R. Loxton (4) (Moorook); B. S. McCallum (4), E. Tillbrook (2) (Morchard); H. Hunt (1), L. Frame (1) (Mount Barker); A. A. Jefferies (0), J. L. Connors (0) (Mount Bryan); A. J. Hemmings (6), G. T. Gurry (6) (Mount Gambier); G. Vigar (3), T. Speed (2) (Mount Hope); D. Learmouth (0), J. H. Buckley (4) (Mount Pleasant); A. R. Maguire (5), A. C. Watson (1) (Mudlamuckla); A. Ross (5), A. W. Hillier (5) (Mundalla); A. Wells (5), K. C. McLean (0) (Murray Bridge); E. B. Pitman (4), B. Starr (2) (Murraytown); W. Eatts (0), H. White (6) (Myponga); N. T. Robinson (1), C. W. Young (1) (Nantawarra); C. Bray (1), G. Wright (5) (Naracoorte); J. W. McNicol (1), J. Thompson (2) (Narrung); F. Williams (5), A. M. Lawrie (0) (Nelshaby); A. E. Jennings (3), A. K. Bald (0) (Netherton); H. T. Luestner (3), P. A. Luestner (4) (Nunjikompita); B. Harding (4), E. Peltz (0) (Nunkeri); E. R. Pfeiffer (4), J. S. Foggo (4) (O'Loughlin); C. Bartel (4), L. J. Atkinson (5) (Overland Corner); W. J. Marshman (0), G. Rapko (0) (Owen); W. Sheedy (0), S. H. Rashleigh (6) (Palabie); C. W. Neindorf (5), C. S. Foale (6) (Parilla); J. S. Ferguson (5) (Parilla Well); A. D. Sanderson (4), A. E. Isaacson (5) (Parrakie); A. A. Petch (0), E. Gregory (5) (Paruna); R. S. Bussenschutt (4), J. Prouse (4) (Paskeville); W. A. Clifford (3), F. W. Hinze (5) (Penola); A. T. Duke (6), J. H. Richardson (5) (Penwortham); C. H. Scholz (6), A. L. Berry (6) (Pinbong); S. C. Johnson (5), B. J. Hudson (3) (Pinkawillinie); A. E. Davis (5), S. Bone (4) (Pinnaroo); J. Brown (2), J. P. Colebatch (4) (Port Elliot); A. Day (6), A. R. Kammermann (4) (Pygery); R. Thompson (4), J. Castine (4) (Quorn); A. E. Seary (0) (Rameo); J. V. Dundas (4), H. J. Crouch (3) (Red Hill); W. M. Andrews (5), F. R. White (5) (Rendelsham); M. B. Geneste (4) (Renmark); W. J. Kelly (0), A. B. Wright (0) (Richman's Creek); F. Masters (5), S. E. Barber (6) (Roberts and Verran); S. C. Sincock (2) (Rosedale); S. L. Bowden (2), E. T. Oates (0) (Roseworthy); F. W. Coleman (3) (Saddleworth); R. L. Thorp (1), E. L. Atkinson (1) (Scott's Bottom); G. Barrett (4), E. B. Bell (3) (Shoal Bay); G. O. Lovelock (3) (Smoky Bay); J. B. Kirchner (5); A. E. Dolling (5) (Snowtown); P. H. Quirke (4), E. F. Ward (4) (Stanley Flat); C. M. Hudd (4), R. Sissons (3) (Strathalbyn); C. H. Williams (5), W. J. Williams (5) (Streaky Bay); E. F. Boehm (5), H. C. Colebatch (1) (Sutherlands); L. F. Osborne (5), J. Chant (4) (Tantanoola); W. J. Hammond (5), P. R. Hodge (5) (Taplan); E. Benson (3)

(Taragoro); L. Hannaford (3), W. B. Kelly (1) (Tarlee); F. B. Milne (0), L. H. Butler (5) (Tatiara); E. W. Berry (6), L. Miller (0) (Truro); A. Hatcher (5), W. S. King (1) (Virginia); T. Thompson (5) (Waikerie); C. F. Zippell (4), J. Palmer (4) (Wallala); W. C. Slater (0), J. S. O'Shaughnessy (2) (Wandearah); F. L. Williams (1), R. F. Woodman (4) (Warcowie); P. E. Daniel (6), C. Woods (4) (Warrambo); G. Holder (4) (Watervale); A. W. Kelly (1), A. V. Mitchell (3) (Wauraltee); W. J. Anderson (0), L. A. Slade (0) (Weavers); C. H. Knauerhase (5), T. F. Orrock (5) (Wepowie); P. C. Cole (3), H. E. Stevens (4) (Wilmington); A. B. Curtis (6), P. J. Curnow (5) (Wirrabara); P. C. Jacka (6), J. S. Miller (3) (Wirrilla); H. Doley (0) (Wirrulla); D. Butler (5), K. Ridgway (5) (Wolseley); C. A. Newbon (3), F. L. Johnson (4) (Wudinna); E. A. Spriggs (0), A. Spriggs (0) (Yadnarie); G. P. Roe (5), T. L. Nottle (4) (Yaninee); G. W. Proctor (6), R. R. Wilson (5) (Yeelanna); H. M. McKenzie (5), G. R. Tregilgas (4) (Yurgo).

OPENING SESSION.

Congress was opened on Monday evening at 8 p.m. by His Excellency the Governor, Brigadier-General the Hon. Sir Alexander Hore-Ruthven, V.C., K.C.M.G., C.B., D.S.O. Mr. A. J. Cooke (Chairman of the Advisory Board of Agriculture) presided, and there were also present on the platform:—Hon. A. P. Blesing M.L.C. (Minister of Agriculture), Messrs. J. W. Sandford, A. L. McEwin, F. Coleman, H. N. Wicks, S. Shepherd, P. J. Bailly, P. H. Jones, Dr. A. E. V. Richardson (members Advisory Board of Agriculture), C. A. Loxton, B.V.Sc. (Chief Inspector of Stock), Dr. A. R. Callaghan (Principal Roseworthy Agricultural College), Dr. J. Davidson, Messrs. G. Samuel, M.Sc. (Waite Institute), W. L. Summers (Secretary Minister of Agriculture), W. J. Spafford (Deputy Director of Agriculture), G. Quinn (Chief Horticultural Instructor), C. F. Anderson (Government Poultry Expert), R. C. Scott (Supervisor Experimental Work), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary Agricultural Bureau).

THE GOVERNOR'S ADDRESS.

His Excellency said that there was no question as to the value of the Congresses of the Agricultural Bureau. One of the greatest handicaps the primary producer had to contend with, compared to those in the cities, was the difficulty of co-operation. They were so widely scattered that it was very seldom that they could come together and discuss their problems, and, as organised bodies, make their influence felt and their difficulties known.

It cannot be too often repeated that the rehabilitation of the primary producer and the restoration of his purchasing power are the most important things that must be done if national and world prosperity is to be revived, he added. Day by day, too, your task becomes more complicated and more technical. Not only have you to work your land, to think of soil and climate, but you have also to consider the question of economics, exchange, marketing, transport, and the cost of production. At the moment the question of marketing is the most prominent and difficult of all.

Efficient marketing makes the difference between the farmer getting a fair price for his produce and the man who handles the farmer's produce getting more than his share—the farmer getting a minimum result for a maximum of labor. Scientific marketing is a question that demands our very careful study. We know how successful the Danish farmers have been in marketing their produce, and we often ask ourselves, why? The Danish farmer is not a better man than ourselves, he has not any better soil, and his transport difficulties are great. But he has learnt the secret of marketing, of grading and producing his goods in an attractive form. And he has made one golden rule that nothing

but the very best under any conditions is allowed to leave his shores. He has also realised that one bad consignment will spoil his market and give his goods a bad name.

WORLD SUFFERING FROM MAL-DISTRIBUTION.

It has been suggested that the world to-day is suffering from over-production, but I think that we are gradually coming to the conclusion—and I think even our economists are more or less in agreement on this point—that it is not so much a question of over-production we are suffering from as mal-distribution. Scientific methods of production have outrun scientific methods of distribution. Science has brought about mass production, not only in our manufactured articles, but in our primary products and raw materials as well.

The soil can now produce far more than it ever could before. But unfortunately, at the same time, owing to various causes—hoarding of gold, fluctuating exchanges, and impenetrable tariff barriers—the arteries of distribution have become congested and choked, and the solution of the world's problems to-day lies in finding a means of clearing those arteries. It is a case of privation in the midst of plenty. A great deal of wealth of the world is lying idle, and at the same time there are millions of idle hands. The problem is to enable those idle hands to earn and circulate that idle wealth.

EASTERN MARKETS NEED EXPLOITING.

It has been suggested that production should mark time until distribution comes up into line with it. We have, I think very wisely, turned that down in this country. It was not feasible; it was not desirable; it was uneconomic. Moreover, one cannot say that there is over-production in the world until all the backward races enjoy the same luxuries and amenities of life as the more civilised communities. Civilisation is advancing by leaps and bounds. Science is cheapening production and placing our goods within reach of millions who were unable to procure them before.

In the old days we depicted the savage as arraying himself in a tall hat and a pair of spats, and nothing else, as the first sign of civilisation. To-day he is demanding a complete suit of the best cut and material, and the latest Paris fashion for his womenkind. We do not suppose that the Japanese, for instance, are going for ever to be contented to live in paper houses and eat rice as their staple food. But we must remember that other nations are alive to the awakening of the East just as much as we are. Geographically speaking, we are favorably situated. In our temperate climate we can produce goods which cannot be produced in the tropics, and at the same time we are in easy reach of those markets, compared with our rivals in Europe and other parts of the world.

MUST GO OUT AFTER TRADE.

But even these advantages will not last for ever. The methods of transportation and communication are also progressing and producers in every part of the world are being thrown into mutual competition, and that process is destined to grow. So we must not sit under the tree and wait for the fruit to fall into our lap. We must climb into the branches and help ourselves before others come along and select the best. The first man in gets the markets, and once in he is very hard to displace.

We must be careful in Australia not to become so absorbed in our local affairs that we lose sight of what is going on in the world outside, and miss our opportunities. We are somewhat out of the beaten track in a backwater, but the great tide of human progress goes rolling on all the time. Those who look ahead and read the signs correctly and sow the seeds in the early days are going to reap the harvest in the future.

My message to you to-night is to revive that pioneer spirit of the past and seek out fresh markets. Look beyond your own immediate neighbors. Let scientific development of your markets go hand in hand with scientific development of your land. There is an old song called "I Hear the East A-Calling." Let that refrain ring in our ears and stimulate us to renewed efforts in those undeveloped regions.

Dr. Richardson moved and Mr. Sandford seconded a vote of thanks to the Governor for opening the Congress.

THE MINISTER'S SPEECH.

The Hon. A. P. Blesing, M.L.C. (Minister of Agriculture) said:—In these times of economic stress it should be a matter of congratulation among us that this 44th Congress of the Agricultural Bureau should open under the auspices of relatively favorable weather conditions over the greater part of our agricultural areas. There was a time, during the opening months of the season, when crop prospects were far from satisfactory; to-day, however, subject to a continuance of favorable spring conditions, it is possible to anticipate a State crop yield above the average.

Unfortunately, from the economic aspect, prospects are hardly as pleasing. We are not yet out of the grip of those world factors that have made for low prices during the past six or seven years. With you, I rejoice in the recent improvement in the wool position. I trust that it may be but a foretaste of benefits to come, and that our great pastoral industry will know how to take full advantage of it; and may I add the hope that future successes may not make us forget the lessons of the immediate past.

It is regrettable that the prospects of better wheat prices for this season's harvest should not be as bright as those of wool. You all know the prominence recently given to wheat at the London World Economic Conference. It appeared at one time that because agreement appeared impossible on any single economic factor wheat was to be made the scapegoat for the failure of the Conference; and, judging from press statements, the fact that Australia's interests could not be brought into line with those of such countries as United States of America, Canada, Argentine, Russia, &c., it seemed as if Australia would have been asked to accept the position of the scapegoat for the failure not only of the wheat section of the Conference, but for the Conference as a whole.

We know that finally some sort of agreement has been patched up; and we hope that some good may ultimately come of it; but in what manner it is likely to raise the price of our 1933 wheat above the present low level it is exceedingly difficult to see, particularly as we know that the world carry-over of wheat from the immediately preceding season was abnormally large. In this connection, I shall state that the Government to which I have the honor to belong believes that the wheat farmer is entitled to costs of production at railway sidings; and should prices continue at their present low level, will take early steps to press upon the Commonwealth Government the necessity of finding adequate funds for assisting wheat farmers.

I congratulate you on the increase in the number of your country Branches. I notice that the number has risen from 316 in 1932 to 331 at the present time. I am an old Bureau member, and appreciate fully its advantages to our more or less isolated country producers; and you can rest assured that all your legitimate requests will receive my earnest and sympathetic consideration. I am very pleased to notice that out of 331 Branches, 38 are Women's Branches. No farmer can hope to succeed in his business without a competent wife, and the latter as much as her husband stands in need of exchange of ideas with others. The ideal to be kept before you should almost be "as many Women's Branches as there are Men's." In this manner efficiency in the home will be speedily reflected by corresponding efficiency on the farm.

WHEAT BREEDING.

The importance of wheat breeding to the State hardly needs emphasis at such a gathering as this, for all of you present at this Conference realise the value and necessity of a progressive programme of wheat breeding in a State such as ours, where wheat is the major primary product. Such a programme is being exploited to the fullest extent of the resources at our disposal at Roseworthy Agricultural College. That the wheat breeder's objectives in this work should be based on the soundest premises is of the utmost importance to the wheatgrower. Essentially the object of the breeder is to increase the monetary returns of the grower, and by the grower I do not mean the individual farmer so much as the farming community as a whole. It is possible to go on increasing the yield per acre at the expense of quality, but with the risk of losing prestige on the wheat markets of the world. The quality of our wheats must be given greater consideration in the future, and for this reason it is the policy of the College to aim at producing wheats of higher average quality than the low standards set by leading varieties, such as Nabawa and Free Gallipoli. It should be fully realised, however, that intrinsically high quality is not the object, for it is doubtful whether for our climatic conditions a wheat can be bred which will yield as well as our present standard varieties, and at the same time possess the quality of the best Canadian wheats, but wheats of better average milling value can be produced, and the object is to produce a wheat capable of yielding as well as, or better than, say, Nabawa, but of a superior milling quality. If a variety of higher yielding capacity is produced, but of lower flour strength, then the requirements of the State will not be met. The individual farmer may gain temporarily as a result of the immediate increase in yield per acre, but such a gain would be soon offset if the quality were below that expected of Australian wheat on the world's markets. I am pleased to be able to report that crosses were made at the College last season with this object in view, and by the use of a simple flour test, which can now be carried out on small quantities of grain, selections will be made from these crosses with the greatest confidence.

The matter of disease resistance is also receiving close attention, and varieties known to be resistant to certain diseases have been chosen for use as parents. Concisely, the aim of wheat breeding work at the College may be stated to aim at producing high yielding varieties, possessing good field characters, such as non-shattering tendencies and strong straw, as well as being of better quality and at last equal in disease resistance to our leading varieties of the present time. In recent years the New South Wales Department of Agriculture has pursued an extensive programme of wheat breeding, and during a recent visit to that State I was able to obtain small quantities of seed of some of their more promising new varieties, which are known to be of satisfactory milling quality. These varieties are at present being grown at the College, but while we can hope that varieties bred in other States will suit our soil and climatic conditions, it does not always follow that they will, for it is surely significant that the greatest proportion of the wheat grown in this State is of varieties bred by this State at Roseworthy College. Certainly this is true of outstanding crops. One need only scan the names of the varieties of winning crops in the wheat crop competitions to realise this, for Sword and Ford, two wheats bred at the College, have had pride of place in practically all cases.

It would seem that while we might adopt a comprehensive scheme of introduction of varieties bred by other States, that the best results would not accrue. Only by breeding varieties suitable to the particular climatic and soil conditions obtaining here can the best results be obtained, and for this reason we cannot, and must not, neglect our wheat breeding work. The gain from such work pays for it year after year by even the increase of one bushel per acre, and it would be a short-sighted policy, and one of false economy, to neglect such a national project.

Coupled with the wheat breeding work at the College is the systematic production of pure seed of the leading varieties at present commercially grown. The selection, multiplication, and re-multiplication of such seed, which requires very careful and conscientious attention, has been put on the soundest lines, and every possible precaution is being taken to prevent admixture of any description.

This work is well in hand, and it is confidently anticipated that reliable pure seed of the most important varieties will be regularly available in the future.

I notice that you have made provision for a special session on dairy matters, and in view of the recent progress in the industry, this is as it should be. Until quite recently we had been losing ground in dairying. Since 1929-30 our dairy cattle have increased by about 45,000 head, or nearly one-third; our butter production (21,000,000lbs. in 1932-33) has almost doubled; our cheese production (6,000,000lbs. in 1932-33) has also nearly doubled; our butter exports (9,500,000lbs. in 1932-33) have increased by nearly 9,000,000lbs. since 1929-30. No cheese was exported prior to 1931-32; in 1932-33 we exported 1,579,000lbs. You are, of course, aware that a Royal Commission was recently appointed to inquire into the dairying industry, and we hope that its report will soon be available. Its recommendations will receive our earnest consideration, and to the extent that we think feasible, will be adopted.

Progress in the poultry industry has also been outstanding of recent years. In this connection it will suffice to point out that whereas in 1930-31 we exported about 773,000doz. overseas, in 1932-33 our exports rose to about 3,841,000doz., or an increase of over 3,000,000doz.

Consideration of the progress that has been achieved of recent years in our rural industries must bring to mind the recent death of that old pioneer of progress, the late William Lowrie. To the younger generation among you he is perhaps no more than a name; but I am sure that there are many here to-night who had the privilege of listening to, and who have subsequently benefited by advice he gave in the nineties of last century. It is singularly appropriate that reference should be made to him at this Congress of the Agricultural Bureau. Mr. Lowrie was one of the original members of the Central Agricultural Bureau, and, until his recent demise, the last surviving member. The farming community as a whole owes a debt of gratitude to all those men, but in particular to Professor William Lowrie. What to-day forms part of the everyday routine of all successful farmers was a novelty in his day, and that this should be so you owe very largely to Lowrie's demonstration work and his skilful advocacy of improved methods. His name will always be linked with such progressive methods as the practice of tilled bare fallow before wheat; the use of superphosphate; the association of sheep with wheat in South Australia, &c. Nor should it be forgotten that, together with his predecessor (Professor Custance) he laid the foundations upon which the Roseworthy College has gradually developed. It can be said that with William Lowrie has passed away a man who foresaw the future possibilities of South Australian farming, and by his efforts induced the farming community gradually to follow the course which has led to modern achievements.

Reference to Roseworthy College reminds me of the recent appointment of Doctor A. R. Callaghan as Principal. He came to us from New South Wales with excellent qualifications. Doubt was expressed at the time as to the wisdom of the appointment of a man of his age to so important a position. He has now been with us for over twelve months, and it can be said that he has fulfilled the best hopes entertained of him. I hope that many farmers will send their sons to Roseworthy.

I trust that this Congress will rank among your most successful ones; and that you will return home determined to garner in a crop which will be not only useful to yourselves, but to the State as a whole.

THE CHAIRMAN'S REPORT.

The following report on the activities of the Advisory Board during the past year was read by Mr. A. J. Cooke:—

The past year has been one of the busiest periods which the Board has experienced for many years. Careful consideration has been given to a large number of resolutions, proposals, and suggestions made to the Board, and wherever there were opportunities of meeting the wishes of Branches, efforts were made to seek concessions or assistance in the best interests of the primary producer.

The main difficulty to contend with during times like the present is that of Government finance. In fact, in some instances this has been the only stumbling block barring the way to the successful attainment of requests submitted to the Government. Such requests, however, have not been lost sight of, as it is the policy of the Board to review them from time to time, so that when favorable opportunities present themselves further representation will be made in order to place before the Government reasonable avenues by which assistance can be given to the farming community.

The resolutions submitted by Congress, Conferences, and Branches dealt with a wide range of subjects, and I propose to outline briefly what has taken place on these matters since we met 12 months ago.

At last year's Congress an urgent request was made for an investigation into mammitis in cattle. I have pleasure in reporting that steps have been taken by the Australian Dairy Cattle Research Association to investigate this disease, as well as contagious abortion and other diseases affecting cattle. This work is being conducted in New South Wales and Victoria, and the Association is in active co-operation with its branch in South Australia.

In connection with railway matters, attention was drawn to the necessity for the careful handling of cans of cream at stations and sidings, and during the year rail freights on wheat, livestock, and wool have been reduced by 20 per cent. of the previous rates.

Representations were made to superphosphate manufacturers for a reduction in price, and it is pleasing to note that public announcements have been made to the effect that reductions have recently been made. While speaking on this question, I would like to remind our members that users of fertilisers for purposes other than wheat-growing may secure from the Federal Government an allowance of 15s. per ton during the year ending November 30th next.

In respect to the Farmers Relief Act, measures were taken by the Government to extend the operations of the Act so that farmers may obtain finance to pay for such items as Life and Fire Insurances, Clothing, Medical Expenses, Subscriptions to Friendly Societies, Machinery, Fencing Wire, Stallion Fees, Subscriptions to Veterinary Lodges, Veterinary Services, and Rabbit Poison.

The question of purchasing stallions through the State is one matter which is to be again brought under the notice of the Board for further consideration.

The conditions under which farmers were working in relation to transport of their produce—and which were brought before last year's Congress—have been materially altered in as much as primary producers may use commercial vehicles for purposes other than the carriage of goods for hire or reward and further, a large number of permits for the carriage of primary products—including lambs, calves, and pigs—over various roads of the State have been granted by the Transport Board.

Special representation was made to the Government during the year for better facilities in connection with veterinary services. Many members here to-night will remember the popular lectures and demonstrations given by the late Dr. Place, and there have been continual requests by Branches for similar lectures. We have been indebted to the Chief Inspector of Stock and the Principal of the Agricultural

College for the assistance they have rendered from time to time, but they have not been able to meet the constant demand which Branches have made. On this account the Board interviewed the Minister, and made suggestions so that the Department of Agriculture would have the part-time services of a veterinary surgeon to visit Bureaux and Conferences. Owing to the financial position, however, the Government have been unable to accede to the request for the present, and the Minister has asked that the matter be referred to him again during the early months of next year. In the meantime a Committee of the Board has been appointed to investigate the matter so that full information will be available for the Government when the question is re-submitted.

Efforts have been made to secure alterations to the tariff on fertilisers. There has not been any favorable result. During the year, however, two members of the Board gave evidence before the Tariff Board with the object of securing an alteration in the existing duty on sulphate of ammonia.

A new rule has been adopted in connection with the publication of the Congress Report, whereby the number of attendance cards handed in by each delegate is published in the *Journal*.

Enquiries were made in connection with the increased price of American farm journals, and it was found that the extra cost was due mainly to exchange, and consequently the Board could not take this matter any further.

The Director of Education informed us that with reference to the resolution passed at the Women's Congress asking that first aid be taught in schools, this subject was taught wherever possible. All trainees at the Teachers' College are instructed in first aid, and every year there is an increasing number of schools in which the subject is taught.

In connection with the operations of the Society for Prevention of Cruelty to Animals, Branches were informed that they may take whatever action each Branch though fit to protect their members wherever it was thought such protection was necessary.

Special legislation was not deemed necessary in the case of having the grade and guarantee of purity of contents marked on containers of lubricating oils and greases. Where there is competition among vendors of goods of this kind ordinary trade relationship as between the buyer and seller was deemed sufficient for the regulation of the quality of the goods.

In connection with the destruction of rabbits on Crown lands in farming areas, assistance has been given to district councils as far as Government funds have permitted for the purpose of destroying rabbits after sections have been declared vermin infested. This matter will, however, receive the attention of the Congress again this year.

Owing to unforeseen circumstances in connection with the calling of this year's Congress, it is regretted that we were unable to send the agenda to Branches earlier. As soon as approval to hold the Congress was given, however, Branches were notified, and when sufficient material had been supplied the Congress Committee met to consider motions, &c., submitted. While this was in progress the Committee were able to arrange a programme of addresses, &c., which will, I feel sure, maintain the high educational standard which has characterised our Congress for so many years. Our greatest thanks are due to the assistance which contributors have given to us in arranging an agenda at short notice.

Owing to the fact that wheat crops judged in the championship competition are those awarded first place in their respective districts and not from the whole of the competitions, it is not equitable to give special recognition by means of trophies to crops placed second and third among the championship entries.

Orchardists will be pleased to learn that the services of Mr. Geo. Quinn, Chief Horticultural Instructor, have been retained, and the Minister has been approached by the Board with a proposal which, if adopted, would mean that more time could be given to the compilation of the records of the Blackwood Experimental Orchard. This matter is at present under consideration.

Precautions against outbreak of fires through the medium of internal combustion engines in the fields were discussed at the Gladstone Conference, and the Minister has intimated that a section in the amendments to the Bush Fires Act will be added to deal with the use of portable engines in the open.

Representation has been made to the Government for a Pure Seeds Act which was recommended by Conferences, and the Board hopes that some such legislation will be enacted to give protection to producers when purchasing their seed requirements.

Irrigation problems along the River Murray have received the attention of the Board, and effect has been given to the request of Branches that more frequent irrigations be made available to the River Murray settlers. The Bureau Conference at Berri expressed the view that lighter waterings are desirable in order to assist in combating the increased salt and seepage trouble, and Branches have been asked to give this matter their earnest attention.

The rising water-table on the Berri Flat is causing settlers in that area considerable anxiety, and a request was made to the Waite Agricultural Research Institute for an investigation in order to ascertain if the cause is wholly or in part attributable to the general rising of the level of the river consequent on the construction of the locks and weirs along the Murray. Professor Richardson has intimated that a report will be made available to the Board in terms of this request.

The system of irrigation along the River Murray came up for discussion at the Berri Conference, and the Board has made a request to the Department of Lands to consider the possibility of modifying the present system in order to conform to the suggestions made in a pamphlet issued by the Council for Scientific and Industrial Research.

In connection with the proposal to centralise the control of the lower swamps of the river at Murray Bridge, the Board has made a request to the Government that the person appointed to the administrative position should be one with a thorough knowledge of agricultural irrigation.

Attention was drawn to the spread of cape tulip in the south-eastern portions of the State, and at the request of the Board the Local Government Department made an appeal to the district councils to have this weed destroyed as early as possible.

The Dairy Conference at Mount Barker recommended that all factories be compelled to pay for cream according to grade on a differential basis. The Minister has asked that this matter be placed before him again after the Dairy Commission has presented its report, so that he can give consideration as to amendments which are necessary to the Dairy Industry Act and suggested alterations to the existing regulations. When this report is received, the Board will have an opportunity of reviewing other items which have come before it in connection with the dairy industry.

The Board was represented on the Committee which was appointed to make an investigation into the question of the adjustment of debts. It is understood that an amending Bill is being prepared as a result of the work of that Committee.

At the request of the Non-irrigated Fruitgrowers' Conference, arrangements have been made whereby apple growers may have their sizing gauges tested by officers of the Department, and cultivation tests to determine the effect of deep cultivation in apple and stone fruit orchards are being arranged for trial at the Blackwood Experimental Orchard. Experiments are also being conducted at Angaston with the layering of vines with the object of re-organising old, worn-out vineyards.

The importance of the work done at the Blackwood Experimental Orchard is fully recognised by the Board. Representation has been made to the Minister to have the vacancy of Orchard Assistant filled, and it is hoped that this appointment will be made with the object of maintaining the valuable assistance which this institution offers to the fruitgrowers of the State.

A request was made from Branches that a scheme of certification of potato seed be adopted so that growers might be in a position to obtain reliable seed within our own State. A conference was held at Mount Barker, and approval was subsequently given by the Minister to the proposals outlined by growers of seed at that meeting.

The number of Branches has been increased, and it is pleasing to be able to state that despite the period of depression there has not, on the whole, been much lack of application of the main objects of our organisation. The Bureau exists mainly for educational reasons, and this objective is achieved by the mutual assistance which one member is able to give to another, and by close contact with the technical officers of the Department. So long as farmers realise the educational advantages which this institution affords we have no fear as to our future, and we will continue to exist for the benefit of the primary producers, and make that progress which has been an outstanding feature of the work of the Bureau for the past 45 years.

Throughout the year Conferences have been well attended, and representatives of Branches have shown a general desire to assist these meetings by reading papers and by helping in discussions on matters of importance and interest to their districts.

At last year's Congress and at subsequent Conferences, resolutions were passed with reference to the annual subscription of 2s. 6d. The main objection to the existing conditions seems to be the discrimination between old members and new members, and the Board is of opinion that a flat rate charge of 2s. per household, exempting life members and Branch Secretaries, would be preferable to the existing arrangement. There is a motion on the agenda dealing with the subscription, and an opportunity will then be given to discuss the matter further.

Other features of Bureau work, such as competitions and various meetings of a social nature, have not been neglected. Every district should have its competition whether it be for crop growing, pruning, or any other form of rural activity, and in particular I appeal to farmers in the wheat-growing areas to renew their support in the crop competitions to an extent which will outrun even the record years since the championship competitions began.

Special meetings will be held at this Congress for delegates from Women's Branches. There are 38 of these Branches having an important influence on the social work of the districts in which they are formed. The Department of Agriculture is lacking in a staff appointment directly applicable to the work of women members of the Bureau. Assistance in this respect comes from outside, and the Board wishes to extend our thanks to Miss Campbell, of the Education Department, for her continued assistance in preparing and giving addresses to Conferences and Branches wherever it is convenient for her to attend. This work is all the more appreciated when it is remembered that her services are given voluntarily, and are consequently the outcome of a genuine desire to assist the movement. Valuable work is also accomplished by individual members of Branches who have given such practical support from year to year to their Branch meetings, Congress, and Conferences throughout the State.

The Agricultural Bureau appreciates also its association with the officers of the Department of Agriculture. It may be said that were it not for the agricultural Bureau these officers would find it difficult to get in such close touch with the farming community. This is undoubtedly true, but on the other hand we feel that we have a staff intensely interested in their work, competent to perform it, and furthermore willing to sacrifice personal convenience in a desire to further the interests of those whom they are appointed to serve. The untiring efforts of the Director of Agriculture (Professor Perkins) in his services for the benefit of the primary producer are well known to us all. Besides the big task of controlling his Department we find him a guiding hand at our meetings, and we are looking forward with

considerable interest to the final reports of the Bulk Handling Committee and the Dairy Commission, on both of which he so ably represents the Department as well as the farming and dairying interests of the State. Similarly, Messrs. W. J. Spafford, Geo. Quinn, H. B. Barlow, C. F. Anderson, R. C. Scott, and the able officers working under them, have accomplished much for the benefit of primary production, and I feel sure that I voice the sentiments of Bureau members generally when I state that given proper facilities for their work they will continue to render that service which has been distinguished by their efforts in the past. Outside of the department the Agricultural Bureau has received the assistance of private lecturers, &c., as well as the help of the Stock and Brands Department and the School of Mines. The work they have done for us is regarded very highly by our Branches and we extend to them our appreciation of the manner in which they have shown their willingness to co-operate with the department whenever possible.

In closing, I would like to pay a tribute to the work of our Branch Secretaries who act as the principal executive officers of the organisation in their respective districts. Their work is often onerous and perhaps at times irksome, but they prove themselves loyal to the organisation by sustained interest in its affairs, and by exhibiting a high sense of duty in the voluntary work which they undertake for the good of their fellow members.

TUESDAY, SEPTEMBER 12th.

Morning Session.

Mr. H. B. BARLOW (Chief Dairy Instructor) delivered an address, "The Production of Pigs Suitable for the Local and Export Markets."

Mr. W. N. RULE (Butter Grader and Factory Inspector) read a paper, "The Care of Milk and Cream on the Farm." (This paper was published in the September issue.)

"Egg Production on the Farm," by Mr. F. Wormald (Gawler River). (This paper appears in this issue.)

The following resolutions were then carried:—

That no points be deducted by Judges at the Royal and other Agricultural Shows for dehorned bulls, and that the Government be asked to introduce a law making it compulsory for all bulls to be dehorned.

That this Congress request the Government to introduce legislation to provide for a Cattle Compensation Fund on similar lines to that carried out in Victoria.

At the Horticultural Session the following papers were read and discussed:—"Experiments in the Steaming of Figs," Mr. N. S. Fotheringham, R.D.A. (Manager Berri Experimental Orchard); "Orange Survey on Irrigation Areas" (this was published in the September issue). Mr. E. F. Ward's (Stanley Flat) paper on "Salient Points in the Preservation of Fruit" is published in this issue.

Afternoon Session.

Papers as follows were read:—"The Lucerne Flea Problem in South Australia," Dr. J. Davidson, M.Sc. (Waite Inst.); "The Meat Export Trade," Mr. H. J. Copley (Chairman Stock Salesmen's Association); and "Resume of 12 Years Experimental Work at Kybybolite," Mr. L. J. Cook, R.D.A. (Manager Kybybolite Experimental Farm).

Evening Session.

Mr. W. J. Spafford (Deputy Director of Agriculture) addressed delegates on the "Diseases Responsible for the Reduced Wheat Yield in 1932," and Mr. C. T. McKenna, B.V.Sc., M.R.C.V.S., read a paper, "Two Diseases of Sheep of Economic Importance in South Australia."

WEDNESDAY MORNING, SEPTEMBER 14th.**FREE PARLIAMENT.**

The following resolutions were carried:—

"That owing to the fall in the price of petrol a deputation of members of the Advisory Board wait on the major oil companies asking for a substantial reduction in the price of power kerosene."

"That Congress urge the Federal Government to abolish the duty on kerosene and reduce the duty on petrol by 50 per cent., and that letters to this effect be sent to the Prime Minister, the Minister of Customs, and each member from this State."

"That Congress approach the super manufacturers with a view to obtaining a reduction in the price of superphosphates."

"That the Federal Government be approached to form a Home Consumption Pool at a price sufficient to bring the total harvest to the average price of 3s. 6d. per bushel."

"That the Government be urged to sanction the putting into effect some system of bulk handling of wheat in South Australia to benefit producers."

"That Congress approach the Government with a view to their abolishing the unconstitutional Act which provides or demands that a farmer sell his wheat after a period of 90 days."

"That Congress requests the State Bank, when sending out Form D.2, which shows the allocation of crop proceeds, to definitely state how much interest is paid and to whom paid. The information is required for income tax returns."

"That Congress urge the Government to have appointed more representatives of farmers on the Farm Relief Board."

"That Congress ask the Government to empower the Farm Relief Board to provide accommodation for farmers under the Farm Relief Act to pay a subscription to district hospitals."

"That in the case of a bush fire, where serious damage is done to property, the aggrieved owner shall have the right to demand an inquest without financial liability."

"That an appeal be made to the Government to destroy rabbits on Crown lands."

"That the Government supply to landholders all poison free for the destruction of rabbits on adjacent unoccupied Crown lands and roads."

"That a double fence be put around roadway, railway and all boundary fences of isolated paddocks if the condemned pleuro paddocks adjoin the roads."

"That this Congress requests that the Government be asked to appoint a permanent instructor on sheep, lambs, and wool to the agricultural staff."

"That in view of hard times at present prevailing amongst outback farmers, a special concession be granted by executive of Royal Show, Adelaide, that they be allowed to send in entries for competition at Royal Show at a nominal rate instead of having to take out a full member's ticket."

Congress supported the proposal of the Board in recommending an annual household subscription of 2s. for the *Journal of Agriculture*, the present exemptions to remain.

"That this Congress of delegates assembled from various parts of the State is alarmed at the Government's notification that certain concessions enjoyed by delegates of the Agricultural Bureau for the past 44 Congresses are to be curtailed, and respectfully ask that the Government reconsider the matter with a view to having future Congresses arranged under the same conditions as in the past. South Australia is essentially dependent on the success of primary production and we are strongly of the opinion that Congresses are of immense benefit to producers throughout the State, and that the proposed action will react detrimentally to the Agricultural Bureau system."

DEFEATED MOTIONS.

"That the following taxes and Customs duty be abolished on the undermentioned items used by primary producers:—Sales tax on all lubricating oils and greases and Customs duty on all fuels for tractor and transport vehicles."

"That the Advisory Board of Agriculture be empowered to fix the f.a.q. standard of wheat in South Australia."

"That further representations be made to the Government to allow grain to be conveyed in washed superphosphate bags."

"That a time limit be placed on the discussion on all papers read at Congress."

"That the procedure of the Annual Congress be altered, the Free Parliament session to be extended and to take precedence of all papers."

LAPSED MOTION.

"That the Stallion Act be amended."

MOTIONS WITHDRAWN.

"That at least five minutes be allowed the mover of motions and resolutions when introducing the same."

"That as apparently the rule *re* new members is not giving satisfaction, it be rescinded, and the following substituted:—"That all members, except life members and Branch Secretaries, pay the annual subscription of 1s. if they do not require the *Journal*, or 2s. 6d. including the *Journal*. Members whose subscriptions are unpaid on January 31st be struck off.'"

Evening Session.

The following addresses were delivered:—"With the Trade Ship to the Near East," Mr. J. B. Murdoch (Member Advisory Board), and "Farm Implements and Machinery" (illustrated), Mr. S. Shepherd (Member Advisory Board).

On Thursday morning delegates inspected the Waite Research Institute at Glen Osmond.

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ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on Wednesday, August 30th, there being present Messrs. A. J. Cooke (Chairman), A. M. Dawkins, J. B. Murdoch, S. Shepherd, A. L. McEwin, Geo. Jeffrey, F. Coleman, P. J. Baily, H. N. Wicks, J. W. Sandford, Professor A. J. Perkins (Director of Agriculture), and Mr. H. C. Pritchard (Secretary). An apology was received from Dr. A. E. V. Richardson.

Re-appointment of Members.—The Honorable the Minister intimated that he had re-appointed the following as members of the Board for two years from July 1st, 1933:—Messrs. R. H. Martin, J. W. Sandford, S. Shepherd, A. L. McEwin, J. B. Murdoch, Geo. Jeffrey, and Dr. A. E. V. Richardson.

Annual Congress.—The Secretary intimated that arrangements had been finalised for the 44th Annual Congress to be held in the Way Hall on September 11th to 13th. His Excellency the Governor would deliver the opening address at 8 p.m.

Life Members.—The following names were added to the roll of Life Members of the Agricultural Bureau:—Mr. J. Turner and Mr. S. W. Chapman (Blackwood), Mr. John Boundy (Minlaton), Mr. W. L. Schulz (Petina), Mr. P. R. Hodge (Taplan), and Mr. W. Giles (Angaston).

New Branches.—Approval was obtained for the formation of Women's Branches at O'Loughlin and Wepowie, with the following persons as foundation members:—*O'Loughlin*—Mrs. G. W. Foggo, Miss G. Foggo, Mrs. J. S. Foggo, Mrs. S. Trewartha, Miss G. Trewartha, Miss E. Trewartha, Miss D. Kloeden, Mrs. A. Kloeden, Mrs. E. E. Lutz, Miss F. Hasting, Mrs. C. Bergmann, Miss V. Kloeden, Mrs. W. V. Pfeiffer, Mrs. A. W. Pfeiffer. *Wepowie*—Mesdames J. F. Burns, L. R. Jasper, M. B. Duffy, L. Kitto, R. M. Orrock, H. W. Noske, and L. H. Pasco, Misses A. Noske, J. Medlow, D. L. Gregurke, J. Gregurke, G. M. Halliday, E. H. Roocke, A. Knauerhase, V. Roocke, and B. Roocke, and Mrs. A. B. Knauerhase.

New Members.—The following names were added to the rolls of existing Branches:—Angaston—Sibley Russell; Kalangadoo Women's—Mrs. J. Hunt; Mangalo—F. Munday, A. Hannemann; Paruna—W. E. R. Sumner; Morchard Women's—Mrs. Halliday, sen.; Brownlow—N. Brook, C. G. Brook, M. O. Steinborner; Truro—J. Steinert, C. Steinert; Oalca—D. Oash; Butler—N. W. Wayre; Pinnaroo Women's—Mrs. W. J. Eley, Mrs. E. Staker, sen., Mrs. G. E. Harding, Mrs. H. K. Harding, Mrs. J. B. Webb; Eurelia—A. Hall; Yurgo—M. C. Rogers, O. C. H. Easton, L. S. Hopgood; Eurelia Women's—Miss Hall; Coonawarra Women's—Mrs. F. Jackson, Mrs. L. Teichelman; Rosedale—E. Mellors, W. Myers, N. J. Webb; Goode Women's—Miss D. Jolly; Pinbong—A. L. Berry; Lone Pine—H. Parbs, A. Liebich, J. H. Schultz; Port Elliot—E. H. Coote, L. Ifould; Blyth—J. Strout, R. Lilywhite, R. Coles, R. L. Gold; Gladstone Women's—Mrs. V. C. Woods, Mrs. D. Prior, Mrs. J. Leesue; Balumbah Women's—Miss R. Strelan, Mrs. J. Murphy; McLaren Flat—R. G. Nottage; Strathalbyn—Sergt. A. Kite, W. P. Merten, K. V. Griffin; O'Loughlin—G. W. Foggo, J. S. Foggo, S. Trewartha, C. Kloeden, W. Lutze, D. Trewartha, A. Trewartha, W. Foggo, E. Foggo, A. Kloeden, jun., C. Griffen, W. Kloeden, P. Zacharzewski; Tantanoola—C. McPherson, R. Mundy; Myponga—J. Bowyer, E. H. Baxter, H. Lawton, F. Summers; Wirrilla—R. Tickle, V. Ratlew, R. Kelly, — Collins; Boor's Plains—M. Ward; Sutherlands—G. W. Kernich, L. C. Kernich; Block E—R. Francis, G. Francis, A. W. Lott, J. Haynes, D. Winder, F. C. Berrill, Mrs. E. Harris; Greenock—C. B. Schultz, O. Nitschke, L. Ottó, G. Jenke, B. Bahnisch; Parilla Women's—Mrs. L. G. Martlew; Black Springs—J. Fisher; Kangarilla Women's—Miss H. Paddick, Miss Yvonne Myer, Mrs. L. Osmond, Mrs. S. Dowling, Mrs. K. Grimwood; Clare Women's—Mrs. A. Telfer, Mrs. L. A. Davies, Mrs. G. Bails, Mrs. A. C. Pollock; Belalie Women's—Mrs. O. Brogan, Mrs. F. Hockey; Maltee—N. Bayley; Balhannah—W. Miller, W. Hicks, H. H. Shillabeer, C. Dibel, P. J. Nolan, W. A. Robinson, A. G. Middleton, R. Hancock, G. R. Cowell; Kelly—L. Smallacombe, T. S. Cheeseman; Monarto South—A. H. Schubert, O. Beschke, H. T. Braendler, B. E. Hein; McLaren Flat Women's—Mrs. J. Sigston, Mrs. S. Ward;

Rendelsham Women's—Mrs. M. Klem, Mrs. C. Osmond; Moorook—S. Perkins; Barmera—F. C. L. Cook, E. Anderson, J. B. Cockin, E. Wiedeman, W. Mudge, C. Pike, L. Wing, Milang—J. Daniels, L. Young, G. Vaughton, J. P. Yelland; Kulkawirra—J. Guthleben; Frances—F. A. Stevens; Light's Pass—E. Hahn, B. Semmler; South Kilkerran—L. E. Jacka, E. F. Heinrich; Boolgun—N. Koehne; Mypolonga—H. O. Rowley, H. Lawson, R. R. Rowcroft; Millicent Women's—Mrs. L. R. Elton; East Allendale—N. C. Wallace; Artherton—W. H. Bagshaw; Hope Forest—L. Fincher, R. Coad, C. Peterson, Mrs. E. Peterson; Berri—W. J. Kitson; Nunkeri—R. Bruce, J. Ling; Petina—D. J. Aiston, B. Mudge; Wilmington—Dr. G. J. Stoney, P. H. Spaegth, L. G. Pascoe; Wolseley—M. B. Steer, F. J. Sherwell, F. J. Tregoweth; Millicent Women's—Mrs. G. B. Hutchesson, Miss K. M. Hutchesson, Miss I. Fensom; Dudley—W. M. Roach, J. W. Marsh, L. Longbottom, R. Hyde, M. Hyde, E. G. Spackman, D. Ritchie, A. Champ, L. Seipelt; Weavers—R. Daniell, A. C. Cornish, J. Purvis, jun.; Parilla—J. W. D. Carman; Finnis—M. Squires, J. Byrnes; Nunkeri—H. W. Sanders; Belalie Women's—Mrs. D. Boucaut, Mrs. L. Boys, Mrs. P. J. McCarthy, Mrs. E. E. Grabra, Mrs. W. Hoffmann, Mrs. — Davies, Mrs. H. Medlin, Mrs. — Honey, Mrs. E. E. Bayly; Pinnaroo—C. Dowd, L. Dowd, A. Davis; Lyndoch—W. Hutchinson, F. H. Springbett; Warrambo Women's—Miss D. L. Oswald, Miss M. L. Dolphin; Stockport—H. Arnold; Blackwood—G. Morphett; Mount Gambier—S. R. Ricketts; Butler—C. S. Coleman, C. E. Reynolds, H. B. Tilly, R. Coleman, W. Davey; Kybybolite—F. C. Watson, R. J. Pettit, J. D. McAuliffe, L. Darcy, P. Edwards; Myponga—T. D. Coward, S. Herring; Lenswood and Forest Range—E. Mason; Goode—E. Morecombe, C. Townsend, W. Lange; Mundalla Women's—Sister G. G. Morphett; Belvidere—Master J. Vivian; Taplan—J. B. Scheadel, J. Lintern, J. Neaylon, W. Fogden, M. Fogden, W. Laidlaw, A. Jenkins, A. Wallis, P. Bates, R. Chellew; Bute—H. Percy, S. P. Wheaton, Dr. C. T. Pfeiffer, S. Heinrich, C. Measday, K. Hall; Taplan Women's—Mrs. B. Rayson, Mrs. E. H. Schulze, Mrs. P. Burridge, Miss Gogler, Miss I. Hammond, Miss V. Hammond, Miss N. Rayson; Cummins—R. Granit; Morehard Women's—Miss B. Halliday, Miss S. Twigden, Miss D. Twigden, Miss R. Twigden; Netherton—W. J. Wilkin; Laura Bay Women's—Miss A. Lowe, Mrs. E. D. Barnett, Miss V. Barnett, Miss T. Barnett, Miss M. Spry; Mount Barker—W. Bell; Yurgo Women's—Mrs. J. Jarrett, Miss B. Jarrett, Miss N. Jarrett, Mrs. R. Rogers, Mrs. V. Easton, Mrs. N. Easton.

Present number of members, 7,785; present number of Branches, 331.

The Board considered a number of items in Committee.

GRUBBING

IS A ONE MAN JOB

FOR STUMPS LARGE OR SMALL, GREEN OR DRY,
SHORT OR HEAD-HIGH. THE ENORMOUS POWER OF A

MONKEY GRUBBER

EASILY ACCOMPLISHES THE TASK

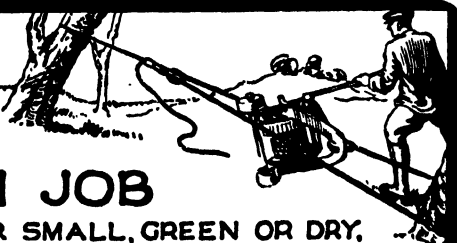
Removing the most stubborn obstacles cleanly, with most roots intact.
Easy to handle, simple to operate, expeditious—its only need, regular oiling.
The Standard equipment will clean up everything over 1½ acres from one anchorage.

Each part designed for simplicity, easy handling and long trouble-free service.

A TIME SAVER AND PROFIT MAKER

ADELAIDE STOCKISTS—Australasian Implement Co., Colton, Palmer & Preston, Harris Scarfe Ltd.,
McPhersons Pty. Ltd., South Australian Farmers' Union.

TREWHELLA BROS. PTY. LTD., TRENTHAM, VIC.



DAIRY AND FARM PRODUCE MARKETS.

MESSRS. A. W. SANDFORD & Co., LIMITED, reported on October 2nd, 1933:—

BUTTER.—With the bountiful spring rains received the production of dairy produce expanded very rapidly last month and a good deal of the leeway was made up as a result of the dry June and July. Although the export of butter this season is still considerably below last year's exports, the disparity is now being lessened each week because of the increased productivity in South Australia. Fortunately the British market showed improvement, and prices hardened there, but at the date of report values were slightly easier again. The local trade has been well maintained, so that ready clearances have been effected of all butter from week to week. Choicest creamery fresh butter in bulk, 1s. 2½d.; prints and delivery extra. (These prices are subject to the stabilization levies.) Store and collectors', 8d. to 8½d. per lb. at store door, less usual selling charges.

EGGS.—Packing for export is now in full swing, but there is a large proportion of the supplies from country districts which will not pass the graders, and for these there is not nearly so strong a demand as for the prime quality new laid export eggs. Farmers can assist the industry greatly by taking more care with their supplies and having them marketed promptly and by keeping them clean, and this all helps to enable shippers to get larger numbers away. Ordinary country eggs, hen or duck, 4½d. per dozen.; selected export quality eggs, 1½ozs. and over, 8½d. to 9½d. per dozen.

CHEESE.—This commodity is being manufactured in larger quantities each week, and from now on exporting will be done to relieve the position. Local and Western Australian trade, however, is keeping up well, but is now not sufficient to absorb all stocks. New makes, medium and large, 7½d. to 7¾d.; loaf, 7½d. to 8½d.; semi-matured and matured, 9½d. to 10d. per lb.

BACON.—The trade in bacon continued at a high level throughout September, the cool weather having assisted in this respect. Considerable business was done in forward booking of Christmas hams, and the trade is in a sound condition, and stocks have been kept moving nicely from week to week. Best local sides, 9½d. to 9¾d.; best factory-cured middles, 10½d. to 11d.; large, 9d.; rolls, 8d. to 8½d.; hams, 11d. to 1s. per lb.; cooked, 1s. 1d. to 1s. 2d.

LARD was somewhat short in supply and the market was firm. Print lard, 7s. per dozen.

ALMONDS.—Moderate supplies were received on to the clearing floors each week, and these met with ready quittance at quotations. Softshells and Brandis, 8½d. to 9½d.; hardshells, 5d. to 5½d.; kernels, 1s. 11d. to 1s. 11½d. per lb.

HONEY.—A better demand for honey set in at the beginning of the month, and some interstate sales and good local trade was negotiated. Stocks held have been considerably reduced, and preparations are now being made for the handling of the new season's flow. Prime clear extracted in liquid condition, 3d. to 3½d. per lb.; lower grades, 1½d. to 2½d. per lb.

BEESEX.—Stocks are light and demand moderate. 1s. 0½d. to 1s. 2d. per lb. according to sample.

LIVE POULTRY.—Supplies throughout September were rather lighter than usual, but this no doubt would be due to many farmers visiting the city for the Adelaide Show, and also the cold wet weather interfering in some districts with deliveries. Values ruled firmer and a strong demand was experienced for all classes of poultry. We advise consigning. Crates loaned on application. Prime roosters, 4s. 3d. to 5s.; nice-conditioned cockerels, 3s. 6d. to 4s. 2d.; fair-conditioned cockerels, 2s. 9d. to 3s. 4d.; chickens lower. Heavy weight hens, 3s. to 3s. 10d.; medium hens, 2s. 6d. to 2s. 10d.; light hens, 2s. 2d. to 2s. 5d.; couple of pens of weedy sorts lower. Geese, 3s. to 4s. 6d.; goslings lower. Prime young Muscovy drakes, 4s. to 5s. 3d.; young Muscovy ducks, 2s. 10d. to 3s. 4d.; ordinary ducks, 1s. 9d. to 2s. 9d.; ducklings lower. Turkeys, good to prime condition, 8½d. to 1s. per lb. live weight; turkeys, fair condition, 7d. to 8d. per lb. live weight; turkeys, poor and crooked breasted lower. Pigeons, 4½d. to 6d. each.

POTATOES.—Local new, 4s. 9d. per cwt.

ONIONS.—New season's, 4s. per cwt.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of, and to the end of September, 1933, also the average precipitation for September, and the average annual rainfall.

Station.	For Sept. 1933.	Av'ge for Sept.	Av'ge Annual Rain- fall.
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FAR NORTH AND UPPER NORTH.

Oodnadatta	0.23	0.30	4.70
Marree	0.02	0.44	5.89
Farina	0.02	0.48	6.47
Copley	0.10	0.66	7.94
Beltana	0.21	0.74	8.54
Blinman	0.48	1.06	11.95
Hookina	0.49	1.00	11.53
Hawker	1.22	1.15	12.30
Wilson	0.94	1.09	11.78
Gordon	0.57	0.99	10.63
Quorn	1.84	1.30	13.29
Port Augusta ..	0.64	0.93	9.42
Bruce	0.83	0.98	9.93
Hammond	1.01	1.18	11.31
Wilmington	2.01	1.90	17.43
Willowie	1.73	1.43	12.19
Melrose	3.55	2.44	22.85
Boomer Centre ..	2.57	1.67	15.15
Port Germein ..	1.42	1.29	12.43
Wirrabara	3.05	2.17	19.21
Appila	2.34	1.64	14.57
Cradock	0.94	1.03	10.83
Carrieton	1.76	1.18	12.31
Johnburg	1.47	1.08	10.61
Eurelia	1.20	1.30	12.87
Orroroo	1.85	1.25	13.21
Nackara	0.96	1.14	11.16
Black Rock	1.96	1.25	12.41
Oodlawirra	0.88	1.41	11.56
Peterborough ..	1.67	1.43	13.21
Yongala	2.09	1.58	14.42

NORTH-EAST.

Yunta	1.03	0.73	8.50
Waukaranga	0.24	0.67	8.00
Mannahill	0.65	0.60	8.28
Cockburn	0.52	0.61	7.96
Broken Hill	0.67	0.74	9.63

LOWER NORTH.

Port Pirie	1.39	1.39	13.17
Port Broughton ..	1.93	1.51	13.93
Bute	2.00	1.61	15.36
Laura	2.88	2.13	17.91
Caltowie	2.24	2.00	16.69
Jamestown	3.29	2.09	17.71
Gladstone	2.27	1.95	16.29
Crystal Brook ..	2.19	1.73	15.78
Georgetown	3.08	2.14	18.35
Narridy	2.54	1.79	15.85
Redhill	2.83	1.76	16.55
Spalding	3.66	2.41	18.99
Gulnare	3.72	2.24	18.56
Yaaka	2.84	1.74	15.33
Koolunga	2.32	1.63	15.40
Snowtown	32.6	1.65	15.64

Station.	For Sept. 1933.	Av'ge for Sept.	Av'ge Annual Rain- fall.
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LOWER NORTH.—continued.

Brinkworth	2.50	1.88	15.74
Blyth	2.26	1.93	16.77
Clare	4.37	2.83	24.53
Mintaro	5.60	2.89	23.42
Watervale	5.26	3.10	26.91
Auburn	5.33	2.77	23.98
Hoyleton	3.07	1.94	17.32
Balaklava	2.26	1.67	15.49
Pt. Wakefield ..	1.74	1.25	12.93
Terowie	2.01	1.48	13.35
Yarowowie	2.02	1.54	13.57
Hallett	3.57	1.90	16.40
Mount Bryan ..	4.29	2.16	16.65
Koorunga	2.87	2.08	17.89
Farrell's Flat ...	3.59	2.14	18.65

WEST OF MURRAY RANGE.

Manoora	3.70	2.32	18.83
Saddleworth ...	4.64	2.20	19.55
Marrabel	4.65	2.28	19.84
Riverton	4.95	2.34	20.75
Tarlee	3.32	2.07	18.11
Stockport	3.00	2.00	16.88
Hamley Bridge ..	2.44	1.90	16.54
Kapunda	3.10	2.21	19.79
Freeling	2.85	1.99	17.85
Greenock	3.58	2.53	21.56
Truro	3.30	2.29	19.96
Stockwell	3.60	2.20	20.12
Nuriootpa	3.84	2.34	20.64
Angaston	4.03	2.57	22.43
Tanunda	4.08	2.48	22.02
Lyndoch	4.60	2.77	23.45
Williamstown ..	5.38	2.92	27.71

ADELAIDE PLAINS

Owen	3.22	1.83	14.33
Mallala	2.02	1.84	16.56
Roseworthy	2.82	1.95	17.34
Gawler	2.57	2.02	18.96
Two Wells	2.04	1.56	15.70
Virginia	2.74	1.75	17.12
Smithfield	3.25	1.98	17.50
Salisbury	2.46	1.88	18.54
Adelaide	2.89	2.06	21.10
Glen Osmond ..	4.47	2.69	25.96
Magill	3.45	2.69	25.50

MOUNT LOFTY RANGES.

Teatree Gully ..	2.98	2.98	27.30
Stirling West ..	8.24	5.03	46.91
Uraddla	8.05	4.79	43.91
Clarendon	5.49	3.42	32.82
Morphett Vale ..	3.80	2.44	22.64
Noarlunga	3.04	2.22	20.34
Willunga	4.85	2.76	26.01
Aldinga	3.76	2.22	20.21

RAINFALL—continued.

Station.	For Sept. 1933.	Av'ge for Sept.	Av'ge Annual Rain- fall.
MOUNT LOFTY RANGES—contd.			
Myponga	4.65	3.67	29.48
Normanville	3.09	2.15	20.69
Yankalilla	3.06	2.50	22.85
Mount Pleasant	5.55	3.23	27.18
Birdwood	6.07	3.35	29.15
Gumeracha	6.72	3.70	33.39
Millbrook Res.	6.36	4.07	34.86
Tweedvale	7.05	4.14	35.89
Woodside	6.75	3.86	32.25
Ambleside	8.06	4.07	34.87
Nairne	5.86	3.32	28.09
Mount Barker ..	6.15	3.66	31.79
Echunga	6.79	3.78	33.15
Macclesfield	6.04	3.68	30.43
Meadows	7.53	4.26	36.12
Strathalbyn	3.99	2.20	19.34

MURRAY FLATS AND VALLEY.			
Meningie	2.57	2.04	18.37
Milang	1.74	1.53	14.92
Langhorne's Ck.	2.00	1.67	14.76
Wellington	1.97	1.62	14.56
Tallem Bend	2.35	1.87	14.70
Murray Bridge ..	1.00	1.60	13.59
Callington	1.88	1.82	15.20
Mannum	1.22	1.32	11.47
Palmer	3.11	2.12	15.43
Sedan	1.38	1.37	12.11
Swan Reach	0.77	1.34	10.60
Blanchetown	0.79	1.01	11.04
Eudunda	3.85	1.90	17.11
Sutherlands	1.87	1.23	10.82
Morgan	0.80	1.01	9.20
Waikerie	0.92	1.10	9.66
Overland Crnr.	0.95	1.14	10.41
Loxton	1.30	1.44	11.59
Renmark	0.89	1.24	10.49

WEST OF SPENCER'S GULF.			
Eucla	0.23	0.77	9.98
Nullarbor	0.33	0.57	8.73
Fowler's Bay	0.91	0.90	11.82
Penong	0.89	1.00	12.12
Koonibba	0.91	1.02	11.82
Denial Bay	1.05	0.83	11.36
Ceduna	1.03	0.86	9.95
Smoky Bay	0.99	0.89	10.28
Wirrulla	1.35	1.14	10.08
Streaky Bay	1.17	1.32	14.82
Chandada	1.28	—	—
Minnipa	1.99	1.28	13.68
Kyancutta	1.83	—	—
Talia	2.70	1.58	14.63
Port Elliston	1.17	1.48	16.39
Yeelanna	1.89	1.84	15.72
Cummins	2.28	1.93	17.35
Port Lincoln	2.25	1.97	19.34
Tumby	2.15	1.66	13.92
Ungarra	2.53	2.11	16.73
Carrow	2.04	1.57	13.08
Arno Bay	1.66	1.50	12.44

Station.	For Sept. 1933.	Av'ge for Sept.	Av'ge Annual Rain- fall.
WEST OF SPENCER'S GULF—contd.			
Rudall	1.66	1.41	12.19
Cleve	2.56	1.65	14.66
Cowell	1.04	1.18	11.10
Miltalie	1.86	1.48	13.54
Darke's Peak	2.87	1.70	14.92
Kimba	2.17	1.14	11.52

YORKE PENINSULA.			
Walleroo	2.00	1.33	13.91
Kadina	2.09	1.55	15.61
Moonta	2.39	1.39	15.05
Paskeville	2.60	1.56	15.46
Maitland	3.46	2.00	19.90
Ardrossan	2.67	1.47	13.93
Port Victoria	2.90	1.55	15.40
Curramulka	3.01	1.88	17.87
Minlaton	2.85	1.85	17.80
Port Vincent	2.44	1.76	14.40
Brentwood	2.71	1.72	15.45
Stansbury	3.22	1.89	16.81
Warooka	2.63	1.86	17.51
Yorketown	2.81	1.85	16.94
Edithburgh	2.51	1.77	16.34

SOUTH AND SOUTH-EAST.			
Cape Borda	2.78	2.12	24.83
Kingscote	2.56	1.83	19.11
Penneshaw	2.23	2.14	18.85
Victor Harbor	4.06	2.36	21.27
Port Elliot	3.59	2.21	19.91
Goolwa	2.49	1.94	17.81
Copeville	1.42	1.57	11.44
Meribah	1.50	1.51	11.10
Alawoona	1.15	1.16	10.02
Mindarie	1.55	1.61	11.91
Sandalwood	1.78	1.64	13.57
Karoonda	1.95	1.75	14.33
Pinnaroo	1.51	1.76	14.54
Parilla	1.74	1.84	13.90
Lameroo	2.28	2.08	16.08
Parrakie	2.07	1.88	14.49
Geranium	2.46	2.05	16.41
Peake	2.08	1.97	16.03
Cooke's Plains	1.96	1.84	15.38
Coomandook	2.16	2.04	17.11
Coonalpyn	2.42	1.98	17.42
Tintinara	2.37	2.18	18.60
Keith	2.53	2.22	17.87
Bordertown	2.84	2.21	19.22
Wolsley	3.11	2.22	18.41
Frances	3.63	2.25	19.99
Naracoorte	4.56	2.56	22.59
Penola	3.32	2.79	26.06
Lucindale	3.71	2.47	23.16
Kingston	3.03	2.34	24.33
Robe	3.32	2.18	24.64
Beachport	4.78	2.30	26.93
Millicent	4.34	2.91	29.76
Kalangadoo	5.21	3.41	32.03
Mount Gambier	3.17	3.07	30.52

AGRICULTURAL BUREAU REPORTS.

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		Oct.	Nov.			Oct.	Nov.
Adelaide	*	—	—	Gladstone	*	27	—
Alawoona	*	—	—	Gladstone Women's	*	17	21
Allandale East	†	27	—	Glencoe	*	10	14
Alma	*	—	—	Goode	*	4	1
Appila-Yarrowie	†	6	3	Goode Women's	*	4	1
Ashbourne	*	—	1	Greenock	†	9	6
Auburn Women's	*	27	24	Green Patch	†	—	2
Balaklava	*	3 & 23	R	Gumeracha	*	2	6
Balhannah	347	—	—	Hanson	*	3 & 31	—
Balumbah	*	—	—	Hartley	*	4	1 & 29
Balumbah Women's	*	4	1	Hindmarsh Island	*	—	—
Beetaloo Valley	†	2 & 30	—	Hope Forest	†	2	6
Belalie Women's	360	10	14	Hoyleton	*	16	20
Berri	*	4	1	Inman Valley	†	19	16
Belvidere	†	—	—	Jamestown	330	18	15
Blackheath	†	5	2	Jervois	*	12	9
Black Rock	†	9	7	Kalangadoo Women's	*	14	11
Black Springs	*	—	—	Kalangadoo	*	14	11
Blackwood	*	9	13	Kalyan	*	18	15
Blyth	†	27	54	Kangarilla Women's	*	19	16
Booborowie	*	2 & 30	—	Kanni	*	—	—
Booleroo Centre	*	27	—	Kapinnie	*	—	—
Boolgun	*	26	30	Kapunda	*	13	10
Boor's Plains	337	5	2	Karoonda	*	4	1
Bowhill	†	2 & 30	—	Keith	*	—	2
Brentwood	†	5	2	Kelly	†	28	—
Brinkley	*	4	1	Ki Ki	*	—	—
Brinkworth	*	2 & 30	—	Kilkerran	337	3	2
Brownlow	*	—	—	Kongorong	*	2 & 30	—
Buchanan	†	—	—	Koolunga	†	—	—
Bugle	*	10	14	Koonibba	†	—	—
Bute	*	19	16	Koppio	*	3 & 31	—
Butler	†	—	—	Kringin	*	2	6
Caliph	*	3	7	Kulkawirra	*	—	14
Caralue	*	—	1	Kyancutta	†	3	7
Carrow	*	4	1	Kybybolite	*	—	2
Charra	*	—	—	Kybybolite Women's	†	3	7
Cherry Gardens	†	28	25	Lameroo	*	28	—
Chilpuddie Rock	†	—	—	Langhorne's Creek	†	—	1
Clare Women's	†	—	—	Laura	*	7	4
Clarendon	*	2 & 30	27	Laura Bay	*	10	—
Cleve	*	7	4	Laura Bay Women's	*	10	14
Collie	*	4	1	Lenswood and Forest	*	—	—
Coomandook	*	27	24	Range	*	—	—
Coonawarra	360	5	2	Light's Pass	*	2 & 30	—
Coonawarra Women's	*	18	15	Lipson	*	28	—
Cummins	†	13	10	Lone Gum and	*	—	—
Cungena	*	5	2	Monash	†	4	1
Currency Creek	348	2	6	Lone Pine	*	2 & 30	—
Dudley	*	3 & 31	—	Lowbank	*	4	1
Elbow Hill	339	—	—	Loxton	*	13	10
Eudunda	*	2	26	Lyndoch	†	3 & 31	—
Eurelia	*	14	11	McLaren Flat	*	—	—
Eurelia Women's	362	4	1	McLaren Flat Wm's	363	5	2
Farrell's Flat	*	27	24	Macclesfield	†	19	16
Finnis	348	—	—	MacGillivray	†	3 & 31	—
Frances	†	—	—	Mallala	*	16	20
Frayville	*	—	—	Maltoe	*	—	2
Gawler River	†	—	—	Mangalo	*	—	—
Georgetown	*	28	—	Mangalo Women's	363	—	—
Geranium	*	28	25	Marama	†	—	—

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Meribah	*	—	—	Rosedale	†	—	—
Milang	*	7	1	Roseworthy	*	—	—
Millicent	†	27	24	Rudall	*	3 & 31	—
Millicent Women's ..	*	—	—	Saddleworth	*	6	3
Miltalie	*	28	—	Saddleworth Women's ..	†	3	7
Monarto South	345	—	—	Scott's Bottom	†	28	—
Moorlands	*	4	—	Shoal Bay	†	3 & 31	—
Morchard	329	27	—	Smoky Bay	*	—	—
Morchard Women's ..	*	6	3	Snowtown	†	13	10
Mount Barker	*	16	20	South Kilkerran ..	†	3 & 31	—
Mount Bryan	*	—	—	Springton	†	4	1
Mount Compass	*	—	—	Stanley Flat	*	16	20
Mount Gambier	†	13	10	Stockport	†	—	—
Mount Hope	341	3 & 31	—	Strathalbyn	*	4	8
Mount Pleasant	†	13	10	Streaky Bay	*	27	24
Mudamuckla	*	14	11	Sutherlands	†	5	2
Mundalla	*	—	—	Tailem Bend	*	5	7
Mundalla Women's ..	*	5	2	Talia	*	27	24
Murray Bridge	346	—	—	Tantanoola	*	7	4
Murraytown	333	—	—	Tantanoola Women's ..	†	4	1
Mypolonga	*	4	8	Taplan	*	3 & 31	—
Myponga	*	19	16	Taplan Women's ..	†	—	—
Myrla	*	4	1	Taragoro	342	R	2
Nantawarra	†	—	2	Tarlee	*	—	—
Naracoorte	*	14	11	Truro	†	—	20
Narridy	*	—	—	Tulkineara	*	5	2
Nelshaby	*	—	—	Tweedvale	*	19	16
Nelshaby Women's ..	364	—	—	Ungarra	*	5	9
Netherton	*	4	1	Upper Wakefield ..	333	2	—
Nunjikompita	*	—	2	Uraidla and Summer-	*	—	—
Nunkeri	†	4	1 & 29	town	*	2	6
O'Loughlin	*	9	13	Waddikee Rocks ..	*	28	—
Overland Corner	†	4	1	Waikerie	*	13	10
Owen	*	9	13	Wallala	*	11	8
Palabie	*	—	—	Wanbi	*	25	22
Parilla	*	17	21	Wandearah	*	3 & 31	—
Parilla Women's	*	18	15	Warcowie	†	3 & 31	—
Parilla Well	*	17	6	Warcowie Women's ..	†	—	—
Parilla Well Women's ..	*	17	28	Warramboo	343	3	1
Parrakie	*	—	—	Warramboo Women's ..	*	13	R
Parrakie Women's ..	*	24	28	Wasleys	†	12	9
Paruna	*	6	3	Wasleys Women's ..	†	5	2
Paskeville	†	3 & 31	—	Watervale	*	16	20
Pata	*	6	3	Wauralte	*	3 & 31	—
Penola	*	7	4	Weavers	†	9	13
Penola Women's	366	—	—	Wepowie	*	2 & 30	—
Penwortham	†	—	2	Wepowie Women's ..	*	3	7
Petersville	*	3 & 31	—	Williamstown Wm's ..	†	4	1
Petina	†	28	25	Willowie	*	23	27
Pinbong	†	—	—	Wilmington	*	10	14
Pinnaroo	*	—	—	Wirrilla	*	—	2
Pinnaroo Women's ..	†	6	3	Wirrilla Women's ..	*	5	2
Port Elliot	†	—	—	Wirrulla	*	18	15
Pygery	341	3 & 31	—	Wolsley	*	9	13
Pygery Women's	*	—	—	Wudinna	†	14	—
Quorn	*	—	—	Yadnarie	*	3 & 31	—
Ramco	*	2 & 30	—	Yandiah	†	13	R
Redhill	†	—	—	Yaninee	*	—	—
Rendelsham	*	7	4	Yeelanna	*	4	1
Rendelsham Women's ..	367	—	—	Yurgo	*	—	—
Riverton	*	9	13	Yurgo Women's	*	—	—

* No reports received during the month of September. † Held over. R In recess. ‡ Formal.

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

[Branch Secretaries are reminded that the following are exempt from payment of the Annual Bureau subscription:—Life members, Branch Secretaries, members appointed before August 1st, 1930, and new members who reside in the same house as (a) a life member, (b) Secretary, or (c) another member who already subscribes.

The subscription for all other members is 2s. 6d., commencing from August 1st in each year, provided that—subject to the above exemptions—nominations forwarded during the months of January to June must be accompanied by a payment of 1s. 6d. each nomination for that period.]

MEN'S BRANCHES. SOUTH-EASTERN DISTRICT.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Mt. Gambier ... Millicent	8/9/33 August	10 —	Address—N. Ashn Demonstration—H. H. Orchard	G. Gurry L. Hutchesson

UPPER NORTH DISTRICT. (PETERBOROUGH AND NORTHWARD.)

MORCHARD (Average annual rainfall, 13.59in.).

July 7th.—Attendance, 10.

SHOEING HORSES ON THE FARM.—Mr. H. Kupke read the following paper:—"When travelling about, one often sees working horses on farms that have a stiff and hobble gait, look poor, with rough coats, and have a jaded appearance. By looking closer one often finds that this is not for want of feeding and care, but if these horses had shoes on their feet they would probably look the best horses on the farm. If horses working on stony farms require shoeing, it pays well for the time lost in fitting them with shoes, especially at harvest time, wheat carting and seeding. They travel much better, and will not lose condition, as the unshod horse doing the same kind of work. There are many draught horses that are faulty in the hoofs; therefore farmers should be very careful to breed from mares and sires that have sound, round feet that are free from cracks and splits, and also wide heels. Shoeing can be done by most men on the farm who are sufficiently strong to hold up the horses' legs. First, take off the unevenness to make the hoof level (be careful not to interfere with the frog, excepting to remove any loose pieces); then start fitting the shoes so that they will lay perfectly on the foot, and the outer edges of the shoe just level with the walls of the hoof. Have the heels about $\frac{1}{2}$ in. wide each side, but not too long, because it is likely that some horses in over-reaching may pull off the shoes. Punch holes so that the nails will fit well and clip the shoe neatly. Commence nailing. Be careful to set all the nails at the same angle so that they will come through evenly. In driving the nail, give 2 light taps, then send home with 4 or 5 sharp hits. Cut off the points close with a farrier's shoeing hammer. When all the nails are driven draw up in the usual way. When clenching the nails the foot should be level on the ground; this will allow the shoe to slacken a little, and there will be a springing effect on the shoes. Finish off with the shoeing rasp, but keep the rasp off the clenches. Use the very best make of nails for draught horses—No. 8 and 9 nails. Shoes should not be too heavy, $\frac{1}{2}$ in. x $\frac{1}{2}$ in. mild steel are preferred. When the shoes are on give the hoof a painting of Stockholm tar, or an oil that is cooling (Neatsfoot), &c. (Secretary, H. McCallum.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Warcowie	29/8/33	14	"Classing the Clip," A. Crossman	A. F. Crossman

MIDDLE-NORTH DISTRICT.**(PETERBOROUGH TO FARRELL'S FLAT.)**

JAMESTOWN (Average annual rainfall, 17.95in.).

June 19th.—Attendance, 12.

MAKING A WILL.—The following paper was read by Mr. A. Watke:—It is said that a man's first duty to his dependants is to make the best possible provision for their present and future needs. He cannot properly safeguard their future unless he makes a good will. He opens the way to confusion and unhappiness if he waits until he is ill. He who is wise then will avoid mistakes by making his will while in good health. A will is a written document giving instructions for the disposal of one's effects after death. It is naturally a most important document and one which should be properly prepared by a competent person, such as a solicitor or a reliable Executor Company, so that future difficulties in interpretation, or cost in obtaining the Court's decision as to meaning, may be avoided. It must be signed, witnessed, dated, be without alteration unless properly initialled, and should be the only document of its kind left existent by the testator. The necessity for a will is the proper allocation of a person's effects after death according to his requirements, and as he sees and sums up the position prior to his decease, endeavoring to provide for his dependants or allow them to become possessed of such part of his estate as he thinks proper, just and fit. The estate may consist of real and personal property which could not be easily divided without first realising on whatever is comprised, were he not to make a will and allow division according to law. After possibly years of hard work and saving a person naturally wishes to insure that such property as he has acquired will be distributed in a proper manner, and to such as are considered justly entitled to share in the estate on decease, or, the desire may be that dependants will be provided as amply as circumstances will allow. Then, too, he may wish to guard against someone receiving an advantage to which they have little claim, other than by relationship, or who may already have obtained benefit and be amply provided for.

Who may make a Will?—Any person whether married or single, who has attained the age of 21 years, and who possesses anything of value, is competent to make a will. As it is most essential that a will be properly drafted and executed, to avoid any possibility of doubt or wrong interpretation, it should be in simple language and direct in instruction. Every person possessed of means, even if not of great amount, should make a will and lodge it away from his home for safe-keeping. Banks are the usual depository of these documents and care for them without charge to their customers. Having decided to execute this document it is wise to give the matter full consideration and definitely decide on the form it is to take, that is, outline a plan for the investment or distribution of the estate should death occur. It is wise to reach certainty in this regard as otherwise you may be unintentionally influenced by the party preparing the document, and who is not fully conversant with the full facts or intentions. No two persons' estates are alike and you cannot set down any hard and fast rule as to distribution and it follows that the testator should be the person giving the directions, the person preparing the will, setting these on paper with proper regard to any omission of which the testator may not be aware. If your estate consists of assets which could easily be converted into cash it would be an easy matter, but where the ownership is of land, leases, stock and plant, shares, and so on, it naturally follows that considerable thought must be given to obtain fair and even distribution. Another matter that should receive due thought is the appointment of executors. Only one is essential, although two are wise, as one may predecease the testator. The executor, or executors, should be a person, or persons, in whom the testator has full confidence and who are competent and willing to act should the need arise. The main things to remember then before the preparation of the will is to know what you intend it to contain and that you have executors in whom you have confidence and who are willing to act. Now after the will has been prepared and is ready for signature assure yourself that it is in keeping with your requirements. For such reason it is advisable, if in the slightest way complicated, to take it to your home and then quietly study its contents at leisure. If you are satisfied with it do not delay its completion and proper lodgement in a safe

and known place for keeping. If it requires alteration it is advisable to have a new document prepared but again do not delay as after all it is your intention to make your will and not just play with the idea.

Some of the requirements for a valid Will.—A will must be signed at the foot or end by the testator. Such signature to be made or acknowledged by the testator in the presence of two or more witnesses, who are all present at the same time, and who must sign as witnesses in the presence of the testator and each other. Any words that follow the signature of the testator will have no effect. If the will consists of several pages it is only absolutely necessary that the signature should be written at the end of the writing on the last page, though it is usual and advisable to sign at the end of every page for greater security. If the testator cannot write, he may make his mark, but this must be done in the presence of two witnesses who must both be present at the same time. Any person may be a witness provided he or she is intelligent enough to understand the act. It is not necessary that the witnesses should see or be informed as to the contents of the will, though if corrections are made it is advisable that the witnesses should see these, to be able to verify to their existence if necessary. It is also usual and desirable, though not absolutely essential for the testator and witnesses to initial any corrections or interlineations or erasures. Any such alterations made after the will has been executed have no effect, unless they are made under the same conditions as an original will. An executor may also be a witness, but he cannot also be a beneficiary, as no person under a will, or the wife or husband of such person, should be a witness, for although in that case the will is not invalid, yet such persons' interest under the will lapses. It might be interesting here to cite a case which brings out this point, and which was decided in court after considerable argument. A lady made a will in the proper manner, but seven years later made another will containing the usual clause revoking a former wills. The latter will was attested and witnessed by two witnesses, one of whom however was the husband of the main legatee. Both wills were admitted for probate, and the question arose as to what was their combined meaning and effect. After argument and consideration the Judge gave his decision that as the later will was witnessed by a person whose wife was practically the sole legatee or beneficiary this nullified the later will and the earlier document would be accepted. This then resulted in a distribution of the estate which was not the last wish of the testator. The verdict and result is rather confusing, but the case may be taken as a warning that where a later will is meant to revoke an earlier one, it should plainly say so. Practically without exception the last will in date is the one meant to be effective.

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tive. The trouble is, of course, that many old people quite forget the wills they have made or when, and so cause confusion, often leading to litigation and expense amongst their surviving relatives. It should always be remembered that no one who takes a benefit under a will should be an attesting witness to its execution, for, though the will may stand good, the benefit is lost. And this rule applies equally to the husband or wife of such a witness, and so may defeat the intention of the testator, and must be avoided. Should a further case come before the court for decision the Judge is bound to follow the earlier opinions by reason of their not being further contested at a higher court.

The Form of a Will.—No particular form is required although most stationers supply a will form for about sixpence. This is fairly generally used, but mainly by the novice, so here again let us stress the need for preparation by a competent person. Any omission usually leads to expense even though it leaves the context of the will as before. In preparation no unnecessary words should be used, but the testator should express his wishes simply, clearly, and without ambiguity or doubt. The object of the testator should be clearly given and the gifts likewise described. If all the property is to be left in one lump it is better to say so rather than attempt to enumerate it. He should always take care to dispose of the whole of the property. An executor, or executors, should be appointed. The date of execution is usually placed at the end of the will. After the testator's signature it is usual to insert the attestation clause. This generally reads:—"Signed by the said testator as and for his last will and testament in the presence of us both present at the same time who in his presence and in the presence of each other have hereunto subscribed our names as witnesses." The witnesses sign beneath this clause. The insertion of this clause facilitates proof. If it is absent affidavits by witnesses must be produced, proving that all the formal requirements of execution have been complied with.

The Revocation or Annulment of a Will.—This is done by:—(1) The marriage of the testator subsequent to execution. (2) The execution of a later will or codicil inconsistent with the former. (3) By any writing executed in the same way as a will and declaring an intention of revoking a will. (4) By burning, tearing, or otherwise destroying the same with an intention of revoking it. As regards the latter. It is definite that there must be a destruction. Merely cancelling the signature will not work a revocation. The revocation of one will does not revive an earlier will. Destruction by burning is the only safe and sure way of guarding against the restoration of an older will and an endeavor to ultimately prove it for probate. A previous beneficiary may become aware that he or she has been excluded from a later executed document, and at some opportune time gain access to the last will and conveniently destroy it. The former, and existent will would then operate, although court action might follow in the endeavor to prove the execution of the later document. It would be difficult to prove the later wishes of the testator, and even if a decision were given to annul the existing will and allow the testator to have died intestate, that is dying without a valid will, the object of the later will would again be defeated and division made in accordance with the law.

A Codicil to a Will.—This must be executed in the same manner as a will as regards dating, execution, and attestation of witnesses. It is employed when the testator desires to make alterations in his will already executed, and such alteration is not of great difference and easily understandable. The added writing follows the previously written and completed document. If the testator desires to recast his will it is better to make an entirely new will, at the same time revoking the former will and seeing to its permanent destruction.

Grounds upon which a Will may be attacked and possibly become worthless.—Mainly these are:—(1) That the will has been revoked. (2) That it was not duly executed. (3) That at the time of its execution the testator was not of sound mind, memory, or understanding. (4) That its execution was obtained by undue influence or fraud. (5) That the testator did not know and approve of the contents of the will. There is one point to be particularly stressed, and that is the disadvantage of an estate continuing for a long period after death of the testator. This is usually created by the widow receiving a life interest in the estate, and on her death division in accordance with instructions. Recent years have especially proved the fallacy of this. It was expected the widow would be comfortably provided for by income from the property. This was usually worked by beneficiaries, and gave the widow no power to realise on any assets if necessary. Owing to adverse seasons the income became insufficient to meet the essential expenses to carry on, and she, in advanced years, had the worry of trying to keep matters going, and usually became involved and in straitened circumstances. Actually she was expected to have comfort and freedom from worry in old age, but the opposite resulted. Special care to avoid such a result is strongly advocated when framing a will. The foregoing emphasises the need for

every wise person possessing means to make a good and proper will, and after execution in the lawful way, lodging it in a well-known place, away from home, for safe custody. If alteration is necessary, do not hesitate to make a new will and properly destroy the old." (Secretary, B. Phillips.)

MURRAYTOWN.

June 10th.—Attendance, 8.

QUESTION BOX.—Discussing the question: "What is a profitable wheat growing price?" the Honorary Secretary (Mr. E. Pitman) said there were many things to be considered, one of the first being the price paid for the farm, i.e., the amount of interest that had to be paid each year; how far the farm was away from the port or railway station; the condition of the roads thereto; whether the farm was hilly or undulating, stoney or cut about with creeks, &c. He considered he could average some profit at approximately 10s. a bag at the port. Mr. Joppich said that hilly country was more costly to work than level land owing to the shorter life of the machinery and the amount of strength required for working. He thought that on 18bush. average land wheat growing would pay at from 3s. 4d. to 3s. 8d. a bushel—much depended on the farm management. Mr. Borgas said that if the interest bill was not too high he thought there should be a profit in growing wheat in average years at, say, 10s. per bag. Mr. Joppich asked how to treat sitting hens that were infested with lice; the hens invariably left the nest before the chicks were due. Both Mr. Ryan and Mr. Jackson advised the use of insectibane for the nest and also on the heads of the young chicks at two weeks' interval. Mr. Borgas initiated a discussion on harrowing wheat after it was up, and Mr. Ryan preferred to harrow red soils in a dry year immediately after a rain. Mr. N. Scholz would only use sharp harrows if harrowing a growing crop. Mr. Joppich said much depended on the state of the soil. If loose black soil one would probably pull a lot of wheat out of the ground.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Murraytown ...	30/8/33	5	Discussion	E. Pitman
Redhill	29/8/33	12	Address—J. O. Hatter ..	S. Pengilly
Appila	1/9/33	6	Address—E. L. Orchard ..	E. Wurst
Jamestown	28/8/33	9	Address—J. O. Hatter ..	B. Phillips

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

UPPER WAKEFIELD.

July 6th.—Attendance, 19.

WHITE HEADS IN WHEAT.—The following paper was contributed by Mr. R. Herriott, B.Sc. (Agric.):—

"Every year at harvest time one hears farmers discussing the prevalence of "white heads," which have appeared in their crops. There is absolutely no doubt that the loss from this cause in the Australian wheat belt is very considerable each year. One occasionally hears or sees cases in which losses are estimated at above 50 per cent. The so-called "white head" becomes particularly noticeable in wheat crops because of its characteristic premature ripening, together with its bleached and whitened appearance. It usually possesses no grain, although occasionally heads will be found that contain a few grains of a very inferior sample. The causes of their appearance are many, but they can be divided into two distinct groups, those due to some meteorological accident, i.e., some weather upset, and those caused by the secondary effects of harmful fungi, withdrawing nourishment from the roots of infected plants.

Meteorological Accidents.—These include such conditions as frosts, hot winds, droughts, or dry spells and excessive moisture. Late frosts leave their mark upon wheat crops in some locality every year. The chief cause for damage is that the young emerging ear cannot stand the chilling to which it is subjected on frosty nights. The reproductive organs present within the glumes are therefore rendered inactive, and although the head may continue to develop normally, no grain is set. Affected plants may be picked out in the wheat crops before the actual appearance of "white head" by their characteristically lighter green color. Frost at this stage may also cause a weakening of the basal nodes of the straw leading up to lodging after some light rain or wind. Hot winds also have a detrimental effect upon the developing ear, in that

they cause a very rapid increase in the normal transpiration rate, with the result that the roots, especially if the crop be sown on stubble, have difficulty in making up this moisture deficiency. The plant cells at the top of the ear then become desiccated, and die. With the low average altitude of the Australian wheat belt, open character of the country, and relative absence of shelter, wheat crops must inevitably suffer from hot winds, and yields may be regularly reduced from 20 up to 50 per cent.

The effects of hot winds and frosts are often unnecessarily confused. Frost mainly takes its toll in low-lying areas, and as all flowers in the ear do not mature at the same time, any part of the ear may be affected. Sometimes it will be the tip, sometimes the flowers in the centre of the ear that are affected. Hot winds, on the other hand, are invariably more noticeable in open plains or undulating country, especially along the tops of ridges. In this case we have either all the flowers in the heads killed or those from the top downwards, resulting in the characteristic "tipping" of the wheat crop. A knowledge of local climatic conditions should also help greatly in separating these two causes. Deficient moisture supply is closely linked up with the effect of hot winds, and the symptoms seen in the wheat crop are inseparable.

Attention to the following points should assist greatly to reduce losses from these causes when they occur regularly in any particular district:—

1. Sow early maturing varieties, as these will ripen earlier, and possibly miss the troubles referred to, especially hot winds.
2. Sow at times recommended in your own particular district.
3. The application of superphosphate increases the rate of ripening, and hence reduces loss from these causes.
4. The adoption of early and clean fallowing greatly increases moisture conservation.
5. Wheat sown upon a well consolidated seedbed invariably roots better, and is consequently more able to supply extra moisture needed during the occurrence of a hot wind.

Coupled with the effects of frost, wind, drought, &c., we also have those injuries caused by excessive moisture. During the early stages excessive moisture is evident, particularly from the fact that the crop "yellows off." This is due to the combined effect of lack of nitrate nitrogen in the soil, it having been leached out in drainage waters, and the coldness of the soil, consequent upon its high moisture content. The development of "white heads" from this cause is chiefly due to the fact that such conditions greatly favor diseases like take-all, foot rot, root rot, &c.

Botanists definitely regard fungi as plants, and, like plants, they develop whenever climatic conditions are favorable from spores. They are also parasitic in nature, and can therefore only develop where host plants are present. When spore and host plants are present, therefore, climatic conditions will determine the severity of the attack. Muggy conditions are considered as favorable for the maximum development of most fungi. Once growing upon the host plant, they become dependent upon it for nourishment, and it is this withdrawing of nutrients from the host plant, thus reducing its vigor, which accounts for the harmful effects of these parasitic fungi.

TAKE-ALL.

Take-all has been known to exist in Australia for over 60 years, but recently the disease has been shown to be caused by at least three different parasites, each developing its own characteristic symptoms. The three diseases are now commonly known as take-all, root rot, and foot rot. Much confusion exists between diseases due to these parasitic organisms and those due to wind and frost. In the latter case the straw usually retains a clean appearance, whereas in the case of the fungus diseases definite brown or black discolorations of the basal nodes of the stems are always present. Parasitic diseases normally occur in over-wet seasons, especially in unconsolidated areas, whereas hot winds prove more disastrous in drier seasons. Both troubles, however, can quite possibly occur in the same crop at the same time.

Take-all may be distinguished from the other root diseases from the following description:—It invariably appears in more or less rounded patches or strips of varying size. In worst cases the plant dies back before the stalks appear. In less severely affected plants a stalk may appear, but it soon becomes stunted, and rarely matures an ear. If ears be formed grain fails to develop, and what are known as "white heads" may be seen through the crop. The roots have a characteristic appearance. They become stunted and deformed at an early stage, and may be quite thickened and knotted close to the stem. They are always excessively covered with root hairs, accounting for their characteristic woolly appearance. The stem bases show a distinct black coloration, extending above ground level, and covering the length of the stem for about 2 in. The discoloration is partly superficial, and can be scraped off. In later stages this dark mass becomes distinctly dotted with small black bodies, which contain the seeds or spores of the fungus. On moistening, these fruit cases burst, liberating their seeds, which germinate and grow on wheat, rye, barley, barley grass, &c. In the

absence of any suitable host they soon die. It has become shown, by experiment, that when the soil temperature is above 80° Fahr. it is impossible to even give wheat take-all, whereas at very low temperatures high infections are recorded. Our winter temperatures are very close to those for maximum infection, thus making control measures much more difficult. So far as is known, all our wheat varieties are equally susceptible to the disease, and take-all may be found on all types of soil, but is most prevalent in moist, moderately warm springs, on land sown with wheat year after year.

ROOT ROT.

Root pest is a very similar disease, affecting the heads in exactly the same way as take-all. It does, in fact, quite often occur together on the same plant with it. Certain differences do occur, and these are pointed out in the following few lines:—Take-all develops in more or less circular patches, but with root rot no such regularity occurs. In the more typical cases affected plants are scattered through the crop, and this invariably happens even when some affected plants occur in patches. It usually goes unnoticed until "white heads" make their appearance, and if any grain is formed it is always shrivelled. The stem discoloration is less marked than with take-all, and varies from dark brown to black in color. It is partially superficial, and can quite easily be mistaken for take-all. The discoloration is, however, usually in spots or streaks rather than generally distributed, as was the case with the latter. This disease is probably as equally common as take-all, and occurs under very similar conditions. So far, root rot has only been discovered on wheat and barley grass; hence, as with take-all, cleaning the land of barley grass is an important factor in its control.

FOOT ROT.

The third disease of this group, foot rot, resembles root rot in general characteristics much more closely than take-all. It may be identified by the presence of one or more dark brown streaks or spots at the bases of the affected stalks. Unlike take-all and root rot, however, this dark discoloration is not superficial, i.e., cannot be scraped off, does not usually extend above ground level, and is usually accompanied by a greyish discoloration along the stem. Brittleness of straw with the tendency to snap off at ground level is also a characteristic.

The disease is not particularly common in our wheat belts at present, but it has a particularly wide range of host plants, it having been found upon wheat, barley, rye, and many grasses, including barley grass.

Reviewing these three diseases, then, it will be seen that they are alike in all the main essentials. Their ultimate effect upon the wheat crop is the same; their host plants are, in most cases alike, and the predisposing factors, such as excessive dampness, lack of consolidation of the seedbed, &c., are found to operate with equal importance to each disease. It is little wonder, then, that this group has in the past been regarded as take-all only, and because of this similarity conditions tending to control one will be found to control all three. In connection with the control of this disease, it is unfortunate that infection comes through the soil and not through the seed, as the case with, say, stinking smut, thus removing any possibility of controlling it by pickling the seed. It has also been pointed out that all varieties alike are affected, which eliminates any chance of control by seeding immune or resistant varieties, as can be done with most other diseases. Starvation of the causal organisms, combined with the exercising of great care not to bring about infection in hitherto unaffected areas, are the only possible means of controlling the disease.

METHODS OF CONTROL.

No one cultural operation can account for its control, and success in this direction definitely depends upon the intelligent employment of each of the following interdependent practices:—Although the theory of agriculture generally deplores stubble burning, the securing of a good, clean stubble-burn in badly affected paddocks does much towards the control of this disease. Where only small patches of the disease occur, and these are surrounded by a normal vigorous straw growth, little difficulty will be experienced in securing a good burn; but where more serious infections occur it will quite often be necessary to use harrows, &c., to drag straw over these patches before a successful burning can be ensured. The object of burning is to destroy as much as possible of diseased roots and straw. If not burned, the infected parts of the stubble may be blown about the paddock and into other paddocks, especially if broken up by the trampling of sheep and horses.

Paddocks which have been allowed to go to pasture should preferably be burnt, where possible, before fallowing, as the growth of barley grass, spear grass, silver grass, &c., greatly favors the spread of these root-rotting diseases.

The importance of early fallow in connection with disease control cannot be over-emphasised. The ploughing-in of infected stem bases and roots will cause the spores to germinate when moisture conditions become suitable. Having germinated, these spores must find some susceptible plant to attack, or else die of starvation, which leads up

to the fact that clean fallowing is an essential control measure. Self-sown wheat, barley, and barley grass are all attacked by these diseases. Consequently, the existence of such plants on the fallow only turn it into a breeding and multiplying ground for the various fungi, with the result that they will be even more prevalent in the succeeding crop.

The working of stubble land dry is also a measure to be avoided wherever possible, for under such conditions infected stubble is very brittle, is broken up into numerous small pieces, which are then blown about by wind, and cause a rapid increase in the size of infected patches, and possibly extending the disease into hitherto clean areas.

Certain crops, notably oats and peas, are not affected by these "root-rotting" fungi, and the introduction of these into the farm rotation proves a valuable step towards the control of these diseases. After the growing of such a crop it is essential to fallow early and cleanly before again sowing wheat.

The practice of sowing dry also greatly increases the spread, as both fungus spores and wheat seeds will germinate together with autumn rains. If the variety selected is sown as late as possible after autumn rains it is highly probable that many take-all spores will have germinated and died before the wheat gets away, with the result that take-all infections will be minimised. The application of fairly heavy dressings of superphosphate does much to control the disease. This is probably due to the fact that earlier maturing and more vigorous plants result, and these are better able to resist the attacks of fungi. Waterlogging is also a predisposing factor, for wherever water tends to lie on the surface for any length of time the effects of these three fungi are always very much more severe than on well-drained land. These root diseases will be found to be worse on sandy land in one season and clay land in another. The lighter soils are usually the worst affected, and this is definitely due to the fact that difficulty is experienced in obtaining a good firm consolidated seedbed about 1½ in. x 2 in. deep. The thorough preparation of the seedbed, so that there is at seeding time a very firm seedbed at a depth of about 1½ in. is one of the most important factors in ensuring a good, even germination, and the development of strongly rooting, abundantly vigorous disease-resistance plants. If wheat is planted deeper than 1½ in. considerable time and energy is wasted by young seedlings in developing their permanent rooting system at the 1½ in. level. The permanent root system is then forced to develop in a very poorly compacted over-aerated region of the soil, and the resistance to take-all and its allied diseases is very greatly lowered. The feeding off of crops on affected land must never be practised, as the corresponding reduction in vigor of individual plants will greatly increase their susceptibility to the take-all group of fungi. If cutting infected crops for hay, cutting high so that diseased portions will not be spread over the farm is a highly desirable practice. For reasons already stated, infected paddocks should never be allowed to go to pasture. An oat crop or good clean fallow is the only preventive we know. The dumping of bags in bare patches in paddocks caused by these diseases cannot be too strongly deplored. A moment's reflection should show that such practices only tend to distribute spores from paddock to paddock or farm to farm.

If all the above recommendations are conscientiously carried out—and many of them are simply practices which should be carried out in ordinary farm routine, quite apart from all considerations of disease—take-all, foot rot, and root rot will be greatly reduced, if not entirely eliminated from our wheat fields." (Secretary, C. Neumann, Halbury.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Snowtown	21/9/33	46	Address—Hon. T. Bath, M.L.C.	A. Hocking
Gawler River . . .	5/9/33	19	Address—H. C. Trumble, M.Sc.	K. Roediger
Yandiah	8/9/33	12	Impromptu Speeches . . .	O. Borgas
Rosedale	4/9/33	22	Address—H. Nott	S. Sincock
Blyth	29/8/33	—	Address—W. J. Spafford; and Annual Social	R. Eime
Stockport	1/9/33	9	"Pigs," C. Nairn	L. Klover
Lyndoch	29/8/33	15	Formal	J. Hammatt, Williamstown
Penwortham . . .	24/9/33	12	"Peach Aphis," A. Ahle	A. Jenner
Nantawarra . . .	31/8/33	5	Formal	S. Herbert
Buchanan	25/8/33	10	Annual Meeting	L. Bell
Buchanan	22/9/33	16	Congress Reports	L. Bell

YORKE PENINSULA DISTRICT.**KILKERRAN.**

July 11th.—Attendance, 13.

PREPARATIONS FOR SEEDING.—Mr. C. Hill read the following paper:—"In making preparations for seeding, the work actually begins at harvest time, when the practical farmer selects the varieties of wheat he requires. The selection of good seed is most important, and too much care cannot be taken to see that it is true to type and free from barley, which is very prevalent amongst wheats at the present time. In the selection of seed the farmer is greatly assisted by the crop competitions that are held annually, for after being judged a list of the different types recommended by the judges as being fit for seed are advertised. The value of the experimental farms cannot be over-estimated in proving the most suitable varieties of wheat to grow in the various districts. The correct time for sowing the different varieties must also claim attention. When the object is the production of grain, the late wheats should be sown first, followed by the mid-season varieties, and the early maturing wheats last of all. The grader is the best machine to use for cleaning the seed; it removes cracked and pinched grains, and turns out a sample that is almost perfect, which gives better germination and a stronger plant. Pickling must also be carried out thoroughly. If dry pickle is used, care must be taken to see that the seed is dusted as evenly as possible. If formalin or bluestone is preferred, the main point is to see that the grain is thoroughly saturated. It is not advisable to leave the delivery of the super too late for wet weather may cause unnecessary delay. During slack time thoroughly overhaul the drill or combine, and replace any worn parts. A good plan is to blacklead the stars, which will prevent the super sticking so badly. Go over swings, chains, and harness. When horses have been grazing in the paddock give them at least one feed a day for a few days before they commence hard work. Prior to the commencement of seeding fill up the chaffhouse, or, if a power farmer, see that the tractor is in good order, to ensure an uninterrupted run through the seeding operations. The stubble on which the barley crop is to be grown should be burnt off, and for working the ground the combine proves very satisfactory in this district, seed being sown at the rate of 1bush. with $\frac{1}{2}$ cwt. of super. The amount of wheat to be sown should vary a little. For a non-stooling variety I prefer 75lbs. to the acre, and a wheat that will stool, a little less. A dressing of at least 1cwt. of super to the acre is advisable. Seed should be sown about 1in. deep with a light set of harrows behind the combine to level the ground and cover any exposed grains."

TRAINING A SHEEP DOG.—Mr. J. Dutschke read the following paper:—"A dog should be taken in hand at about 4 or 5 months old, or earlier if he shows signs of beginning to work. He should first be put through the elementary course of instruction. Do not try and teach him everything at once, but take him steady, and have patience. Patience is one of the greatest factors in training. Teach him a little every day, and the task will not become so burdensome. When training begins, the first thing that should be taught is obedience. If this is taught right from the outset half the battle will be won. Teach him that by beginning with small lessons, such as to sit up or shake hands. Be very firm in teaching him. When the dog has been told to do something do not rest satisfied until he has done it. Study the dog. If he will not obey, give him a good beating. If that has a tendency to make him nervous or frightened, resort to some other method. Try and gain the dog's confidence. The best way to train a dog that has a tendency to run away is to get him on a chain. Much can be accomplished if a stick or strap is kept handy. Never let a dog bite the sheep when he is driving them. If he does this the best way to prevent it is to muzzle him. A very important thing to teach a dog is to sit down. No matter where the dog is, when he is told to sit down he must do it immediately." (Secretary, G. Heinrich, Maitland.)

FARM CONVENIENCES.

[Paper read by Mr. D. Wright at the July meeting of the Boor's Plains Branch.]

THE HOME.

Our first thoughts should be for conveniences in the home; there are many comforts that lie within the reach of all, that may be added to the home, that will make the work of the housewife more attractive and less fatiguing. One of the most important of these is a water service to the kitchen. This convenience can be accomplished at a reasonable cost, and will compensate the outlay in more ways than one. A good bathroom is more essential in the farm house than many other so-called conveniences. In the matter of lighting there are various plants and lights that are at the disposal of the farmer; in these days the subject of cost plays a large part. The convenience of a good lighting plant is fully realised by those who have the advantage of owning one. Among other conveniences on the farm are petrol irons, butter churns, and washing machines; these can all be added at various times to the home at reasonable

prices, thereby adding comfort to the lot of the farmer's wife. Perhaps one of the most useful conveniences on the farm is the telephone. During busy periods—seeding and harvest—the cost of this instrument will cover itself in time and petrol saved; again, in the case of sickness or accident the usefulness of this instrument is demonstrated.

THE FARM.

It is hardly necessary to stress the importance of having the water laid on to the various sections of work. Water handy to the chaffcutter, stables, cowyards, and pigsties is invaluable, not only for the sake of saving labor and time, but in times of fire. When sidelines are playing an important part in the farming community conveniences and labor-saving devices are being given a prominent part. In altering or building fowlhouses it is a simple matter to build the nests in the front of the house with a trapdoor to collect the eggs. A concrete or cement floor under the roots will facilitate cleaning. Automatic water buckets ensure a fresh supply of water for the fowls and save water carrying. Since the slump in grain prices much attention has been given to the breeding of pigs, and to endeavor to make it pay it is necessary to use every labor-saving device that we can. Self-feeders can be made from old petrol and bitumen drums and 200gall. square tanks. These can be made in various ways and at a reasonable cost. The average gate in the pigyard is one that gives a considerable amount of trouble. An effective and lasting gate can be made from an old square 200gall. tank by cutting the sides and bottom out to the required size and boring a hole through the iron into the post to take a $\frac{1}{2}$ in. bolt. A ramp is necessary where pigs are reared to any extent; a simple ramp can be made out of timber found on the farm, old wooden waterpipes make excellent sides for this. It is a good plan to have the ramp movable, so that in the event of one vehicle being higher than another it can be raised or lowered as required. The cost of running a car as well as a truck has induced many farmers to do away with small trucks, replacing them with trailers behind the car. The cost of building and running a trailer is small against that of the maintenance of a truck. The chassis, springs, &c., necessary for a trailer can be obtained at bedrock prices; the convenience of these vehicles will more than cover the initial outlay. A farmer who is working a small holding will find a one-man bag loader a valuable asset in saving time and work. These can be bought or made from disused waterpipes, bent and rivetted into position. Among the many conveniences to be found on the farm none plays so important a part as that of a well-equipped blacksmith's shop. Forge, anvil, and vice all play their part in reducing costs, and save the expense and inconvenience of travelling to the town to have minor repairs done.

GATES AND MOTOR RAMPS.

Farmgates are not always as convenient as they might be; an excellent idea for all the main gates is to have them made of iron. These make strong gates and add appearance to the homestead. Old water pipes cut and flattened each end and rivetted to angle iron from obsolete machinery will prove to be satisfactory and serviceable gates. Wooden gates can be made easily on the farm, but it is not advisable to use these if they are intended to hold back horses and stock. The iron gate, although it may cost a little more, will have a longer period of service. The ordinary wire gate is generally a source of trouble, and one cannot do better than to refer to the reference to wire gates in the May issue of the *Journal of Agriculture*. A recent addition to farm conveniences is the car ramp. These are to be seen in various shapes and forms. Three types of ramps can be made on the farm that will cater for the majority of motor traffic met with. The first can be made by using two sections out of an old spring-toothed cultivator; the gaps in the sections can be filled with pieces of scrap iron the required thickness bolted or rivetted to the sections. A hole 2ft. wide, 18in. deep, and about 10ft. long is necessary to stop cattle from crossing the sections placed across this pit. This will make an ideal ramp for the average light car. The second type can also be made from material found on most farms. Twelve lengths of 2in. or 3in. piping 2ft. 6in. long are required, also four pieces of T iron or railway iron 3ft. or 4ft. long; these can be found in the framework of old harvesters. The piping when bolted to the T iron and placed over the pit will prove an effective ramp, and one that is capable of carrying the weight of a fair load. The third type is one that will prove to be more costly, because the material is not found on the average farm. However, by purchasing obsolete railway irons and bolting them to two iron supports an excellent ramp can be built. Care should be taken in not placing the irons too far apart, thereby making a trap for stock in which to break their legs. Of the three types I favor the second, in which the centre of the pit is uncovered. This generally proves an obstacle to any stock that may attempt to cross it. The farmer of to-day has proved himself efficient by getting out of the rut of past years by adopting up-to-date and convenient methods, and it is to his advantage to use every convenience and labor-saving device that he can command.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Weavers	4/9/33	11	"Tariffs and Arbitration," J. Bridges	H. Cornish, Stansbury
Brentwood	7/9/33	9	Discussion	G. Carmichael
Sth. Kilkerran..	29/8/33	14	"Blacksmithing," L. Heinrich	R. Hasting
Paskeville	29/8/33	12	Winter School Report, G. Meier	J. Prouse

WESTERN DISTRICT.

ELBOW HILL (Average annual rainfall, 11in. to 12in.).

June 6th.—Attendance, 11.

SHEEP ON THE FARM.—Mr. J. Wildman read the following paper:—"For this locality the Merino serves the dual purpose of fat lambs and also wool. This breed of sheep does not produce an ideal carcass for the freezers, but when the season is favorable a very fair lamb can be produced, and by keeping to the Merino the standard of the wool does not receive a setback. The type of Merino should be plain body, clean face, and no wrinkles on body or breach, and carrying a fleece of medium fine wool about 60's count. By keeping the sheep free from wrinkles the flock has a much better constitution, with less trouble from flies. One of the most important things is to be able to calculate the carrying capacity of the farm. This is hard to arrive at in some seasons, but be careful not to over-stock as this entails more money invested, less profit per sheep, and a great deal more risk. With over-stocking the sheep are inclined to stray and are much harder on the fences. The lambs should be dropped about June or July to be on the safe side for green feed in this part. A ewe having green feed when the lamb is at foot will produce a much better lamb than the one having to wait a month or two before the green feed comes after dropping the lamb. This district has more late seasons for feed than early ones, so that the later lamb is preferable. Except in cases where only a few sheep are kept—under 100—the lambs can be dropped all the year. All sheep should be crutched about April or early in May. The sheep should be changed frequently from different paddocks, according to the supply of pasture and number of sheep. They should not be allowed to walk for water in summer; this has a tendency to collect dust in the fleece. Shearing should range from the middle of August until the middle of September; no later on account of grass seeds and dust. Before starting shearing, the shed should be in order, to get the shearing done without delay and to have as fast and efficient shearers as possible to get the sheep shorn with the least number of times of yarding as possible; every time the sheep are driven into a dusty yard with full fleece there is a considerable loss in the value of the wool; it is also harder on the sheep and lambs. Either blades or machines can be used with complete satisfaction, provided the operators are competent men. Machines are very rough on the sheep if not understood. The blades do not bruise the sheep to the same extent as machines. For small flocks, the blades are more suitable and economical. If the wool contains sandy or dusty backs, these should be removed and baled separately. Make the bales true to sample; if it be dusty let it all be dusty, and if clean wool take care to have it clean, and so on in every class. Some farmers do not take sufficient care when shearing and baling the wool, yet it is the leading sideline and also shows more profit than any other operation. Farmers have hundreds of pounds worth of machinery for wheat growing, some hardly ever used, yet too often no provision is made for handling one of the most profitable sidelines on the farm." A good discussion followed.

DISADVANTAGES OF A HOME CONSUMPTION PRICE FOR WHEAT.—The Rev. H. White read the following paper at the meeting of the Branch held on July 11th. The speaker stated that his paper was written in reply to a paper by Mr. Payne, of the Miltalie Branch, which was published in the September issue of the *Journal*:—"Farmers must demand at least the cost of production in order to survive," says Mr. Payne, and adds further, "You must demand it; it is your right." "A guarantee of 5s. a bushel would be the very worst thing that could happen in the interests of progressive farming. The old policy of each man for himself would further entrench vested interests, that have existed too long at the cost of primary producers. The high prices resulted in a land boom that is very largely the cause of Australian difficulties, and to base the cost of production on such fictitious land values is not good business. Furthermore, farmers are told to demand a certain price, but who is to pay this price? Ninety-two per cent.

of our wheat harvest is sold under competition in the world's markets and only 8 per cent. remains at home for food and seed, so that it will be realised that we are not in a favorable position to obtain all that we demand. While this does not prejudice any claim for a reasonable price, it makes it extremely difficult to see how the claim is to be met. Mr. Payne made the following quotation from Sir Otto Niemeyer's report, "So long as the sheltered trades of Australia insist on taking so large a share of the national dividend (and even an increasingly large proportion as the national dividend drops) the difficulties of the unsheltered export trade can only increase." Sir Otto, in the rest of the quotation, shows how difficult the lot of the primary producer is, and points out clearly that the situation can only be met by a considerable reduction in the cost of production. Mr. Payne, who used the quotation advocates the acceptance of the wrong method of adjustment as against the correct one supported by the report. In effect he asks for a protective duty on home consumed wheat. It should be pointed out that there is no proper analogy between the prices fixed by millers and bakers and this suggested fixation of wheat prices. There is no surplus problem if the price of each article is based on the fluctuating price of grain, and so long as neither baker nor miller presumes unduly on the minimum prices, it is wiser to have some basis upon which work is done. To support the dried fruit and sugar industries, a call is made on the living of every individual to support a minority at a much higher standard of living generally than they themselves enjoy. Mr. Payne admits that the price of bread will increase. He speaks of the price-controlling factors in milling and baking, but he seems optimistic when he says that "while you practically double the price of wheat, bread will not increase to any appreciable extent." Based on Mr. Payne's figures—which he will not dispute—flour under this scheme will increase to about £14 per ton, and on the same basis of calculation bread must advance to at least 5d. per loaf, and more in the country. Based on Mr. Payne's calculation again, this increase on bread alone will tax a man and wife without family 13s. a year, the average family of man, wife, and three children 30s. a year, and so on in proportion to the size of family. Calculating the number of people drawing rations as at 20,000, it would cost the Government another £250 a week to provide bread only for these. Nor will the increases stop at bread, it will extend to many other commodities, nearly all of which are used by the poorer classes. Proceeding, it is not a good argument in favor of Mr. Payne's suggestions to quote the duties placed on imported wheat by continental countries. The reason for this lies in a precisely similar scheme (only much wider in its scope) advocated by America to control the price of wheat for its primary producers. This has created a surplus, and the attempts at price fixing and Government control have only increased the problem and will continue to do so so long as the Government is regarded as a paternal pocket into which everyone may dip as need arises. Farmers should know just how small an amount this scheme will really net for them. Based on last year's production, the net increase will be 2d. per bushel, and the average farmer cropping 350 acres and averaging 12 bush. per acre would receive £35, and proportionately more or less according to the acreage and productivity. Mr. Payne admits that his scheme will not save the situation. It may be likened to giving every unemployed man 6d. or so to buy food. This is not solving the unemployment problem. It is like putting a stay against a bulging wall that in time requires more stays to prevent collapse. The whole policy of recent years is a futile effort to bolster up a situation that is wrong—every industry seeking protection, tariffs, bonuses, bounties, &c., until the economic war has proved as disastrous as that waged between nations. Mr. Payne says: "If this were a free trade country it would be fair enough to accept world conditions." If that is so, then the solution of the problem lies along the line of reconstruction, a reconstruction that aims first of all at a good foundation. The shortage in wheat income must be met by concentration in other sides of production, for instance, lambs, wool, poultry, cattle, dairy produce, and bacon, with added keenness to the standards of production in every one of these side lines. I know Mr. Payne will agree with me on this demand for increased quality. Our investments have been largely in the form of land which has depreciated by approximately 200 per cent. Primary industry is setting this chimera of wealth on one side of its ledger and bewailing the fact that its income will not meet expenditure. What must be done? First, let us know the worst, and strike upward from that point. We must base our production costs on the present values, which have a close connection with parity. It is all very well to talk of Australian values. They are represented by the Australian note and are not what they seem. There must be a writing down of values. There must be a revision of tariffs. This seems to me to be one of the keys to the situation, and must be faced boldly and quickly to ensure security for the future. The aim in all efforts to improve methods of manufacture and production is to reduce costs. A comparison of prices will show that where industry is unhampered by Government restrictions or given Government assistance, the cheapening of costs results, and is to the benefit of the consumer. It is reasonable to expect that with the wonderfully improved methods of farming and efficient machinery, the consumer may not look for a cheapening of the finished article,

rather than buying wheat at a price quite in advance of that obtained by farmers who labored under the disabilities of a generation ago? This reduction of costs may not result quickly in a small populated country, but it should be kept in view as a necessity under modern conditions." (Secretary, W. Cooper.)

MOUNT HOPE.

July 13th.—Attendance, 9.

VERMIN DESTRUCTION.—Mr. L. Myers read the following paper:—"In the last few years vermin have increased to such an extent as to become a very serious menace to all farmers, and rabbits are the most troublesome. It is almost impossible to check them entirely, and to keep them in reasonable control takes much labor. The most effective method is with dogs and traps. When starting on a paddock with dogs block as many of the burrows in the morning as can be attended to in the afternoon. Some system must be adopted, such as driving them into a corner, or where they can be caught. If it is possible, make a yard in the corner of the paddock to run them into, or if the scrubby ridges are not too wide, make a V-shaped race with a small yard at the point with a trap, so they can get in and not get out. To do this, use a piece of netting about 3ft. to 4ft. long, and make it into a tunnel with a fairly big entrance, running into a small outlet. Place this right in the corner so that the rabbit has his head in the entrance when he comes to the corner. It is advisable to have water there, but do not allow the dogs to drink too much. If the rabbits are very thick, go over the paddock two or three times in the morning; then follow on with traps, setting one at every open burrow. When this has been done, take the dogs over the paddock again, this time taking a .22 rifle. Many will be easy to shoot, thus saving the dog much needless running." (Secretary, A. L. Myers.)

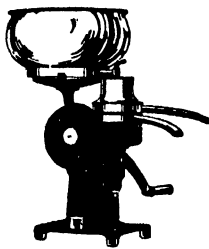
PYGERY.

July 4th.—Attendance, 9.

FALLOWING.—Discussing this subject, Mr. A. Kammerrmann expressed a preference for early fallowing because grass and weeds were easily destroyed; if left late the grass was too high to be covered. His last year's early fallow was clean, the late dirty. He preferred shallow working. Mr. E. Edmonds said shallow ploughing conserved the moisture better. No matter how often the fallow was worked mustard seeds grew.

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He advised, fallow early and shallow, and work it well or keep sheep on it. Mr. Symonds: "See that the plough is in good order and all shares sharp." He kept sheep on the fallow last year; it was hard, but free from weeds. He did not believe in too much working. Mr. Woodrup advised keeping sheep on barley grass in its early stage to prevent too much seeding. Sheep would not eat the seed-heads of barley-grass.

TAILING LAMBS.—Mr. Kammermann said that cleanliness was the first essential. He liked to leave the tail about 2in. long. The very short-tailed sheep were more often blown than those with a longer tail. He did not favor crutching; three years' experience had shown that crutched sheep were badly blown, while the uncrutched were not affected. He cleaned up all that were affected and applied sheep oil. He did not crutch any sheep this year, and out of a large mob he had less than 3 per cent. fly-blown. Mr. Edmonds crutched his sheep because it saved the wool that would only be greasy locks or dags if left until shearing time. Those he missed invariably got blown. When tailing lambs he thoroughly washed the instruments, but did not put anything on the lambs; he had had no losses. He left two joints on the tail. Sheep with the tail wrinkle were the first to get blown. Mr. Woodrup crutched to have sheep clean at shearing time. The crutching wool was clean, but if left until shearing it was lost. He tailed lambs at 3 weeks of age and left two joints on the tail. He tailed the lambs in the sheepyard and kept the tools in a dish of disinfectant water. Mr. Day favored from 2in. to 3in. of tail, the sheep looked better and they kept cleaner than those with a shorter tail. He used formalin in the water for the instruments. A wrinkle-free sheep was rarely fly-struck. Mr. Symonds had so much trouble last year that he crutched his sheep this year and saved half a bale of clean wool. He used sheep-dip at time of crutching.

RABBIT DESTRUCTION.—Mr. Kammermann had found oats and strychnine, or jam and strychnine very good. He dissolved the strychnine in vinegar then mixed with water and soaked the oats in it and distributed them along a furrow made with the poison cart. For burrows he found the ear exhaust was the best. Cynagas was too expensive. Mr. Edmonds thought cynagas was most effective to kill rabbits in the burrows. To deal effectively with rabbits all landholders should destroy simultaneously. (Secretary, A. Day.)

ROBERTS AND VERRAN.

July 5th.—Attendance, 12.

INCREASING PRODUCTION.—Paper read by Mr. E. Pobke:—"Every farmer's aim should be to get the maximum returns in conjunction with an outlay of costs as small as possible. Modern machinery and modern methods are necessary if the occupier of land is to make his business payable. The farmer should study the soil on his holding and work it accordingly. Climatic conditions should be thoroughly looked into, and also the natural herbage growing on paddocks which have been left out for several years. It is beneficial if the farmer keeps an eye and also an open ear on research and experimental work that is carried on in a district with similar conditions to that in which he is situated. He should also be interested in agricultural practices that are published from time to time. Every farmer will place fallow in the affirmative, and fallow is one of the main things for increasing production. Correct rotation of cereals is another vital point. In keeping sheep either for wool or mutton the farmer will find it helpful in keeping his ground in good heart through the sheep's droppings, and they will keep the fallows clean and check the growth of wild bushes which soon appear on grass land. Keep only seed from wheat that has been proved in your district after a 'thorough test.' " (Secretary, C. Masters.)

TARAGORO.

June 8th.—Attendance, 8.

FARM OUTBUILDINGS.—The following paper was read by Mr. E. Benson:—"Farm outbuildings are the most necessitous things on the farm, and without them the farm is not of any great value. All outbuildings should be built strong, weatherproof, and left in such a manner so that any one or more of them may be extended. Most farmers of to-day usually build to carry only what stock they have at the time; such a step is a very grave error. Before erecting, see that the site is on high and dry land; water becomes a menace to all buildings. In building a chaff house, a two-storied building is the better, the top one holding the chaff and the lower the oats. Two or three shoots should lead to the back of the manger of the stable, which should be built directly behind the chaff house, with trap doors. This does away with all hand bagging. A shoot should also be used for the oats. The barn should be erected on a concrete foundation of about 2ft. 6in. high, which ensures dryness, and can quite easily be made mouse-proof. The stable should face the east, with the back closed in, with a door in the centre, the water trough to be in the back yard so that the horse can have a drink when they wish, also a roll. Each horse should have its own stall, with collar, hames,

and winkers hanging in same, and stalls should be cleaned out every day. *The Pig Sty* should be built facing the east, with a fairly well-sloped floor, with a drain at the foot running into a pughole. This enables all water and slush to get away and the sty can be easily kept clean. Fowl houses should be fairly open, with roosts of piping hanging by wire from the roof. Piping should be used; wood provides a harbor for tick. Machinery, sheep, and shearing sheds should be under one roof. *The Men's Living Quarters.*—Some farmers prefer the men to sleep under the same roof as they do, whilst others desire privacy, and wish their men to live away from the house. If the latter, give the men comfortable quarters, as many a good man has left his job against his own and his employer's will on account of uncomfortable living quarters. These should be built of stone or wood and iron, lined with suitable material, and should have an open fireplace and a large window" (Secretary, T. Winters.)

WARRAMBOO.

July 4th.—Attendance, 11.

PREPARATIONS FOR SHEARING.—Mr. H. Tucker read the following paper:—"On most mixed farms there is always a certain amount of preparing to be done before shearing can be commenced, because farmers have to make the most possible use of what sheds they have throughout the year. After the shed has been cleaned out, see that it is clear underneath the grating in the catching pen, and, if not in possession of grating, posts laid down over the ground close together in the pen will be better than nothing at all. There should be shed room to cover at least 100 sheep—say, 40 in the catching pen, and 60 besides. Shorn sheep should be turned out through the shed into a separate pen. These pens are best if made fairly high and blind, for a shorn sheep is very active at times, and it takes more than netting to hold him. Floor space for at least two men is wanted in the shed; shelves nailed up at each place, and also water pots nailed to a post. A 5lb. jam tin makes a good water pot, and there must be something put in the bottom of them, such as a piece of leather cut out to fit in. This is to save the points of shears. Everything necessary for the job should be on hand, such as wool packs, blue string, tar for cuts in sheep, and blowfly oil. Stencils should be used to make the branding of the bales look neat. Neatness in appearance goes a long way with buyers in the wool stores. These can be made out of a kerosene tin with a little care and time. All dirty sheep should be crutched before being allowed to enter on the shearing floor." (Secretary, F. Chilman.)

VARIETIES OF WHEAT FOR THE DISTRICT.

(Paper read by Mr. O. J. MURPHY at the June meeting of the Warramboos Branch.)

The selection of wheats for seed purposes is a matter of prime importance. At the present time the price of wheat is at a low level; and it should be the aim of every farmer to select varieties which are likely to give the highest yields at harvest time; yield is of more importance than area.

Generally speaking, the comparatively low rainfall of this district coupled with the fact that spring conditions in the shape of hot north winds and late frosts are often very severe, call for sowing of early varieties of wheat, and particularly varieties which do not carry much flag. Gluyas is the best known variety of the latter type. However, it is not advisable to limit the selection of seed varieties to one or two early varieties under the prevailing conditions of this district. Seeding operations extend over a lengthy period, from early April until the end of June. In some cases, this period is exceeded. Moreover, we are called upon to deal with a wider range of soil types and conditions, new or virgin ground, stubble ground, grass ground, fallow, sandy ridges,

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and low-lying flats of comparatively firm soil. It is not to be expected that any one variety of wheat sown at any time between April 1st and June 30th on any one of the varieties of soil mentioned will always give good results. The selection of varieties to sow calls for good judgment on the part of the wheatgrower.

The chief varieties of wheat grown in this district at the present time are Gluyas, Late Gluyas, Golden Drop, Canberra, Ford, and Nabawa. Other varieties not so extensively grown are Queen Fan, Quality, Waratah, King's White, and Jacobs'. Several of these varieties failed last season when red rust and take-all were prevalent, but it should be pointed out that the yields obtained and the degree to which the varieties were affected by disease depended very largely on the time of sowing. King's White sown early in the season during April yielded a poor sample, weighing approximately 57½ lbs. to the bushel. The same variety of wheat, sown in the latter part of May, produced a good sample weighing over 63 lbs. per bushel. The 1932 season was abnormal, and consequently wheat varieties should not be judged on that season alone.

The writer recommends the selection of varieties which have a good record over a period of years. It is not a paying proposition for the farmer in comparatively new country to experiment extensively with new varieties, the testing of new varieties is interesting and essential if one wishes to keep pace with the times, but these varieties should be limited to one or two and sown on small areas.

GLUYAS AND KING'S WHITE.

Gluyas has given the best results during the past four seasons—two semi-drought years and two comparatively wet seasons. This variety has been one of the leading wheats in South Australia for several years, and in the writer's opinion is a variety well suited for this district. I recommend it for sowing on fallow, stubble, or grass ground during May and June. Sown in April there is a danger of the variety being affected by frost. The chief objection to this wheat is its liability to lodge. The variety should not be discarded on this account, because even if lodged the toughness of the straw permits clean reaping. Gluyas is primarily a grain yielder. It is not a good hay wheat, and its chaff is hard and not attractive to stock. If cut for hay, the binder should be used when the crop is green. Cut green; the hay will retain its color in the stack. King's White is an early bearded variety, which has been used extensively at Roseworthy College over a number of years for wheat breeding. Many well-known varieties, such as Sultan and Caliph, are closely connected with King's White, which is one of the best hay wheats grown in Australia. During the past four seasons this variety has yielded little less than Gluyas. It has the following advantages over Gluyas:—A considerably better hay wheat, a more valuable stubble for stock feed, and a chaff which is very attractive to stock, notwithstanding the beard. This variety, on account of the protection afforded by the beard, is not affected by frost, and the heads are never tipped by hot winds. Although it matures in a shorter period than Gluyas, it can, if necessary, be sown with more safety in the early part of the season. On the other hand, it is more susceptible to attacks of red rust than Gluyas, and on account of the bulky chaff and the bearded head, the harvesting of this variety by means of the ordinary stripper and winnower is a more irksome job. Present day harvesters and threshers handle the variety quite effectively.

On account of the peculiar formation of the land in this district, viz., sand rises liable to drift, with intervening low-lying flats, the effects of frost are most severe. A quick-growing bearded wheat, such as King's White, is a very suitable variety, well worthy of trial. It should recommend itself, particularly to the owner of a new block where the presence of stumps does not permit the use of a binder. The cocky chaff from King's White is bulky and more attractive to stock than the chaff of any other variety we have grown.

NABAWA.

Nabawa was the leading variety of wheat in South Australia last year. It has been strongly recommended by our Agricultural Instructor. Nabawa is a mid-season variety. It is a good grain wheat, and appears to be immune to flag smut. On this account it is recommended for sowing on stubble ground. Many failures have been experienced in this district with Nabawa, probably due to the fact that its habits of growth are not well known. In this district Nabawa must be sown early and on clean ground if the best results are to be obtained. It is a very slow grower in its early stages, and cannot on that account compete with rubbish, such as barley grass and mustard. This wheat should only be sown on new ground, free from weeds, or on well-worked fallow. It should give good results sown early as a first, second or third crop on new ground, before weeds have made their appearance. It is not to be compared with Gluyas, King's White, Canberra, and other early varieties for late seeding on grass land.

OTHER POPULAR VARIETIES.

Late Gluyas is a popular variety in this district. In our experience it is not so good a yielder as Gluyas. This variety was badly affected by rust last year. It stands up better than Gluyas, is an easier threshing wheat, and carries more flag. It is doubtful

whether this selection from Gluyas will stand dry weather conditions as well as the earlier variety.

Canberra and Ford wheats have lost some of their popularity. Canberra appears to be susceptible to loose smut. It is an early variety, which has given good results sown late in the season. Ford regained some of its former popularity last season on account of its resistance to red rust. Like Nabawa, this variety requires a good clean soil and little competition with weeds in its early stages if it is to give a good yield.

Waratah is an early variety, having the same period of growth as Gluyas, and claiming Gluyas as one of its parents. It is better hay wheat than Gluyas, stands up well, is an easy threshing wheat, and rust resistant. It is New South Wales's most popular variety. The spikelets of the head of this variety may afford some protection against frost.

Of the varieties mentioned, Gluyas, King's White, Nabawa, Waratah, and Late Gluyas are five good wheats for this district, likely to give good results over a period of years, provided always that due consideration be given to the time of sowing and the class of soil on which the varieties are sown.

Of the new varieties which have been prominent within recent years Sword, a Ford crossbred wheat, should be well worth a trial by those interested in the testing of new varieties. Sword has shown a marked resistance to red rust, and has given very high yields in other parts of the State.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Green Patch ...	31/8/33	12	Discussion	C. Whillas, Port Lincoln
Petina.....	11/9/33	14	Address—W. H. Brown-rigg	W. Stone
Wudinna	2/9/33	14	"Harvesting Machinery," C. Newbon	D. Duguid
Taragoro	31/8/33	—	Formal	T. Winters, Cleve
Goode	9/8/33	24	Annual Meeting	B. Linke

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

June 16th.—Attendance, 26.

CARE OF THE MOTOR CAR.—Paper read by Mr. A. Hein:—"The correct lubrication of the engine is the most vital point to be considered, being careful to see that the grade of oil recommended by the manufacturers is used and that it is kept at the correct level. Cheap oil will generally lose its body in a few hundred miles, cause wear in the main bearings, and run up the repair bill. It is important that compression be equal in all cylinders. Faulty compression may be shown in loss of power or missing in the engine. Compression should be tested occasionally by turning the engine until resistance in each of the cylinders is felt. If the compression is weak in one or all of the cylinders the valves may be pitted and not seating properly, and need regrinding. The piston rings may be weak or poorly fitting. Any of these faults should be corrected immediately. If the valves are allowed to remain coated with carbon for any length of time they become badly pitted, and are much harder to grind to a smooth seat. Inspect the wiring, terminals, and spark plugs, and see that all connections are tight. Examine the battery regularly. See that all the cells are filled to the proper level with pure distilled water. Keep the radiator full of water and see that there is no obstruction in the flow of water through the radiator tubes. Examine the foot and hand brakes, they must work freely and be properly adjusted. The steering should be examined for loose bolts and nuts. Attention to these parts will add to the safety and pleasure of driving your car. Shackle bolts should not be made too tight, or the result will be hard riding and spring breakage. They should be tightened only until end play is removed. Examine the tyres for any cuts or bruises. If they are not taken care of at the start, sand and water will work under the outside tread and loosen the entire tread. Most tyre troubles are due to under inflation. Do not neglect necessary adjustment and repairs. Do not race the engine. Do not start with a jerk, always engage the clutch gradually and the car will start easily. Do not forget above all else that the car is a fine piece of machinery and that one will be repaid many times in excellence of service for the care and attention given it." (Secretary, C. Altmann.)

July 15th.—Attendance, 24.

CARE OF FARM STOCK.—Mr. A. Braendler read the following paper:—"Horses that have been spelled in the paddock for a long time should, on being brought into the stable, be fed on long hay for a day or two or only a small quantity of chaff. Never work them too fast for the first few days. If they have worked for a few weeks and are then to be rested for a few days, do not turn them out on short green grass without giving them dry feed every day or night—sudden changes will upset them. Never change the feed or water suddenly; always water before feeding, never just before hard work. To get the best returns from cows see that they have free access to water and provide a lick of sweet bonemeal mixed with a little salt in a box convenient to the drinking trough, especially in summer. Never change their feed suddenly and always see that they have plenty of it. A change from one paddock to another is beneficial. Do not allow them to graze on fresh green clover early in the morning when the grass is very wet and dewy, because they are likely to bloat. Always try and give them a little green in summer. If this is not available, feed them on lucerne hay, bran, clover hay, sweet green hay, or ensilage. Always feed regularly and keep them in good condition. It has often been stated that sheep only need be taken to water about twice a week, but my experience is if they have the water in their paddock where they can drink whenever they like they will keep in better condition and do on less grass through the summer. When the grass is green and it is desired to fatten them quickly, change them from one paddock to another every two or three weeks. Do not do this early in the morning when the grass is very wet or dewy. When the grass is dry do not shift them into a paddock containing green stinkwort that is just coming out in flower or there will be serious losses. Pigs will do much better if clean water and clean feed is provided for them. A little paddock in which to run and feed is good for all breeding sows, and young growing pigs will thrive if run in a paddock where there is plenty of green soft grass growing, barley, dandelion, or clover. The more milk and grain that can be fed to them the better they will do. Always have charcoal and ashes in a box for them, with plenty of water, especially in summer. Always remember that free access to water applies to all animals, especially in summer. and also do not forget to provide shade in summer and shelter in winter. (Secretary, C. Altmann.)

MURRAY BRIDGE (Average annual rainfall, 13.59in.).

June 28.—Attendance, 14.

PRUNING.—With suitable diagrams and sketches Mr. A. H. Paterson, Agricultural Instructor at the Murray Bridge High School, gave a lecture on "Pruning." He traced the growth of the tree from its seedling stage to the time when it would be in full fruit. Although from the backyard point of view it was not always necessary to bud a tree to get fruit, to run an orchard on commercial lines it was essential to have a standard tree bearing fruit at the right time. The unfixed type would give spasmodic results, causing much inconvenience and waste of time. The budding should be done about 4ins. above ground level. Pruning for the first four or five years should aim at building up the framework of the tree to a wineglass shape. The first pruning would be to cut off the topmost part of the seedling. The strongest growth is at the topmost part of the tree. The second pruning required the selection of three limbs for main arms. When the tree had reached the fruit-bearing stage one of the first principles to remember was to keep the tree in a state of semi-debility—not too vigorous nor too weak. The fruit and leaves should be kept down to the bottom part of the tree as much as possible. Especially was it important where fruit was liable to be sun-scorched. Strong growth at the top and good fruit production did not go together. It was necessary to supply a leader for each arm to draw up sap, not to supply fruit. On a normal tree about half the leader should be kept and pruned to a bud going in the direction the limb was desired. The fruiting wood must be kept as close into the main arms as possible and covered with fruit-bearing shoots. A simple rule used at the High School for boys learning pruning with the peach was never reduce the length of the fruiting wood. On an apricot, leave untouched anything shorter than 9ins.; over 9ins. reduce back as required. Summer pruning was essential to deal with water shoots, and thin out fruiting wood when too thick. The buds of the apple and pear were different to those of the peach and apricot. Progressive orchardists pruned the orange mainly to get a hemispherical shape and to let the light in to the centre, because fruit grows on the annual wood, and such pruning permitted fruit to grow inside the shape of the tree. The shoots should be thinned out and dead wood removed. **Vines.**—Mr. Paterson illustrated by diagrams the different methods adopted in different districts for treating the special vines in those districts. **Questions and Discussions.**—Mr. Paterson explained the difference between a wood shoot and a water shoot as being the growth from the wood of the previous year as distinct from a long shoot from an older lower limb. Several points

were made clear as to the treatment of a tree that had not been pruned for several years, the main one being that the work of shaping must be done gradually. (Secretary, F. Hurr.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Marama	5/9/33	6	Discussion	T. Hinkley
Pinnaroo	21/6/33	18	Address—R. L. Griffiths .	H. Badman
Pinnaroo	4/8/33	17	Address—Mr. A. J. Cooke	H. Badman
Pinnaroo	25/8/33	16	Annual Meeting	H. Badman
Pinnaroo	9/9/33	18	Address—J. Wilson	H. Badman
Overland Corner	6/9/33	22	"Co-operation," E. Chas- ton	H. Loffler
Alawoona	16/8/33	10	"The Foot of the Horse," A. Pengilly	A. Giles
Nunkeri	5/7/33	8	"Harness," P. Oster	E. Peltz
Nunkeri	26/7/33	16	"Fallowing Implements," B. Harding ; "Fallow- ing," H. Sanders	E. Peltz
Nunkeri	29/8/33	15	Address—R. L. Griffiths .	E. Peltz

SOUTH AND HILLS DISTRICT.



The Exhibit staged by the Balhannah Branch of the Agricultural Bureau which was awarded the First Prize of £30 donated by the Royal Agricultural and Horticultural Society and the £5 5s. trophy presented by Cresco Fertilisers Ltd. The exhibit scored 915 points out of 1,000.

CURRENCY CREEK.

June 12th.—Attendance, 8.

FARM EFFICIENCY OF THE TRACTOR.—Mr. G. Holme read the following paper:—"The quality and quantity of the work, its cheapness and the time occupied are all factors which count in the efficient working of a tractor on the farm. The best results will be obtained by working the cultivating implements at the right depth. The tractor also has a reserve power that is lacking in horse teams. The power drives and the tractor gives absolute control of the speeds necessary to make a first class sample of grain. The tractor will work for a period of from 50 to 70 hours before it is necessary to make a complete stop; to change oils, &c. The hours worked depend on one or more men, not the tractor because motor power in its different forms is now looked upon as inexhaustible. With the tractor ploughing can be done for less than 1s. per acre, cultivating and seeding for less, and harvesting for about 1s. per acre. Because it is possible to work "non stop" on a paddock costs are further reduced, because there is no power wasted in stops or starts. With a tractor outfit the land can be worked at the most opportune time, which materially assists in the control of weeds." (Secretary, D. Jeff Gordon.)

FINNISS.

July 10th.—Attendance, 13.

PIG BREEDING.—The following paper was read by Mr. M. Burzacott:—"It pays a farmer who is going in for pigs to breed suckers because he can get the type of pig he requires. If he wants Large Whites he procures the sows and boar, and then breeds from them. When choosing breeding sows, be sure that they are healthy, also select a healthy boar, because if the parents are subject to a disease or deformity the litter is liable to inherit these defects. Great care must be taken to ensure cleanliness, pens should be cleaned out and fresh bedding put in every day. It is not advisable to put too much straw in a farrowing pen until the litter is a few days old, because they are liable to get under it, and the sow will lie on them. The sows sometimes crush the little ones against the wall, and to prevent this put a guard rail 9in. from the wall and just far enough from the floor for the little ones to get underneath. Do not have the rail attached to blocks in the floor, but let into the walls. A good guard rail can be made out of 2in iron pipes. When the little pigs are old enough to eat add crushed grain to the milk, and give them plenty of greenstuff. It is a good plan to have a paddock for them to have a run in and shut them up at night. All grain should be crushed; if a crusher is not available soak it, but do not feed it to the pigs until it has been soaking for at least 24 hours. When the pigs are about 10 weeks old, they are ready to wean. Do not wean too suddenly, keep them from the mother in the daytime and put them with her at night, and lengthen the time gradually until at about 12 to 14 weeks, when they can be taken from the sow altogether. A good lick to supply minerals is 40 per cent. superphosphate, 20 per cent. coarse salt, 20 per cent. charcoal, 5 per cent. sulphate of iron, 5 per cent. Epsom salts, 5 per cent. sulphur, and 5 per cent. soda bicarb." (Secretary, L. Dunn.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Springton	6/9/33	8	" Grass Hay," P. Miller .	E. Brokate
Cherry Gardens.	2/9/33	17	Homestead Meeting	A. Stone
Hope Forest ...	4/9/33	17	Address—A. L. Warren .	E. Muldoon
Shoal Bay	29/8/33	12	Discussion	E. Bell
Scott's Bottom	2/9/33	6	Winter School Report ...	E. Atkinson, Cherry Gardens
Belvidere	15/7/33	15	Winter School Report, L. Yelland	M. Pearce
Mt. Pleasant ...	11/8/33	5	Annual Meeting	D. Smith
Inman Valley ..	21/9/33	13	Winter School Reports, Messrs. Martin and Jagger	W. Mayfield
Monarto South .	16/9/33	21	Congress Reports	C. Altmann
Port Elliot	23/9/33	9	Congress Reports	J. P. Colebatch, Victor Harbor
Macclesfield ...	21/9/33	27	Address—H. B. Barlow .	H. Ross

WOMEN'S BRANCHES.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

ANNUAL CONGRESS OF WOMEN'S BRANCHES.

Congress was opened by His Excellency the Governor on Monday, September 11th, at 8 p.m., the following delegates were appointed by their respective Branches. The figures indicate the number of sessions for which attendance cards were recorded:— Miss L. Dennison (5), Mrs. J. Schmerl (3) (Auburn); Mesdames J. Murphy (5), E. Norris (5) (Balumbah); Mesdames E. L. Orchard (4), F. Cummings (5) (Belalie); Mesdames J. C. Dux (4), F. Hicks (3) (Clare); Mesdames W. Redman (4), E. Alder (4) (Coonawarra); Misses Stott (2), F. Huppertz (3) (Eurelia); Mrs. F. Wienert (5), Miss J. Sargent (3) (Gladstone); Mrs. C. Lutz (5), Miss C. Paech (4) (Goode); Miss A. Kennedy (5), Mrs. H. Brooks (3) (Kalangadoo); Mesdames J. White (3), G. Thorpe (3) (Kangarilla); Mrs. G. O. Cook (4), Miss A. Shepherd (4) (Kybybolite); Mrs. D. F. Morrison (4), Mrs. Bowells (4) (Laura Bay); Mesdames A. J. Turner (0), P. C. Cleave (4) (Mangalo); Mrs. K. Warren (2), Mrs. B. Elliot (2) (McLaren Flat); Mesdames H. J. Hutchesson (5), A. J. Schultz (5) (Millicent); Mesdames J. Twigden (5), W. Twigden (4) (Morchard); Misses W. A. Fisher (5), M. L. Kemp (4) (Mundalla); Mrs. F. Jose (5), Miss T. M. Franks (5) (Nelshaby); Mesdames C. Neindorf (5), C. S. Foale (4) (Parilla); Miss M. Ferguson (3), Mrs. M. Simpson (4) (Parilla Well); Mrs. E. J. Lahne (4), Miss J. Halliday (5) (Parrakie); Mesdames F. Kidman (5), I. Carne (5) (Penola); Mrs. P. N. Dowd (4), Miss K. O'Loughlin (4) (Pinnaroo); Mesdames E. Heylen (5), A. Kammerman (5) (Pygery); Mesdames S. Smith (4), G. E. Andrews (5) (Rendelsham); Miss G. Frost (2), Mrs. H. Roberts (4) (Saddleworth); Mesdames J. P. Burchard (4), M. E. Troeth (4) (Tantanoola); Mrs. W. Fogden (5), Mrs. W. Flynn (Taplan); Mesdames B. Daniel (4), I. Hampel (5) (Warramboos); Mrs. A. W. Wilson (4), Miss G. George (4) Wasleys; Mesdames J. Steer (5), H. Pritchard (5) (Wilkwatt); Mrs. G. Hammatt (5), Miss W. Cundy (4) (Williamstown); Mesdames W. R. Blatchford (5), W. R. Jones (5) (Wirrilla); Mesdames M. Hopgood (5), J. Jarrett (5) (Yurgo); Mrs. A. Pfeiffer (4), Miss I. Hasting (4), (O'Loughlin); Mesdames I. Jasper (5), A. B. Knauerhase (4) (Wepowie).

On Tuesday morning Mrs. J. S. Hammatt (Williamstown) was elected President, and Miss E. Lenihan acted as Secretary.

During the various sessions the following papers were read and discussed:—

RUGS FROM RAGS AND THE SCRAP BAG.

[MRS. E. L. ORCHARD, Belalie.]

To make something out of discarded material appeals to most women folk, and few revivals are giving greater pleasure than that of rug making. Needlewomen, skilled or not, who have time and patience at their disposal can turn waste material into really beautiful and durable rugs, the great charm of the work being in the fact that while the beginner can readily make a satisfactory floor mat a clever worker with a good sense of color schemes can make rugs of surpassing beauty.

At a competition held early this year in Melbourne in aid of a blind institution, there were 137 hooked rugs exhibited—some made by blind workers—and among them rugs that had been 30 years in constant use and looked almost new. Hooked rugs on canvas foundation are the most fascinating of all home-made rugs.

Hessian can be used for a backing; it is cheaper than canvas, and very suitable for working fine designs such as flowers and for small geometrical patterns. Hessian by the yard or cut from bran bags should be washed before using to remove the natural unpleasant odor. Rug canvas is very stiff and open for a beginner, and the squares are easy to follow with any pattern that can be divided into corresponding squares, though at first it may make the worker's fingers tired and sore.

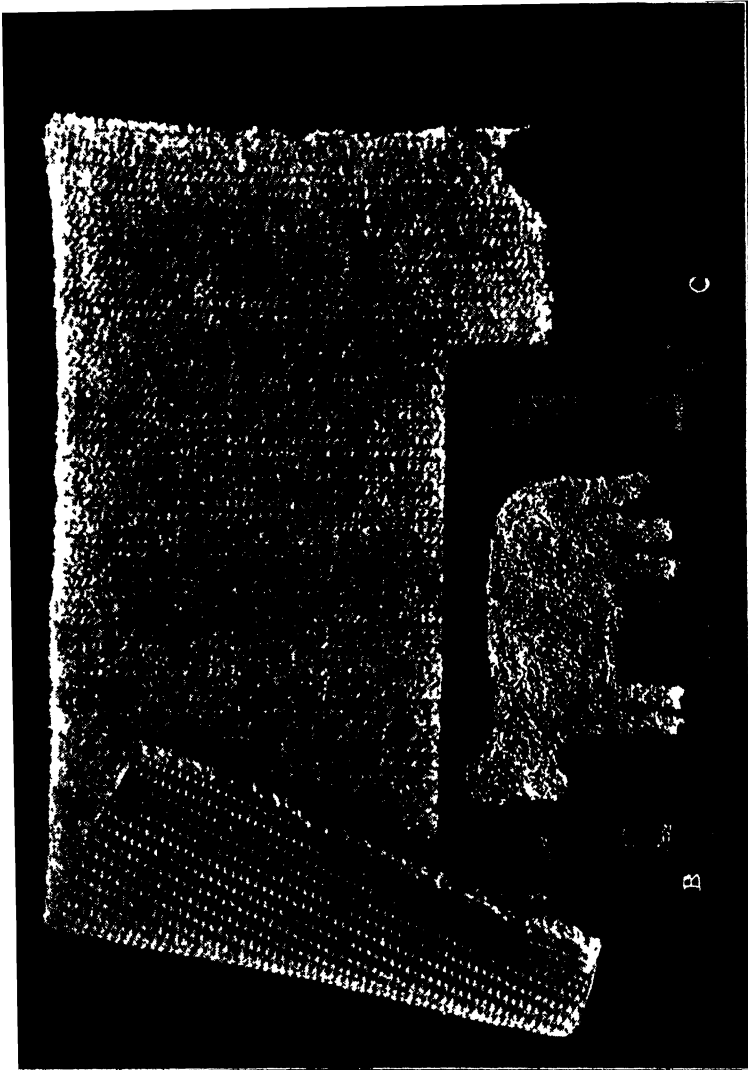


PLATE 1.

- A. Tufted rug. Small strands of scoured wool, hooked through canvas.
- B. Nursery rug. Old material hooked into a bran bag and not clipped.
- C. Dyed wool hooked rug. Been in use 23 years.

ALL that is required to make a hooked rug is a foundation, a No. 00 steel crochet hook, a pair of large, broad bladed, sharp scissors, and a suitable quantity of well washed old clothes.

Woollen material keeps its warmth to the last thread, and need not ever be wasted. Any article that can be cut into strips will make hooked rugs of almost everlasting wear.

Cotton and silk can be used, but it is not wise to mix the materials as they have different wearing qualities. New materials can be used in conjunction with old, but it is best to wash and sometimes fade them before cutting or tearing into strips. Old material must be cut for it will not tear straight; the widths may not be regular, and the result would be uneven work. Generally speaking, a rug wears best if made entirely of woollen or entirely of cotton goods, though they can be mixed and a little silk or artificial silk introduced, but never in large patches, because silk tends to break away and cotton has to be treated differently to get the best results.

It is a good plan to design the rug first, and for a first attempt a simple pattern in lines and squares is best. With hessian for a backing very wide turnings must be taken or it will fray and spoil the appearance of the finished article. When using dark materials for a border, first of all bind the selvages with the same color bias binding, though for a light border it is not necessary except to make the edge stronger. (Plate 2, Fig. D.)

A very comfortable rug can be made from scoured wool. (Plate 1, Fig. A.) This tufted rug was made on canvas foundation, the wool having been prepared as follows:—The sheepskin was cut into strips for easy handling, soaked in cold soap suds for 12 hours, taken out and soaked another 12 hours in fresh soap suds, then scoured thoroughly in hot soapy water, rinsed in clear warm water, and dried. Then the wool was combed and cut off in small sections as the combing proceeded. The tufts were then looped through the canvas.

The Nursery Rug (Plate 1, Fig. B) is made on branbag foundation from strips of old woollen materials pulled through with a latch hook and left unclipped. Green skein rug wool made the hooked doormat (Plate 1, Fig. C), and it has been in constant use for 23 years. The wool was cut in 8in. lengths, doubled, pulled through canvas, the ends slipped through the loop and knotted. This is the oldest type of hooked rugs made in England many years ago.

For the door slip (Plate 2, Fig. C) the materials to be used should be prepared by cutting or tearing into suitable strips, the thickness determining the width—new flannel about $\frac{1}{2}$ in. and cashmere 1in. To test, hold strip under canvas, put hook through top of canvas, and pull up end of strip about 1in. Insert hook in next space, and draw loop of material about $\frac{1}{2}$ in. to $\frac{3}{4}$ in. through to top, and if loop fills space in canvas without being slipped or dragged through it is the correct width, and in testing the stitch is learned. Always commence a strip in the same space as the end of the previous strip, all ends being sheared off in the final clipping. The back must be perfectly free from ends, and each loop, if the strip is of correct width, will help to keep its neighbor in place.

On Plate 2 is shown a hearth rug (Fig. A) and a desk rug (Fig. B), both made from warm woollen material. Fig. D shows a rug in the course of construction—wool and cotton materials being used—and the edge of canvas bound with bias binding.

CROCHETED AND KNITTED RUGS.

Artificial silk, printed cottons, or any similar material can be used in a plaited rug, as Fig. A in Plate 3.

Cut old frocks or dust coats into pieces 8in. to 10in. wide, and plait firmly. The pieces can be cut 3in. or 4in. wide, but as all edges must be turned in to tidy the work, this is difficult in a narrow strip. Also with wide pieces the work is thicker, and grows more quickly if the plait is wide. Plait the strips closely and evenly—just as hair is plaited—with three strands, joining on more material at irregular intervals to prevent bulkiness. As soon as 3ft. or 4ft. in length are plaited commence shaping, and sew with strong thread. In order to keep the work perfectly flat it should be sewn on a table, and very close stitches used to

prevent buckling. Narrow each strand for the last few inches and finish off neatly. Face back a few inches with something firm, thus giving extra strength to the edges, as it is always the edge that wears first.

Silk stockings, bloomers, and singlets or any article in Kayser, celanese, &c., wear can be used after they are discarded as wearing apparel by cutting into strips and crocheting or knitting in oblong or round shapes, and will make useful bedside rugs.

For a crocheted rug commence by cutting off the worn feet of stockings and beginning at ankle cut around leg into one long strip $1\frac{1}{2}$ in. to $2\frac{1}{2}$ in. wide 5 yds. to 8 yds. in length, depending upon the thickness of the stocking. Wind each into a ball and arrange colors, then with a large bone crochet hook commence



PLATE 2.

- A. Hearth rug. Hooked strips of old materials and clipped.
- B. Desk rug. Hooked old materials, mostly dark.
- C. Door slips. Back kept smooth to save lining.
- D. Hooked rug in course of making; edge bound with strip of material.

with enough chain to form centre of rug, work around with double crochet, increasing evenly at corners until size required. To make an oval, increase irregularly at ends, and line with firm materials.

To make a knitted rug (see Plate 3, Fig. B) cut the stockings, &c., into strips in the same manner but only $\frac{1}{2}$ in. wide, cast on to No. 10 bone needles one stitch and increasing by one stitch each turn until five stitches are on, and continue those five stitches until long enough to form centre of rectangular mat. Shape each

turn, and sew strips together with invisible stitches as the work proceeds, arranging colors to form a design or jumble colors as they come, and dye the mat when knitting is completed.

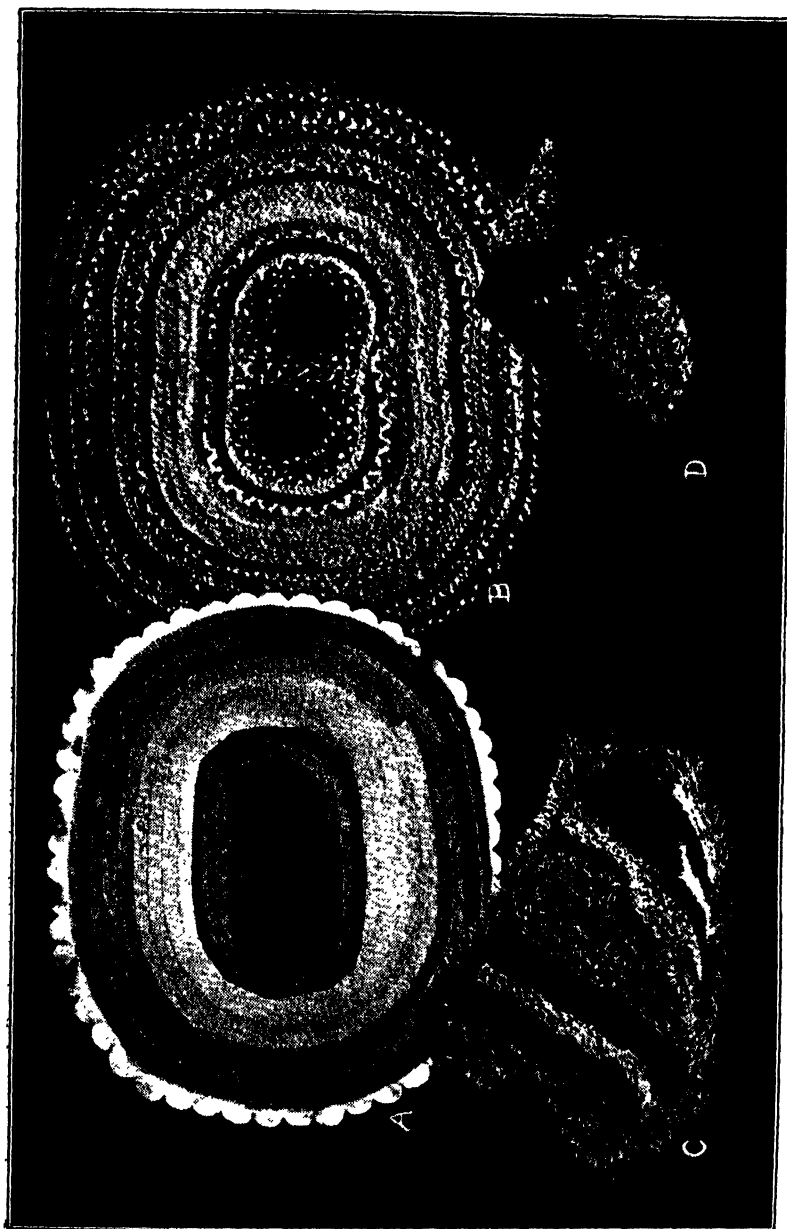


PLATE 3.

- A. Platted rug. Worn coats and frocks cut in strips.
- B. Knitted bedside rug. Old celanese garments.
- C. "Bitea" rug. Lengths of odd knittings sewn to foundation.
- D. Knitted door slips. Short pieces of material knitted with macrame thread.

A pretty finish for a mat of this kind is a flat flannel scalloped edge about $1\frac{1}{2}$ in. wide, and then lined with firm cotton material. These rugs can be cleaned by washing in Lux or soft soap, the same as if the material was still in its original form of stockings or singlets.

There are several other interesting ways of using old materials and also new pieces from the scrap bag, and left-over pieces of knitting wools.

Ravelings from old wool sweaters, socks, scarves and so forth may be used to advantage to make a charming Knitted "Bitsa" Rug. "Bitsa" because it is all bits of wool, odd lengths of new and joined lengths from old knitted garments, the faded colors often making the prettiest rugs. First cut a piece of hessian, ticking, or any firm material suitable for foundation into the shape and size desired, allowing about 2in. all around for a hem. Short size 4 knitting needles in wood or bone are most suitable for use. Cast on six stitches in one or mixed colors—two or even three threads may be used—and if very thick use only five stitches and knit back and forth, always slipping the first stitch until the strip is the required length and about 1in. in width. Fold lengthwise, and top sew to foundation—being careful to sew firmly both edges—cut through centre lengthways with sharp scissors. The cut edges will not ravel. Allow $\frac{3}{4}$ in. to $\frac{1}{2}$ in. between each row beginning at centre to form a round or oval rug, and at one end for a rectangular one. The result is a lovely, deep pile rug that will brighten any bedroom or den.

In this "Bitsa" rug (Plate 3, Fig. C) some strips of machine-knitted wool were stitched in between rows of hand-knitted wool, and show a good method of using discarded cardigans, &c.

Another way of using woollen and wool and cotton pieces—dressmakers' and tailors' scraps are ideal—is to knit with a background of strong thread (Plate 3, Fig. D), and some authorities claim they wear longest of all home-made rugs. The idea is to knit in strips or squares planned in striking designs and attractive colors, and they are very pleasing in effect. Twine about the thickness of knitting cotton but of a firm twisted variety, No. 12 steel knitting needles, cardboard gauge 2in. wide, sharp scissors, and a box of assorted materials arranged for convenience in separate compartments are necessary. The cutting of the cloth into *regular* lengths is essential to the finished appearance, and does away with any clipping afterwards, which is the hardest part of the work. Cut pieces 2in. long and $\frac{1}{2}$ in. wide, and if material is thin cut it wider but the same length, and fold as you work. The easiest way for working a rug made in this manner is to knit in strips and top sew together afterwards.

For comfortable handling cast on 13 or 15 stitches, knit one row, turn, knit first stitch, and lay one piece of material a little more than half way across thread with long end towards worker; knit second stitch, and place long end over and knit next stitch. Insert another piece of cloth, and repeat to end of row. Always work with pile of rug away from you. Knit return row without putting in any cloth. Nine strips of 15 stitches 14yds. long will make a very serviceable hearth rug. It is advisable, after the method has been mastered, to add one stitch each edge for sewing on to prevent buckling. Face the rug underneath for about 2in. to ensure it lying flat.

For the Dollar Rug (Plate 4, Fig. A) the foundation used was part of an old skirt; the border, saddle bag tweed trousers, and the gay pieces from the scrap bag. The gauges used for the discs were $2\frac{1}{2}$ in., 1 $\frac{1}{2}$ in., and 1in. across respectively—the 1in. discs being cut from the centre of the $2\frac{1}{2}$ in. pieces. After cutting the discs the next step is to arrange them on the background, and the button-hole or blanket stitch with contrasting thread. By having between the rug and the hessian back a layer of worn-out hand knitted pullovers, the rug will be made extra thick and warm for the feet.

If only a small quantity of material is available a good plan is to cut in $\frac{1}{2}$ in. strips, thread into a bag needle, and over sew into hessian. Mark a conventional design on the hessian in charcoal or chalk and then, taking long stitches on top and short ones underneath, sew the materials into hessian in the manner of satin stitch in embroidery. Line with another piece of hessian, and bind with a firm piece of contrasting or matching material, and the result is a sail stitch rug, as Plate 4, Fig. B.

Another way to use odd lengths of wool is in making a cross stitch rug (Plate 4, Fig. C). Small mesh canvas and four-ply wool were used, three rows of cross stitch worked over each other, the two top rows being cut through after working.

All wool rugs are vastly improved by cutting the surface loops; this is called clipping or shearing (Plate 4, Fig. D); but cotton mats look best if left in the loops, for if they are cut they go flat with wear, whereas the woollen materials remain soft and springy. These rugs should not be lined as they are fairly heavy

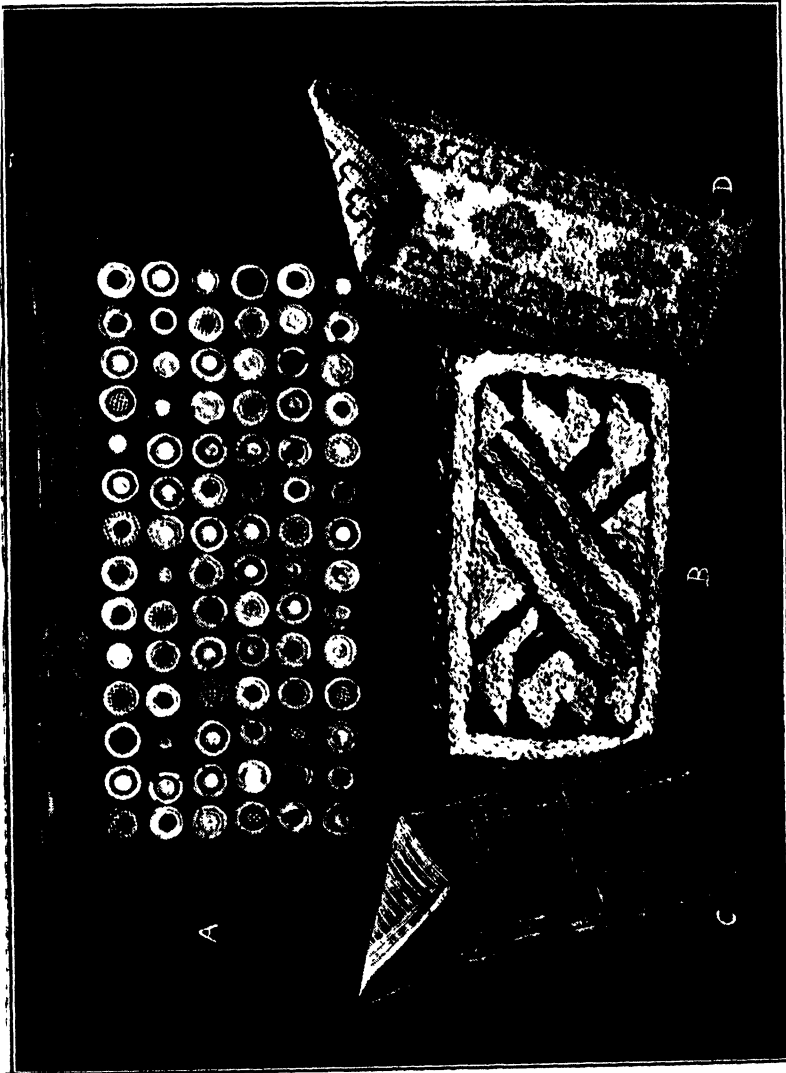


PLATE 4.

- A. Dollar rug. Discs of colored material sewn to a backing.
- B. Sail stitch rug. Narrow strips of thin material sewn in stem stitch into hessian.
- C. Cross stitch door slip.
- D. Hooked door slip, showing part not clipped.

and closely worked, and a lining would hold the dust. To clean them beat against a wall and brush with a straw broom or clean with a vacuum cleaner, and if necessary sponge or wash in Lux or soft soap and dry in not too strong a wind.

Some of the last-mentioned types will not wear as long as hooked or knitted rugs but they do not take so long to make, nor use the same quantity of material. However, they are all beautiful to look at and comforting to use, and the feeling of satisfaction experienced in having made something out of waste material is very gratifying.

THE USES OF WHOLEMEAL.

[By Miss K. O'LOUGHLIN, Pinnaroo.]

Wholemeal is wholesome and economical. It makes a very good porridge for breakfast, and can be used for bread, scones, biscuits, puddings, and cakes.

For bread take one-third wholemeal and two-thirds flour, make in the usual way only mix a little more moist, and add about 1 tablespoon of treacle when mixing, to make six 2lb. loaves.

For scones they, like the bread, are better mixed a little on the moist side, and a teaspoon of honey added when mixing. Any puddings, cakes, and biscuits that have honey or treacle in them are nice made with half wholemeal and half plain flour.

The following recipes have been tried and proved:—

PUDDINGS.

Marmalade.—2 cups of wholemeal, 1 cup of marmalade, 1 tablespoon of butter or lard, 1 teaspoon of carbonate of soda dissolved in 1 cup of cold milk. Steam for 4 hours, and serve with egg custard.

Ginger Pudding.— $\frac{1}{2}$ lb. wholemeal, $\frac{1}{2}$ lb. suet, 1 teaspoon ginger, 1 teaspoon carb. soda, $\frac{1}{2}$ cup milk, $\frac{1}{2}$ cup treacle, 1 egg. Mix flour, suet, soda, and ginger. Beat egg, add to milk and treacle, mix into dry ingredients, put in well-buttered mould, and boil 4 hours. Serve with wine or custard sauce.

Wholemeal Pudding.—2 eggs (beaten) and their weight in butter or lard and self-raising wholemeal, the weight of 1 egg in sugar, 2 tablespoons jam. Steam for 3 hours.

CAKES AND BISCUITS.

Fruit Cake.—1lb. sugar, 1lb. butter, 1lb. currants, 1lb. raisins, 9 eggs, 1lb. lemon peel, $\frac{1}{2}$ doz. dried figs, $\frac{1}{2}$ lb. almonds, 1 nutmeg, essence of lemon and rind and juice of lemon, 1 tablespoon of rum, 8ozs. wholemeal, 8ozs. self-raising flour. Beat butter and sugar to a cream, add eggs, then fruit gradually, lastly wholemeal and flour. Bake in moderate oven for 4 hours.

Cream Buns.—1 cup cream, 3 eggs, 1 cup sugar, $1\frac{1}{2}$ cups self-raising wholemeal, $1\frac{1}{2}$ cups self-raising flour, bake in papers. When cooked and cold lift pieces out of centre. Fill with whipped cream, and dust with icing sugar.

Ginger Buns.—2 tablespoons butter and $\frac{1}{2}$ cup sugar beaten to a cream, 1 egg, $\frac{1}{2}$ cup milk $\frac{1}{2}$ cup treacle, 1 teaspoon each of ginger and cinnamon, $\frac{3}{4}$ cup flour, $\frac{3}{4}$ cup wholemeal, lastly add $\frac{1}{2}$ teaspoon of carb. soda dissolved in a little boiling water. Bake in papers. When cooked and cold, lift piece out of centre, put in some whipped cream, place piece back, and dust with icing sugar.

Ginger Nuts.— $\frac{1}{2}$ lb. wholemeal, $\frac{1}{2}$ lb. flour, $\frac{3}{4}$ lb. butter, $\frac{1}{2}$ oz. ginger, 1 teaspoon carb. soda, $\frac{1}{2}$ teaspoon salt, 3ozs. dark sugar, $\frac{1}{2}$ lb. treacle, 2 tablespoons milk. Bake in moderate oven $\frac{1}{4}$ of an hour.

Ginger Cake.— $\frac{1}{2}$ lb. butter, 1 cup sugar, 1 cup treacle, 1 cup sour cream, 2 cups flour, 2 cups wholemeal, 2 teaspoons carb. soda, 1 tablespoon ginger, 3 eggs, rind of 1 lemon, lemon peel or almonds to taste. Bake 1 hour in moderate oven.

Wholemeal Biscuits.— $\frac{1}{2}$ lb. self-raising wholemeal, $\frac{1}{2}$ lb. self-raising flour, $\frac{1}{2}$ lb. sugar, $\frac{1}{2}$ lb. butter, 2 eggs. Mix butter and sugar to a cream, add eggs well beaten, lastly flour and wholemeal.

A SENSE OF VALUES.

[By Mrs. A. ELLIS, Balumbah.]

We are all satisfied that something is seriously wrong with the world, but few people will admit the possibility that perhaps the trouble lies within themselves. We spend our lives struggling for the shadow only to find we have somehow missed the substance.

Every wise business man takes stock periodically and finds out exactly where he stands, corrects his errors, revises his methods, and determines his direction and policy in order to render the best service possible to prove his efficiency and to ensure success.

We women must also find out whether we are on the right track, whether we assess things at their true value or whether we can improve conditions in our own sphere which will be reflected in the welfare of the community generally.

I will enumerate briefly under headings a few things which are worthy of consideration.

HEALTH.

To be happy one must be healthy, and since the task of feeding and clothing humanity falls to women, they should know how best to perform this task. In this paper, I am dealing with problems that confront farm women generally, and bushwomen in particular.

Many women starve to send as much cream or butter to the market as possible, and some stint their families in so doing. A wiser policy is to use as many home products as possible and sell only the surplus. It is not economy to sell at the present low prices, which are less than half the real or nutritive value of the commodity, and then to have to pay double the value for a substitute. Give the children plenty of butterfat and save on cod liver oil. Study food values. By wise feeding, a mother builds up the constitution of her child, which is infinitely preferable to building up a bank balance.

REST.

Do we realise how important it is to have plenty of rest? Women, who from a false sense of duty make slaves of themselves, become irritable and moody, and their homes are anything but peaceful. Many women are reputed hard workers

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when they are merely slow workers. They could do their work with half the energy if they had *method*.

CLOTHES.

With regard to clothes. Secure good value by buying good materials; it is possible to be fashionable without being a slave to fashion. Do not restrict the body in any way, but let the garments hang from the shoulders. To be well dressed is to be suitably dressed.

WORK.

Women appear to follow custom blindly in the matter of work. How they forge and hug their chains! They cannot resist acquiring possessions which, in many cases, really own the women. Some women long for big houses packed with furniture, and then having acquired them, spend weary days cleaning them. To eliminate non-essentials seems an impossibility for some women. The household gods must be revered. Conditions outback do not foster this trait during the pioneering stage.

There is much vagueness regarding the value of women's work and place in the world. Prior to marriage, their value to the community is recognised as typists, shop girls, dressmakers, nurses, &c., and they receive pecuniary recognition, but immediately a girl marries she loses her status and becomes a dependant to be supported, or even an unpaid farm drudge in some cases, though for income tax purposes her services are valued at £30 per annum. I am not advocating wives should be paid, but we should all realise the value of women's work, particularly in caring for the nation's best asset, the children. How strange it is that we regard caring for people in sickness as a profession, while caring for and maintaining people in health is classed as servitude. To know one's job, to recognise one's sphere in life, to pursue and enjoy it, in a word to "belong," is to get the best out of life, which is generally equivalent to what we put into it.

HOMES.

In some bush localities, homes seem to "happen." Wherever the pioneer pulls up his team there he dumps his chattels and thinks he might put up a bit of a shack. The sense of values in the matter of housing seems almost non-existent outback. Frequently motor cars are better housed than are the wife and family. Women should insist on having some part in designing their homes. A hut made of bags and kerosene tins could face the right way and be placed in the most convenient position, with the best view obtainable. A woman spends most of her time indoors, and some comforts and conveniences are most essential. Building in the centre of the block is a minor detail and not altogether necessary. A small garden, well kept, is of far greater value than a garden too large to be kept in order comfortably.

SPORT.

A certain amount of sport is necessary and desirable, but when the youthful mind is occupied with that only it becomes an obsession and is detrimental to work. Try and inculcate a love of reading in children. While you have books on your shelves you always have friends; you can enjoy the works and benefit by the experiences of the world's best scientists, philosophers, authors, &c.

Beware of class distinction in social activities; this is apt to creep in as prosperity advances. Do not allow all the labor of providing amusement to fall only upon the mothers. See that each member of a family or organisation takes his or her proper share.

EDUCATION.

There is much misconception regarding this important subject. Even in this age, parents vainly imagine that education is a passport to a well paid job with little work attached. They seek for their children a "respectable" job, where

a collar and tie is necessary, and which they deem far superior to a shirt sleeve-job. Rather would it seem that honest labor and beautiful craftsmanship are despised. We must not overlook the fact that people's character and underlying humanity are more important than their occupation. To know one's self and to know one's job is an education in itself. Economic considerations should not have undue prominence when one's role in life is concerned: Discussing the difficulty of wheat growing at a profit to-day with a farmer, I asked him why he continued to grow wheat at a loss. "I have got to grow wheat," he replied, "I can't help it, it is my job." It is a wise man who knows his own job.

PUBLIC AFFAIRS.

A much debated question is whether women should restrict their activity to home duties or take an intelligent interest in public affairs. I believe that women should foster and cultivate a sense of responsibility outside their own homes. It is a duty they owe to themselves, their children, and the future generations to understand economic principles. The problem of war should occupy the minds of all women. Women bear and rear children, expending much trouble and anxiety in order to train them to become worthy citizens. As a nation, we raise innumerable barriers against foreign trade, and then wonder that international relations are not more harmonious. With amazing humility or indifference many people are content to leave the most vital affairs in the hands of a few people without giving any thought whatever to their significance. We must do our own thinking and benefit by past experience. Right thinking is the prelude to sound action, and reconstruction should and must begin from within.

RECIPE FOR CARAMELS.

During the women's session of the Annual Congress, Mrs. Eggers, of Wa-leys, read a paper, "Sweet Making." In the discussion that followed, Mrs. L. Redman, of Coonawarra, gave this recipe for making caramels, which is published at the request of the delegates:—One large breakfast cup of sugar; one level tablespoon of plain flour; stir well together, and then add piece of butter the size of a hen's egg; two tablespoons golden syrup; half cup milk. Boiling quickly, this takes about half an hour to cook, stirring all the time. Test by dropping a little into cold water, and if there is a soft ball, immediately pour out and leave to set. Before quite hard, shape the squares with a knife. To keep, wrap in paper.

OTHER ADDRESSES.

Valuable hints on home nursing were given by Sister Bottrill of the District Trained Nursing Society.

"Milk as a Food" was the subject of an address by Miss E. Campbell, Inspector of Domestic Arts in the Education Department.

Miss Campbell was presented with a set of cut glasses and a dictionary by Mrs. Hammatt as an appreciation of her work for education and for Women's Branches of the Bureau.

Mr. D. Hart, of W. H. Bruce, Limited, gave a demonstration of poultry dressing.

Delegates also visited Walton's Confectionery Factory, the Waite Agricultural Institute, and inspected the Home School, conducted by Dr. Ethel Hillier at South Terrace.

RESOLUTIONS.

The following resolutions were carried:—

"That this Congress strongly protests against any further imposition on the farmer by way of a sales tax on flour; rather would we strive for decreased costs of production."

"That a flat rate be made on perishables on South Australian railways and boats."

"That the Agricultural Bureau ask the Royal Agricultural and Horticultural Society to supply free of cost the material for staging displays of Branches at the Royal Show."

"That the Advisory Board be asked to consider the appointment of a State organiser for the Women's Branches of the Bureau, or failing that a woman representative on the Advisory Board."

"That this Congress of Women's Branches associates itself with the Men's Branches in asking the Government to reconsider its decision to abolish free passes to delegates to the Annual Congress."

BELALIE (Average annual rainfall, 17.71in.).

July 11th.—Attendance, 36.

Mrs. Wedding gave an interesting talk on "Soap Making," and in the discussion that followed it was stated that sugar added to the soap mixture helped to keep the soap from getting too hard. The best soap was made by melting the fat first, then adding caustic soda dissolved in water. Too much water used in boiling left a quantity of water under the soap when set. Resin should be powdered before adding to fat. Lux, borax, and olive oil should be added when the soap had nearly finished boiling. The annual report was read, and officers elected. (Secretary, Mrs. A. Cummings, Jamestown.)

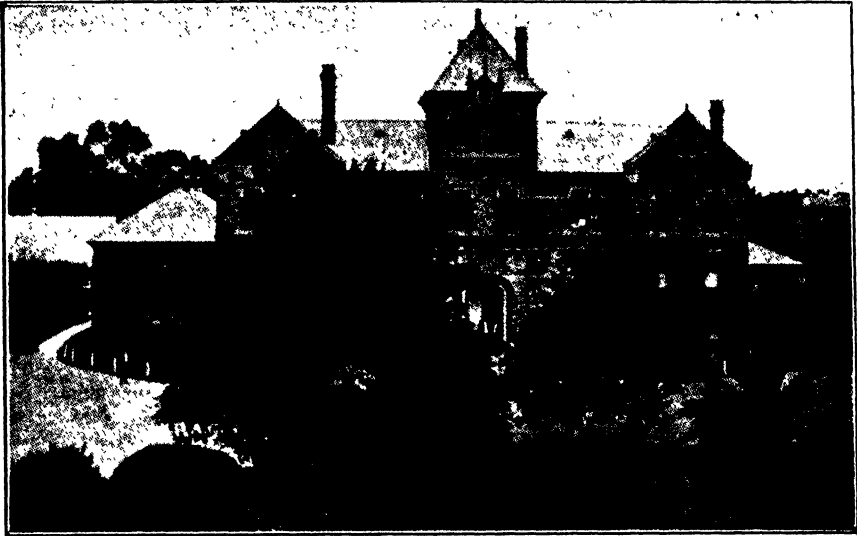
COONAWARRA.

July 19th.—Attendance, 15.

CITRUS FRUITS AND THEIR USES.—Mrs. Allder read the following paper:—"The growing of citrus fruit during the last 10 years has become a leading primary industry, and the annual production is now so great as to make it necessary to find markets for the fruit. New Zealand has been one of our best markets; thousands of pounds worth of fruit being exported there yearly, but this year New Zealand has prohibited the entry of citrus fruit from Australia into their country, owing to disease in some of the States; it being necessary to ship the surplus to England, where the prices are so low that the Government have offered to pay the growers the cost of production for all they ship overseas. *What You Can Do with a Lemon.*—

(1) Heat thoroughly before squeezing to get more juice. (2) It is good for cleaning brasses; put a little whiting first on the article to be cleaned, then rub over with lemon. (3) New shoes that are difficult to polish should be rubbed over with a lemon and then left to dry. (4) Sprinkle lemon juice over a fruit salad, this will prevent it from turning dark. (5) A few drops of lemon juice added to rice when cooking will make it a lovely white. (6) A few drops of lemon juice on a very bad corn will relieve the pain. *Lemon Jelly Filling.*—Grated rind and juice of two lemons, three tablespoons sugar, two cups water, brought to the boil, then thickened with one tablespoon cornflour. Stand all to cool, spread between sponge, and sprinkle cocoanut on top. *Lemon honey.*—½lb. white sugar, 2ozs. butter, two eggs, grated rind and juice of two lemons. Put altogether in an enamel saucepan, stir over the fire until it thickens. Put in jars, keep for cheese cakes, sandwiches, and spread on bread instead of butter. The juice of a lemon in the rinsing water when washing the hair gives a nice gloss to the hair and makes it soft. *Lemon Peel.*—1lb. dry peel, 1½lbs. sugar, half a cup of water. Soak peel three days in brine, then boil twice in clean water about 20 minutes, or until tender. Have syrup boiling, drop peel into it, simmer 20 minutes each day until it candies. *Treatment for Cough.*—Well mix the juice of a lemon, 1oz. of glycerine, and one tablespoon of honey. Take a teaspoon night and morning, or more often if necessary. *Cough Mixture.*—One cup honey, half a cup olive oil, juice of a lemon. Bring all to the boil, then bottle. Take a teaspoon of the mixture when necessary.

ORANGE RECIPES.—*Orange Marmalade* (one day).—4lbs. oranges, 8 pints water, 12lbs. sugar. Slice the oranges, cover with water, stand all night, and boil until tender. Take off fire and cool, boil again and add the sugar. Boil until it jellies. *Orange Ju Jubes.*—Take one cup of loaf sugar, half a cup orange juice, and quarter teacup cold water. Boil water, sugar, and three dessertspoons of gelatine together for 20 minutes; allow to cool gradually. Stir in the orange juice, and when well mixed pour into a flat greased tin. When cold cut in small pieces, roll in icing sugar. *Orange Layer Cake.*—6ozs. butter, one pinch salt, 6ozs. sugar, one flat teaspoon cream of tartar, four eggs, half flat teaspoon carbonate of soda, one grated rind of an orange. Cream butter and sugar, beat eggs well, and add gradually, beating well and keeping mixture smooth. Add the thinly grated orange rind. Sift



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together flour, salt, soda, and cream of tartar, and mix well until smooth and soft. Put the mixture into two well greased sandwich tins. Bake about 30 minutes.

Orange Filling.—Beat the grated rind of a small orange with 1oz. sifted icing sugar, add 1oz. butter, and when well mixed add one tablespoon orange juice and enough sifted icing sugar to make a soft, creamy consistency. *Orange and Lemon Jam*.—Four oranges, four lemons, 2½ quarts water, 6lbs. sugar. Cut up and stand all night with water. Boil one hour, then add sugar and boil about 1½ hours, or until it sets. Boil quickly.

CITRUS RECIPES.—*Sweet Orange Marmalade* (Mrs. R. Redman).—6 sweet oranges, 6 lemons, 12 quarts water. Cut fruit into thin slices and stand in water overnight. Next day boil until tender, add sugar, and boil until it jellies. *Lemon Pudding*.—1 cup sugar, beat to a cream with 1 tablespoon butter. Add 2 tablespoons flour, juice and grated rind of 2 lemons, 1 cup milk and beaten yolks of 2 eggs. Just before pouring into dish fold in the stiffly beaten whites of eggs. Set the dish in a larger one filled with hot water; bake slowly one hour. *Orange Date Cake* (Mrs. Reschke).—4ozs. butter, 8ozs. flour, 4ozs. sugar, ½ level teaspoon carbonate soda, 2 eggs, 2 or 3 tablespoons orange juice, 4ozs. stoned dates, grated rind 1 orange, candied orange peel, 2 level teaspoons baking powder, a little milk. Bake about three-quarters hour. *Lemon Meringue Pudding* (Mrs. Childs).—1 pint water, 1 cup sugar, yolks 2 eggs, grated rind and juice 2 lemons, 1oz. butter, 2 heaped tablespoons cornflour. Put water, sugar, beaten yolks, rind, and juice of lemons and butter in saucepan, bring to boil. Mix cornflour to thin paste with cold water and add to boiling ingredients, boil a few minutes, then pour into greased piedish. Beat 2 whites to a stiff froth, add 2 tablespoons sugar, pile on top of pudding. Bake in oven until a pale brown; serve cold. *Dried Apricot-Orange Jam*.—2lbs. dried apricots (washed), 5 medium sized oranges, 8lbs. sugar, 14 cups water. Soak grated rind and sliced flesh of oranges and apricots in the water 24 hours. Boil half hour, add sugar, and boil for another hour or until it jellies. *Orange Foam* (Mrs. O. Skinner).—2 cups hot water, juice 2 oranges, ½ cup sugar, ½ lemon, 2 tablespoons cornflour, 3 eggs. Boil water, add sugar and cornflour mixed with water; stir and cook five minutes. Add fruit juice. Whip whites stiffly and pour over mixture when cool. Beat until white and foamy. Make a soft custard of 1 pint milk, 2 tablespoons sugar, ½ tablespoon vanilla, yolks of the 3 eggs. Pour over the orange foam. *Citron Conserve* (Mrs. W. L. Redman).—Cut citron into small blocks, removing seeds. Cover with water; stand all night. In morning pour off and cover with fresh water and stand until next day. Strain off; add fresh water. Boil gently half hour; stand all night. Next day to every five cups pulp add 6lbs. sugar; boil one hour or until clear. *Navel Orange Conserve* (Mrs. W. L. Redman).—Slice finely navel oranges and add 1 pint water to each pound fruit. Boil three-quarters hour or until soft. Measure and add 1 cup sugar to 1 cup fruit and add the juice of 2 lemons to every 3lbs. fruit. Boil three-quarters hour. *Lemon Cheese* (Mesdames W. L. Redman, Webber, and Childs).—½lb. butter, 1lb. sugar, 6 eggs, rind of 3 and juice 2 lemons. Put ingredients into pan. Simmer until the sugar is dissolved and it begins to thicken like honey. Pour into jars and cover closely down. This will keep for a very long period. (Secretary, Mrs. F. Skinner.)

EURELIA (Average annual rainfall, 12.87in.).

FISH RECIPES.—Paper presented by Miss C. Stott:—“Fish affords a supply of easily digested nourishment at a very small cost; it is therefore a most valuable article of food. Fish is not so nourishing as meat, but it contains minerals, such as phosphates of lime, soda, and potash, which are useful to form and solidify bone. Fish contains a large percentage of water, and when provided as the chief dish for dinner, it should be followed by a substantial pudding. See that the fish is fresh and on choosing them see that all fish are well covered with scales, the gills red, eyes bright and prominent, and the flesh firm to touch. White fish are the most digestible, though salmon and herrings contain the most nourishment. All fish are very unwholesome when out of season and should not be eaten; the wisest plan is to buy the fish that is cheapest, as this will be that most plentiful and consequently in season. Whiting is the most delicate and easily digested of all fish, and on that account is named the chicken fish. Salt fish should be soaked for two hours in water. Flathead is a dry fish, and should therefore be stewed or stuffed and baked. Bream, schnapper, and cod are the best to boil. The eyes should be left in the fish when they are to be boiled, but they should be removed for baked fish. A fish kettle is most convenient in which to boil fish, being fitted with a strainer with which the fish can be lifted out without breaking. Have the kettle three-quarters full of boiling water. The water that fish is boiled in should be as salt as the sea; the water must never be allowed to boil once the fish is put in, but allowed to simmer gently until it is done. When dishing up be careful to drain the fish well, and lay it on the dish without breaking. *Baked Whiting*.—Method—Skin and fillet the fish and lay in a basin

of salted water for 15 minutes. Take out and dry in a cloth; sprinkle with lemon juice, a little salt, and a pinch of cayenne pepper, and wrap in buttered paper. Grease a baking dish, put in the fish, and cook gently in a fairly hot oven 10-15 minutes. Serve with white sauce. *Fried Smelts*.—Dry the fish by rubbing a little flour over them; dip them in egg and fine bread crumbs, and fry in plenty of very hot fat. Drain on a piece of white paper and serve with thin bread and butter and cut lemon. The smelts should be dry and crisp and a nice golden brown." (Secretary, Mrs. E. Wall.)

MANGALO (Average annual rainfall, 14in. to 15in.).

July 12th.—Attendance, 15.

BREADMAKING.—Mrs. A. Lathlean read the following paper:—"Sift 8 full sifters of flour in a clean dry dish, 2 breakfast cups of yeast, and 5 pints of warm water—the temperature 90deg. in cold weather and 75deg. in warm weather. Dissolve 1 tablespoon of salt in the water. Mix a dough, kneading it thoroughly, and set it aside in a warm place to rise, which will take from 8 to 9 hours. When it has risen to the top of the dish, push it down and allow it to rise again. After it has risen the second time, mould and put it into the tins, and let it rise level to the top of the tins. Then put it into a really hot oven to bake. I allow 1 hour for a 2lbs. loaf and a little longer for a larger loaf. After it has been in the oven $\frac{1}{2}$ an hour turn the bread around. This quantity makes seven 2lb. loaves. I favor setting bread over night and baking next morning." (Secretary, Mrs. F. Coles.)

McLAREN FLAT.

[Paper read by Mrs. R. Elliott.]

July 5th.—Present: 16 members.

BACON CURING.—"The Berkshire pig used to be the favorite breed, but nowadays a longer pig is desired to produce leaner meat. A Berkshire is most difficult to scrape on account of its black hair, but the Mid-York or Tamworth has a better colour skin. The pigs should be regularly fed on good wholesome food. If a good run is provided they will not require much attention until topping up for slaughtering, then they should be put into a yard, kept as clean as possible with a dry, warm sty, and feed on milk, pollard, peas, barley, or wheat. They should have sufficient to eat, but do not put too much food in the trough, or it will go sour and be wasted. The latter has a tendency to make the flesh soft. Pigs that are to be killed should be kept without food for 12 or 14 hours, and in no case should they be driven or heated in any way just prior to killing. The carcass should hang in the air overnight and allowed to set before cutting up. Have the tank ready to put the meat in. If a slate or concrete tank is not available, a sheet of galvanized iron flattened out and turned up all round will serve the purpose. As the carcass is cut up, the portion can be laid out in the tank, flesh uppermost, and lightly rubbed with saltpetre and salt. This brings out the blood which should be drained off next day and thrown away. Again rub the meat with salt and drain it the following day; if free from blood, the pickle can be poured over it. The pickle is made as follows:—To salt a pig weighing about 200lbs.:—7lbs. salt, $\frac{1}{2}$ lb. saltpetre, 2lbs. white sugar, 1 packet mixed spice dissolved in about 4galls. of water; the brine should be strong enough to float an egg. The meat must be turned every day and kept moist. The sides of bacon will be ready to come out of the pickle in a fortnight, but the hams require a week longer; they may then be washed and hung up to dry. In a few days it is ready for smoking. Always retain the same pickle. It can be used several times, the older the better; it only requires, when it becomes discolored, to be boiled and clarified, and cooled before using again. When hung in the smokehouse, hams and fitches should be placed as close as possible without touching. Hang them with string or cord, because wire hooks are apt to rust and leave a mark on the rind. The smoke must be cool, without any flames. Allow the sawdust to smoulder and cause a good quantity of smoke for 24 to 48 hours. Care should be taken as to the kind of sawdust. Some wood is highly flavored, and will taint the meat. Deal should *not* be used."

BUTTER-MAKING.—Paper read by Mrs. W. Oakley:—"Butter is a valuable food, and should be consumed more. It is rich in vitamins, and is easily digested. Children especially should be encouraged to eat plenty of butter. It is a very necessary and helpful food for the development and growth of the body. To produce good butter, care must be taken that the cows do not eat any weeds or food that may taint the milk. All utensils in the dairy must be kept perfectly clean, and after they are washed, rinsed in boiling water. Allow cream from the separator to cool before mixing with other cream. Never run warm cream from the separator on to cold cream; stir in later, with a little salt added. To ensure best results, cream should not be kept more than two days before churning in summer and four days in winter. Cream to be churned should be about 60 degrees F. If this temperature is obtained, and if the cream is fairly thick,

the butter will be churned in a few minutes without any trouble. If the cream is cold, stand in a dish of warm water. Once churning has commenced it should be continued until the butter has become a solid lump; then the buttermilk should be immediately strained off. It is important that all buttermilk be thoroughly washed out of the butter. The water is then poured off, and some clean water added. This process is continued until the water comes away clear. Butter will not keep good for long if any buttermilk is left in it. After washing, add salt, stand aside for a while to get firm, then work all water out. When free from moisture, form into pounds, lay the paper on it, fold over sides, turn with pats, and neatly fold in edges. Butter made in this way will keep in good condition for a fortnight."

BUTTER-MAKING.—Mrs. B. Smith read the following paper:—"During the making of butter cleanliness is the most important part of the process. The flavor depends on how the cows are fed and how the cream is tested. Cows need a liberal supply of bran in their diet; this helps to give the butter a nutty flavor. Also, they should be given plenty of green feed and exercise. All utensils must be washed and scalded after use. If there is no dairy, a hanging safe or cooler should be used for keeping the butter in, and this is better kept in the open air, thus avoiding contact with vegetables, meat, fruit, or the smell of cooking, etc., all of which spoil the flavor of the butter. Freshly separated cream must not be mixed with cold cream until it too has become cold. Scald the churn and rinse with cold water before putting in the cream. Churn until all the butter has collected into large lumps, and then churn a little longer. Pour off buttermilk, and then rinse in three different waters, churning well each time. After the third rinsing, churn for 5 minutes without any water. By doing this most of the water will be worked out of the butter. Turn out into a shallow enamel bowl and knead well with a piece of clean linen which has been scalded and dipped in and wrung out of cold water. This will absorb the rest of the mixture, which must be all removed before adding the salt. Roll and sift the salt, and add a level tablespoonful to 1lb. of butter. Work the salt well into the butter before patting into shape. If the cream becomes too hard to churn, do not add warm water, but a little luke-warm separated milk will be found a great help if mixed with the cream, and will also prevent streaky butter. When once the butter-making has been started, do not leave it stand; this may also cause the butter to be streaky. To make a good butter it is most important to churn three times a week in summer and twice a week in winter." (Secretary, Mrs. D. Elliott.)

NELSHABY (Average annual rainfall, 17in.).

NOVELTIES.—Paper presented by Miss R. Noble:—"To the dress lover often a novel arrangement of belt or neckline, or some novel finish, will make a dress just what one desires. A post and rail of narrow black and white machine-stitched bands of crepe de chene makes a novel and delightful finish to the cape of a black crepe de chene dress, the sleeves being finished with a row of tiny black and white buttons. Novelties in necklaces also have a charm. Seeds threaded with small beads in between are pretty, also wooden moulds covered with dress material and stitched flat on a matching ribbon makes a change and has a good effect. In the garden a wide range of novel flowers and plants are obtainable. A bird sanctuary can be made for a few pence, and an unusual seat or shelter will bring a touch of novelty to the garden. A screen of living flowers or creepers may be made by planting creepers or flowers in a long box, having handles at each end, and having a trellis for them to creep on. This may be used to hide unsightly spots. In the home many useful novelties may be made by clever fingers. Fireside seats can be made for little cost, using any old material for filling, and with a pretty cover one has a useful seat. A novel idea to store hatboxes in the bedroom is to have a stand or table made with two or three shelves. Have an inner ledge to which is attached a ruched or plain curtain, with the side of the curtain made so that it can be easily unfastened. The top can be polished or covered and used as a table or stand. Novel dishes, trays, flower bowls, also brooches, may be made from plaster of paris. Mix plaster of paris with water, have a mould ready, and pour in smooth. If a brooch is being made put a small gilt safety pin in the back before the plaster sets, let dry, then slip out and decorate or paint with watercolors. Varnish with a clear varnish. A pretty sugar basin may be made from a cocoanut shell. Scrape smooth, sandpaper and polish, and mount on piece of polished wood. A novel brassiere is made from two fancy handkerchiefs. They will also make a nightdress top. Easter egg novelties may be made from blown eggshells decorated with sealing wax. A large bowl filled with honesty with red lacquered stems makes a novel decoration. A belt novelty can be made from an old felt hat. Cut the hat in small pieces the required shape and buttonhole together until you have the desired length; slip into buckle and fasten. A novel filling for sandwiches: take equal quantities of carrots, salted peanuts, cream or butter, mince and mix with a little pepper."

KEEPING AND CURING OF MEAT THROUGHOUT THE YEAR.—Paper prepared by Mrs. A. M. Lawrie:—"During the winter this presents little difficulty, but in hot, sultry weather

constant care is necessary. Mutton killed on the farm is the problem facing most housewives in the country. I prefer the wet method of corning. For this a cask or a large open-necked earthenware jar is necessary. To make the brine: take approximately $\frac{1}{2}$ lb. salt and a teaspoon saltpetre to every gallon of water. The brine must be strong enough to float an egg. If the meat is inclined to be tough, the addition of 2 tablespoons of sugar to the brine will help considerably to make the meat tender and finer-flavored. Next cut the meat into even-sized pieces; legs of mutton corn much more readily than the shoulders. The loin should always be jointed, and in very severe weather the bones may be taken right out. The meat once put in the brine, should be weighted down, and for the first three days turned over every day. For beef it is always best to take out the bones from brisket and other thick pieces before putting in the brine. If one is only corning a little, and then using it soon after, it is not necessary to change the brine, but should it have to be kept for some time, it is a good plan to make a fresh lot of brine after the first week, not quite so strong, and the meat will keep indefinitely if it is turned over occasionally. There is another method. Simply dry salting. Take the salt, saltpetre, and sugar (well mixed), and rub into the meat, then store away in a box or cask.

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EARLY BOOKING IS ADVISABLE.

Further particulars can be obtained from the Manager, Parafield Poultry Station, Salisbury, or Poultry Expert, Department of Agriculture, Flinders Street, Adelaide.

C. F. ANDERSON, Poultry Expert.

This has to be done every other day. This is not so satisfactory as the first method mentioned, and the meat has a tendency to become very dry. With this method meat requires soaking in cold water for two hours before cooking. Another successful method is to take the usual brine and add 2 tablespoons of pepper and 1 cup of brown sugar. Bring to the boil, and while boiling drop the meat in and boil for 15 or 20 minutes. Then take off the fire, pack meat into the cask, and pour the brine over; weight it down and allow the fat to set over the top. Do not disturb until it is wanted. The loins of mutton or brisket of beef, if the bones have been taken out, are very nice spiced, for a change, and to do this take out of the brine and wash them. Have ready this mixture:—½ lb. brown sugar, 1 teaspoon allspice, and 1 teaspoon pepper. Rub well into the loin, roll up, and leave for 2 hours before cooking; then cook in the usual way." (Secretary, Miss T. Franks.)

PENOLA (Average annual rainfall, 26.06in.).

July 5th.—Attendance, 21.

HONEY AND ITS USES.—Mrs. W. Clifford read the following paper:—"Honey is the nectar of flowers modified and changed by the honey bee, and has a delicate flavor and aroma imparted by the flowers that is absent from and cannot be given to an artificially made syrup. It varies in color from water white to dark brown—almost black. In some cases it is red and in others of a greenish tinge without any artificial coloring, accounted for by the bees food. In cold weather honey is usually crystallised. Many people prefer it in this state for eating, but if a liquid state is preferred, the jar containing it should be stood in water of about 150deg. to 160deg. Fahr. It is the only food which does not spoil. It will keep for ever. The following are some of the reasons why we should use more honey. By doing so we are helping the primary producers. South Australia produced in 1931-1932: Honey, 1,240,525lbs., valued £18,091; wax, 17,253lbs., value £917; exported honey, 1,058,257lbs.; valued £15,885. The Naracoorte district during a normal year produces about 20,000 tins of honey, which is usually worth about £1 per tin. Honey has a very high dietetic value. It contains iron and potassium for the blood which are not found in cane sugar. It generates energy and is much more easily digested than sugar, containing as it does 75 per cent. of invert sugar, which can be readily assimilated by the body without change, therefore without taxing the digestive organs. In addition there are a number of minor inorganic elements in honey which make it a very valuable food. Dr. Philpots, President of the Food Education Society of Victoria, strongly advises the use of honey in the diet as a preventive of dental decay and as a general assistance to health. If given freely to children it will help to assuage their craving for bought sweets, which in some instances are really injurious on account of the coloring matter used in manufacture, and an excess of refined sugar is now looked on by scientists as a calcium thief, depriving the teeth of calcium salts and ruining them. Honey has a certain percentage of natural calcium and other salts which we need to be healthy. According to Dr. William Tibbles one of the causes of indigestion is excess of sugar. A solution of cane sugar causes heartburn, flatulence, and other gastric troubles, whereas no ill-results follow a solution of invert sugar such as honey. My thanks are due to the secretary of the Victorian Apiarists Association who supplied much of the information and facts contained in this paper. Some ideas and recipes for the use of honey:—Use it instead of sugar in porridge; serve with hot scones, waffles, &c.; cakes made with honey instead of sugar, or with equal quantities of each, keep moist and fresh for a longer period than if only sugar is used; use candied honey in sandwiches for children's school lunches; a paste of honey and soda spread on burns and covered with clean linen quickly relieves pain; mix 1oz. castor oil and 4ozs. honey: take 1 tablespoon night and morning to relieve asthma. Honey can be used in many ways in cough mixtures and a relief for sore throat, bronchitis, and croup. It is a valuable ingredient in cosmetics and toilet soap, and the following recipe is excellent for chapped hands:—White of an egg, 1oz. honey, 1 teaspoon glycerine, sufficient barley flour to make a paste."

RECIPES (supplied by the writer and other members).—*Honey Jumbles*.—1 cup each sugar and honey, ½ packet mixed spice, pinch salt, 1 teaspoon carbonate soda, 4 cups S.R. flour, 2 eggs. Method—Mix honey and sugar well together, then add beaten eggs. After beating lightly, add flour, soda, spice, and salt, which have been previously sifted with flour. Roll out thinly, cut into desired shape, and bake 10 minutes in quick oven. *Wholemeal and Honey Loaf*.—2 cups wholemeal, 2 teaspoons baking powder, 1 pinch salt, 1 cup milk, 1 tablespoon honey. Put honey in cup and add a little hot water, fill up with milk. Pour into a coffee tin and bake about 1 hour with the lid on. *Honey Soap*.—Put 2lbs. yellow soap—cut in thin slices—into a saucepan with sufficient water to prevent it from burning. When soap has dissolved add 1lb. honey and stir until the whole begins to boil. Remove from fire, add a few drops of essence of cinnamon (or any other preferred). Pour into deep dish to cool, then cut in squares. Do not use until it has

hardened. *Honey Sandwich*.—2ozs. butter, 1 teacup sugar, 2 eggs, $\frac{1}{2}$ teacup honey, $\frac{1}{2}$ lb. plain flour, 1 teaspoon cinnamon, 1 teaspoon carbonate of soda, 3 tablespoons milk. Cream butter and sugar well together, add eggs one by one, then honey and sifted flour, soda and cinnamon, and lastly milk. Bake in two sandwich tins 15 minutes. *A Cure for Bouts*.—2ozs. each camomile flowers, sulphur, Epsom salts, $\frac{1}{2}$ lb. honey. Boil together in a quart of water until reduced to about 1pt. Take 1 wineglass every morning before breakfast. *Honey and Lemon Rusks*.—Sieve $\frac{1}{2}$ lb. flour with a pinch of salt, 1 teaspoon cream of tartar, $\frac{1}{2}$ teaspoon carbonate of soda. Beat to a cream 4ozs. castor sugar, 4ozs. butter; beat in 1 egg; add a dessertspoon honey, and beat well. Gradually stir in flour, &c. Add the grated rind of one lemon and mix well. Turn on to board and roll out to about $\frac{1}{2}$ in. thick. Cut into squared fingers and bake until golden brown (about 15 minutes). *Honey Drop Cakes*.—Heat $\frac{1}{2}$ cup honey and $\frac{1}{2}$ cup butter until the butter melts. When warm add $\frac{1}{2}$ teaspoon cinnamon, $\frac{1}{2}$ teaspoon essence cloves. When cold add $1\frac{1}{2}$ cups of flour, 1 egg well beaten, $\frac{1}{2}$ teaspoon carbonate of soda dissolved in 2 tablespoons water, and 1 cup raisins cut finely. Add enough flour to make a dough that will hold its shape. Drop spoonful on greased slide; bake in moderate oven. *Oat Honey Cookies*.—To make oat cookies take 4ozs. rolled oats, 6ozs. flour, $\frac{1}{2}$ teaspoon carbonate of soda, $\frac{1}{2}$ teaspoon each of ground cinnamon, ground cloves, nutmeg, salt, 4ozs. raisins, 1 teacup honey, 3ozs. butter (melted), and one egg. Sift the flour with salt, soda, and spices. Add rolled oats and raisins then honey and melted butter. Mix well so that the last two ingredients may be well worked in. Add egg well beaten, stir for 5 minutes. Drop small portion on a cold oven slide. Bake in moderate oven 15 minutes. *Honey Candy*.—1 cup each honey, sugar, and water, 3 dessertspoons powdered gelatine. Put water and all ingredients in a saucepan and boil $\frac{1}{2}$ of an hour, then pour into dishes which have been dipped in cold water; when set cut in squares and roll in icing sugar. *Honey Date Pudding*.—1 cup S.R. flour, 3 dessertspoons clarified dripping, 1 cup chopped dates, 1 egg, 2 tablespoons honey; rub dripping into flour, add dates. Beat egg yolk and white separately. Warm honey slightly, add yolk, and add to flour, &c. Fold in egg white pour into buttered pudding basin, and steam 3 hours. Serve with honey sauce: Into $\frac{1}{2}$ cup warm honey beat the juice of $\frac{1}{2}$ a lemon or the juice of 1 orange. *Honey Spice Biscuits*.—5 cups of flour, 5 eggs, $\frac{1}{2}$ lb. honey, $\frac{1}{2}$ lb. sugar, 2 teaspoons each baking soda, mixed spice. Boil honey and sugar together, allow to cool, then add well beaten eggs and other ingredients; mix well, and stand overnight. Roll out $\frac{1}{2}$ in. thick, cut into shapes, and bake in moderate oven 10 to 15 minutes. *Honeycomb Toffee*.—4 tablespoons sugar, 2 tablespoons honey, 1 teaspoon carbonate soda; boil sugar and honey for 7 minutes, then take off fire, add carbonate soda; mix well and pour into well buttered dish. Use large saucepan. This quantity will fill 2 soup plates. *Honey Balls*.—1 cup S.R. flour, 2 tablespoons butter, $\frac{1}{2}$ cup cornflour, $\frac{1}{2}$ cup cocoanut, 2 teaspoons honey, $\frac{1}{2}$ cup sugar, 2 eggs. Beat butter and sugar, then honey and eggs. Then flour, cornflour, and cocoanut. Put in teaspoons on greased slide, bake in moderate oven. *Golden Syrup*.—Put 5lbs. sugar in a quart of water in a saucepan, stir well till all is dissolved, then add 2lbs. strained honey in the syrup. Stir well and put in jar. *Buttermilk Cake*.—2 scant cups sugar, 1 cup butter, 2 cups buttermilk, 2 tablespoons honey, 2 eggs, 4 cups plain flour, 2 teaspoons carbonate soda in the milk, fruit. *Honey Sauce*.—Boil $\frac{1}{2}$ pt. water, stir in heaped dessertspoon moistened cornflour, add 2 tablespoons honey, squeeze of lemon juice, 1 teaspoon butter; cook for 3 minutes, stirring all the time. *Honey and Rice Delight*.—1 $\frac{1}{2}$ cups rice, $\frac{1}{2}$ cup honey, $\frac{1}{2}$ cup raisins, 1 tablespoon each butter and lemon juice, cinnamon and chopped almonds. Boil rice until tender in salted water and drain. Brown honey slightly in fryingpan, add lemon juice, raisins, and honey, and pour over rice in shallow piedish. Dab with bits of butter and bake in moderate oven till golden brown; sprinkle with cinnamon and chopped nuts. (Secretary, Mrs. Edith Kidman.)

RENDELSHAM.

July 5th.—Attendance, 12.

RECIPES AND USES OF CITRUS FRUITS.—Mrs. H. Sly read the following paper:—“Lemons and oranges can be used in many different ways. The use of lemon juice in place of vinegar on fish, tomatoes, beet, &c., is a valuable digestive acid. Stale vegetables can be freshened by adding lemon juice to water in which they are soaked. Orange or lemon peel for flavorings should be peeled thinly, and is best grated and rubbed in sugar to bring out the flavor. Lemons for storing should be cut from the tree, leaving a little of the stem on, carefully greased with good dripping, wrapped in soft paper, and kept in a cool dry place. Another method is to pack in dry sand. When lemons are very hard place them in a warm oven before putting on the lemon squeezer. A good remedy for a dry throat or tickling cough: Mix equal parts glycerine and lemon juice, or equal parts honey and lemon juice. Lemon and salt will remove ink stains or rust marks from linen. It is also good for cleaning copper and brassware. Use a cut lemon dipped in salt, afterwards wash in warm soapy water and polish. A few drops of

lemon juice will keep the teeth white. It is also good for shoe polish; a few drops rubbed briskly on black or tan shoes imparts a brilliant polish. Taken in hot coffee, it will often relieve a headache. A teaspoon of mixed spice in hot lemon will often break up a cold, but should only be taken on going to bed, as it causes excessive perspiration. Lemon and orange peel dried and ground into powder is a good flavoring for biscuits, puddings, and cake. When rinsing white silk add lemon juice to prevent it turning yellow. Stains on hands can be removed by rubbing with lemon. A few drops added to prunes when cooking improves the flavor. *Lemon Jam*.—To every pint of water add 1lb. sugar, 1 large lemon shredded finely or put through a mincer. Put the water on the fruit and stand all night. Then boil 1 hour, add sugar and boil again quickly 15 to 20 minutes. (Orange can be used same way.) *Lemon Jam No. 2*.—2lb. lemons, 6 pints water, 12lbs. sugar. Cut lemons very fine, removing all seeds, add water and stand 24 hours. Boil 1 hour or more until peel is soft. Add sugar and boil quickly $\frac{1}{2}$ hour; cool a little before bottling. *Lemon and Orange Marmalade*.—6 large lemons, 2 large oranges sliced thinly; soak in 3 quarts of water for 24 hours; boil 1 hour, then add 6½lbs. sugar and boil briskly 1 hour or more. *Lemon Cheese*.—½lb. butter, 1doz. eggs, 1½lbs. sugar, 6 large lemons (smaller quantity), 2½ozs. butter, 4 eggs, 10ozs. sugar, 2 lemons. Beat eggs, add butter and sugar and grated rind of lemons; strain in the juice of lemons; put in double saucepan and stir over fire until it thickens. Let cool and bottle for use. When cold seal down; it will keep a long time. *Butter Filling with Lemon or Orange*.—3½ozs. butter without salt, 4ozs. icing sugar, and add rind of 1 lemon (or orange grated finely). *Lemon Syrup*.—3 lemons, 2ozs. citric acid, 2lbs. sugar, and 1pt. boiling water. Peel lemons thinly, put all ingredients in a basin, straining in juice of lemons; stir occasionally until sugar and acid are dissolved; 1 tablespoon added to a glass of water. *Lemon Juice*.—1qt. water, 3doz. small lemons, 2½lbs. sugar, rind of 3 lemons. Boil sugar and water until dissolved, add juice and lemon rind peeled very thinly, and boil for 10 minutes; strain and bottle. Enamel saucepan should be used. *Fruit Lemonade*.—Juice of 1 lemon, sugar to taste, a few strawberries or raspberries; crush fruit well, add lemon juice and sugar, and strain into a tumbler of water. *Candied Lemon or Orange Peel*.—Soak peel in salted water for 3 or 4 days, drain, and bring to a boil until soft, in clear water. Then make a syrup of 2 cups of sugar and 1 cup water, boil 8 or 10 minutes, and put the peel, which has been well drained, into a basin and pour syrup over it. Stand 5 days, then drain off syrup and boil 20 minutes. Put peel into syrup and boil slowly until clear. Remove and drain well; dry slowly and put away in jars. *Orange Marmalade* (common oranges).—4lbs. oranges cut in halves, remove cores and pips, slice fruit finely, add 16 cups water; stand overnight and boil 1 hour, then add 12lbs. sugar and boil quickly another hour. *Orange Conserve* (from Navel oranges).—Slice up finely the Navel oranges. To each 1lb. fruit add 1pt. water, boil until soft, then measure cup for cup of fruit and sugar; add the juice of 2 lemons to every 3lbs. of fruit, boil $\frac{1}{2}$ hour. *Orange Marmalade*.—Slice 12 oranges, 2 lemons; add 10 pints water; stand 24 hours, then boil for 1½ hours; add 12lbs. sugar and boil 1½ hours longer or until it jellies. The lemons can be cut in quarters if liked, and removed when marmalade is cooked. *Orange Jelly*.—10 large oranges, 2 or 3 lemons; slice fruit, allowing ½pt. of water to each fruit. Boil slowly until fruit is soft, strain through jelly bag, then measure cup for cup of liquor and sugar. Boil again quickly until it jellies. Bottle and allow to cool before covering. *Orange Cake*.—1½ cups flour, ½ cup butter, ½ cup sugar, 3 eggs, ½ cup milk, 1 teaspoon cream tartar, ½ teaspoon soda, grated rind 1 orange. Cream sugar and butter, add eggs, then milk, flour, and orange peel. Beat well and bake in sandwich tin 20 minutes in moderate oven. Mix icing sugar with orange juice and ice when cold. *Orange Biscuits*.—7ozs. butter, 5ozs. sugar, 5ozs. golden syrup, 8ozs. flour, 4ozs. cornflour, ½ teaspoon spice, 2ozs. each cocoanut and chopped walnuts and finely chopped orange peel. Cream butter and sugar, add golden syrup and grated or chopped orange rind, and then the other ingredients. Knead well and let stand a few hours or all night, in a covered dish, roll out $\frac{1}{4}$ in. thick, cut in shapes, and bake in a moderate oven 15 minutes." (Secretary, Mrs. G. Andrews.)

Other Reports Received.

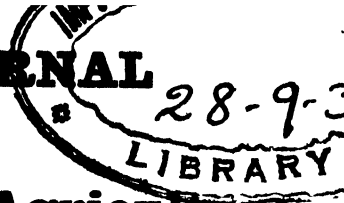
Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Tantanoola	6/9/33	12	Exhibition of Fancywork	Mrs. E. Telfer
McLaren Flat ..	6/9/33	18	Address—Mrs. S. Elliott .	Mrs. D. Elliott
Wasleys	7/9/33	33	Arts and Crafts Exhibition	Miss G. George

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All communications to be addressed:

"The Editor, Journal of Agriculture, Education Building, Adelaide."

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A. P. BLESING,
Minister of Agriculture.

AGRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Fat Lamb and Export Pork Industries.

The Minister of Agriculture (Hon. A. P. Blesing) has received the following report on the Fat Lamb and Export Pork industries from the Deputy Director of Agriculture (Mr. W. J. Spafford) after he had made some investigations into the matter whilst on a visit to Victoria during the recent Melbourne Royal Show.

FAT LAMBS.

After closely following the judging of the mutton breeds of sheep at the Show, discussing the matter of types and methods of handling with many Victorian breeders, and visiting saleyards and slaughterhouses, I could only come to the conclusion that in the matter of breeding and handling of lambs on farms South Australian farmers are working on correct lines.

EXPORTS OF LAMB CARCASSES FROM VICTORIA.

The number of carcasses of lamb exported from Victoria is more than 10 times the number sent from South Australia, and despite the fact that the quality of our lambs is at least equal to those of Victoria the prices received for our neighbor's lambs are greater than what we receive, and this appears to be due to the large numbers produced. For each of the past five years Victoria has sent overseas considerably more than 1,000,000 lamb carcasses, the actual figures being:—

	Carcasses.
1928-29	1,168,358
1929-30	1,515,116
1930-31	1,406,565
1931-32	1,615,736
1932-33	2,424,848

TYPE OF EXPORT LAMBS PRODUCED IN VICTORIA.

The numbers of sheep of the various mutton breeds exhibited at the Melbourne Show give some indication of the popularity of the breeds, although it is necessary to visit sales throughout the season to arrive at a correct idea of the proportion of the different crosses being slaughtered for export.

The animals entered for competition in the various sheep classes at the 1933 Melbourne Show, not including lambs at foot, were as follows:—

Border Leicester	200
Southdown	171
Corriedales	127
Dorset Horn	114
Lincoln	99
Shropshire	62
English Leicester	50
Ryeland	48
Romney Marsh	38
Polwarths	20
Suffolk	16

At the time of the Melbourne Show the lambs submitted for sale in the saleyards were predominantly crossbreds containing much Border Leicester blood, and of a yarding of over 78,000 lambs at Newmarket on September 26th, 1933, it was estimated that more than 75 per cent. of the lambs were sired by Border Leicesters. On the other hand, the lambs by Southdown and Ryeland rams were only just approaching maturity, and would not be submitted for sale until a little later on. In conversation

with interested parties, I gathered that the lambs exported from Victoria are predominantly of two types—(a) the long-bodied, white-fatted lambs by Border Leicester, and (b) the Down type of lambs sired by Southdowns and Ryeland, with the latter breed becoming increasingly popular.

The relatively high prices secured for Victorian lambs appear to be due to the continuity of supplies of large numbers of lambs of similar type, and if we can increase our production of carcasses and keep to the type we are now raising there seems to be no reason why we should not secure prices equal to those paid for Victorian lambs.

PIGS FOR EXPORT.

Victoria is only just becoming an important exporter of pig products, and as we have just arrived at the stage of commencing to ship pig carcasses overseas, it is of the utmost importance that South Australia closely follows all the developments in this direction.

The first thing of importance to note is that there has been a reversal of the type of trade being undertaken by Victoria, for in the past five years the attempt to export bacon and hams overseas has been almost discontinued, whilst rapid strides have been made in the export of frozen pork. These facts are clearly seen in the next table:—

Exports of Pig Products from Victoria.

	Frozen Pork.	Bacon and Hams.
	Lbs.	Lbs.
1928-29	5,130	153,362
1929-30	14,017	161,070
1930-31	253,419	88,168
1931-32	1,565,668	68,554
1932-33	2,148,500	59,574

The fact that the principal pig product to be exported from Australia must consist of frozen carcasses of a weight suitable for conversion into bacon on arrival in Great Britain is generally recognised in South Australia, but we have not yet realised to the full what is the best type of pig to produce for the purpose.

TYPE OF PIG PRODUCED IN VICTORIA.

Close inspection of the pigs submitted for sale for slaughter during Melbourne Show Week disclosed that the great bulk of the bacon pigs were of the long, deep-bodied, fine-shouldered type demanded by the bacon curers in Great Britain, and most of them were of a white color. A count of the pens of bacon pigs showed that almost exactly 70 per cent. of the animals were by Large White boars, most of the pigs being half-breds, whilst nearly all of the remainder were half-bred Tamworths, there being only very few Berkshires and British Blacks. Amongst the porkers about 50 per cent. showed Mid-York blood, and there was a fair proportion of Berkshires, although Large White and Tamworth-cross pigs were in evidence.

As the Department of Agriculture has for some time been educating pig producers towards raising the ideal bacon pig we feel that it will not be long before our own markets will be well supplied with the pigs of a type to bring maximum prices, and as a matter of fact great improvement in this direction has been noticeable in the past few months.

RECOMMENDATIONS.

1. It is necessary for an increased production of fat lambs suitable for export in South Australia if we are to get maximum prices.

2. In encouraging greater production of fat lambs we should stick as closely as possible to the Down type of lamb, which we have conclusively proved can be raised successfully in our conditions.

3. Considering that the quality of South Australian lambs is at least as good as that of the other States, and our prices a bit lower, we would secure an advantage if all lamb carcasses exported from Australia carried one brand rather than that of a particular State.

4. Every encouragement should be given to the production of pigs suitable for export so that exporters can operate freely in our markets. As in all of the principal pig-exporting countries of the world, the use of Large White boars will do more than anything else towards the production of the desired type of animal.

5. A quick change in the type produced and the rapid extension of our export trade would probably help more than anything else to overcome the ill-effects of a stored surplus of wheat if the recent wheat agreement leaves us with an unexportable surplus. With free propaganda we could persuade pig raisers to feed wheat to pigs and sell it as pork, rather than suffer the damage that must follow the holding up of unsaleable wheat.

Urrbrae Agricultural High School.

A day school for agricultural students has been opened at Urrbrae. A course similar to that of other Agricultural High Schools has been provided and a staff of experts appointed. The school was opened in February, 1932, with first year, intermediate, and leaving classes.

All students who have passed the Qualifying Certificate Examination or have spent a year or more at a secondary school are eligible for enrolment, provided:—

- (a) That they intend to become primary producers; or
- (b) That they wish to take a University course in agriculture, with the object of becoming research workers or teachers of agriculture.

A general education is provided, and students may sit for Intermediate and Leaving Examinations. The following are the subjects studied:—English Literature, Algebra, Geometry, Arithmetic, Chemistry, Botany, and Agriculture. (Latin to Intermediate standard if required for Matriculation to Agricultural Degree course.) *Agriculture*, both in theory and in practice, receives special attention. The study of *Farm Crops* and *Animal Husbandry*, together with *Farm Shop work* or *Farm Mechanics* comprises an important part of the school's activities.

The number of admissions for 1934 will be limited. Early application for admission should be made on the prescribed form, which is obtainable from the Education Office.

On application to the Head Master, efforts will be made to obtain suitable boarding accommodation in the neighborhood for those students requiring it.

Control of Sorrel.

Reply to the Secretary of the Marama Agricultural Bureau, who asked, "What is the best method of ridding land of sorrel?" Mr. W. J. Spafford (Deputy Director of Agriculture) says:—There are no materials that can be added economically to soils in the low rainfall parts of this State to rid them of sorrel. In the wetter portions of the country, where valuable crops are grown, the addition of sufficient lime to alter the reaction from acid to neutral leads to the control of the weed, but this treatment is not warranted for ordinary cereal-growing conditions.

After a few years of cropping, with the constant cultivation of the land which is necessary, sorrel should disappear from the fields at Marama, as the aeration and exposure should soon overcome the acidity of the surface soil which is encouraging the sorrel to spread.

Citrus Trees Shedding their Leaves.

Reporting that both orange and lemon trees in the Narridy District were shedding their leaves, the Secretary of the Local Branch of the Agricultural Bureau has been advised by the Chief Horticultural Instructor (Mr. G. Quinn) that it is quite a natural procedure for citrus trees to cast their leaves annually, but usually this is done gradually, and the effect is not to leave the tree totally bare of foliage at any one period, such as is the case with truly deciduous kinds of fruit trees. Apart from an attack of some specific pest or disease, when an orange or lemon tree sheds nearly all of its leaves simultaneously the cause generally can be attributed to some ineffective root action.



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This may be due to excessive wetness in the soil about the roots during the winter season, or to too great a deficiency of moisture in the land during the period of summer. Again, exposure to cold, cutting winds will frequently defoliate these trees, though that is usually noticed more on the side facing the prevailing wind in the locality.

A lack of nutriment in the soil occupied by the roots may hasten the fall of leaves; and intensely cold soil, but not necessarily actual frost formation on ground or plants, will also, if prolonged, cause leaf shedding. These points are presented for your consideration, as without a personal knowledge of all or such of these predisposing influences as may be or have been present in the locality, I am quite unable to definitely state which are the operating factors.

Improvement of Pastures.

The South Australian Committee of the Australian Dairy Council desires to institute a series of pasture improvement demonstration trials on the properties of private dairy farmers in South Australia.

The demonstration area will be planted with a mixture of pasture varieties considered most suitable to the conditions offering, and the results obtained will serve as an illustration of the importance of pasture improvement, not only on the carrying capacity of the land, but also on the health of livestock grazing thereon.

In this connection the Committee is prepared to supply seed and manure to selected trialists, and co operate with them in the planting and management of the demonstration fields.

Landholders who propose seeding pasture areas in the coming year are invited to communicate with the Secretary of the Committee, L. S. Smith, Office of Minister of Agriculture, Adelaide, with a view to obtaining free supplies of seed and fertiliser for planting such land. Those assisted in this direction will be expected to forward monthly reports showing the development of the varieties seeded and, as far as possible, supply a comparison of the amount of produce obtained from such fields relatively to that secured from other paddocks receiving different treatment.

It is hoped to establish demonstration trials in various districts throughout the State, and at the end of each season publish a review of the reports received. In this way valuable information regarding the establishment of pastures for various localities will be made available. Applications should be forwarded on or before January 1st, 1934, and contain the following particulars:—District, area of field to be planted, pasture varieties suggested, area of farm, class of land, number of cows kept, manure.

The various trials will be conducted under the supervision of the South Australian Committee of the Australian Dairy Council, who from time to time will issue reports on the results obtained.

VETERINARY INQUIRIES.

[Replies supplied by Veterinary Officers, Stock and Brands Department.]

Agricultural Bureau, Brentwood, reports cow whose nose appears to be blocked as though with catarrh.

Reply—Give the cow 1 tablespoon Stockholm tar smeared on the tongue once daily for a few days. Provided the condition is not chronic it should clear up as warmer weather comes on. It is not a common condition in cows, and should not occur.

Agricultural Bureau, Brentwood, reports cow and calf stiff in all legs.

Reply—The stock appear to be suffering from an insufficiency of minerals (lime and phosphorus) in the diet. Supplement the grazing by handfeeding some bran and crushed oats, or a little linseed meal, with some chaff. Damp the feed, and mix in it daily a handful of superphosphate, or for preference a heaped tablespoonful of

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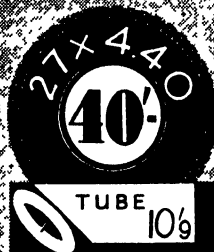
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dicalcic phosphate; whichever of these mineral supplement is used, it should be introduced gradually, giving a small amount to begin with and gradually working up to the full amount as the stock become accustomed to taking it. A daily allowance of salt, 1oz. to 2ozs. should also be given. As an alternative to giving the mineral supplement mixed in with box feed, they can be mixed with an equal quantity of salt to make a lick which can be put out in a box—sheltered from weather—in some convenient place where the stock could have access to it to lick it at will. It would be a sound procedure to feed these mineral supplements regularly to all cattle.

Sevenhills asks for a lick for sheep grazing on improved pastures.

Reply—The following lick is suggested:—Dicalcic phosphate (37 per cent., approximately, P_2O_5), 40 parts; salt, 60 parts. It not taken readily by the sheep, a little crushed oats could be added. The price of dicalcic phosphate (37 per cent. P_2O_5) is about 17s. 6d. per cwt. for small lots. The feeding of licks should start from the time the grass begins to seed, and should be continued throughout the dry period of the year.

Angorichina Hostel asks how to dehorn a 10 months old bull.

Reply—The only way to do this is to cut off the horns, which can be done with a meat saw or with a sharp, broad chisel. Cut off level with the skull. Sear the arteries, and swab daily with following lotion:—Creosote, ½oz.; oil of turpentine, 3ozs.; olive oil, 10qzs. Throw the bull to do the operation.

Taplan Conference: "Does mammitis recur in a cow?"

Reply—Mammitis is due to invasion of the udder tissue by certain germs. This invasion may lead to a mild or severe attack of inflammation of the udder. Again, the disease may become chronic with definite udder changes, or apparent recovery may take place. In the latter case and even in old chronic cases, a flaring up of the disease may take place and an acute mammitis again occurs. The only way in which it is possible to say whether a cow has mammitis or not is by a bacteriological examination of the milk from each of the quarters of the udder. Cows with apparently healthy udders can have the germs which cause mammitis present in the milk. Under suitable conditions and especially after calving, the disease becomes active.

Taplan Conference: "Is it advisable to dispose of a cow that has had mammitis?"

Reply—This depends on the circumstances of each case, and advice should be sought from the Stock and Brands Department before such a course is adopted. The following points should be considered before disposing of a cow:—(1) Mammitis is extremely common and few herds are free from it. (2) If the policy of disposal is adopted, then all the cases of mammitis will have to be removed from the herd. Again, only a bacteriological test of the milk of all the cows in the herd will show what cows are affected and what ones are not. (3) The disposal of a number of cases of the disease may mean that the dairyman has to purchase cows outside. The "bought" cow frequently introduces the disease. (4) The extent of the disease in the herd. If only one case has occurred it may pay to dispose of it. (5) Again, the numbers of quarters affected are of importance. A three-quarter cow may pay her way, whilst a cow with two or quarters affected will probably not do so. (6) The type, condition, and age of the cow should be considered.

Taplan Conference: "Should a cow be allowed unlimited supplies of water after calving?"

Reply—Yes. Cows require a good supply of water at all times. They should be allowed to take as much as they want.

Taplan Conference: "What is a good lick for cows?"

Reply—The following is suggested:—Dicalcic phosphate (37-38 per cent. P_2O_5), 60 parts; salt, 50 parts. For a 2gall. cow on good chaff, give 6ozs. of the above lick mixed in feed daily. For bigger producers increase the amount of lick by 2ozs. of lick for each gallon of milk. Superphosphate is not advised.

Taplan Conference: "What is the cause of gastro-enteritis in lambs and its treatment?"

Reply—The symptoms shown should have been stated. Gastro-enteritis (inflammation of the stomach and bowels) is invariably accompanied by "black scours." It may be "parasitic" in origin or if the lambs are in "high condition," it may be a symptom of infectious entero-toxaemia. It is suggested that particulars of the disease be sent to the Stock and Brands Department, and, if possible, a typically sick lamb be brought down for *post mortem* examination.

Taplan Conference: "Cure for strangles."

Reply—Strangles is a contagious disease of the horse and is chiefly spread by the contact of an affected horse with a healthy one. The disease has been very prevalent in the State during the past year, and in those cases which have come under notice the history is that a horse has been purchased (usually at a horse sale) a short time before the outbreak of the disease. *Prevention*—(1) Isolate any newly bought horses for two or three weeks. (2) Do not buy any horses showing a nasal discharge or swelling between the lower jaws. (It is also advisable to make your purchases well before harvest operations, as an outbreak of strangles can disorganise the farm teams). (3) There is preventive vaccination, but its use is not advised for farm teams. (4) Isolate any horse showing signs of a cold or swelling under jaw and seek veterinary advice. *Cure*—The disease takes its course. Isolate, put out of work, keep warm, and give nourishing but light feed. Steaming of the nose is advisable. The swelling under the jaw should be fomented and lanced when ripe. Strangles vaccine is very useful in an outbreak of the disease. Advice should be sought as to how to use it.

Taplan Conference: "What is the cause and cure of 'mud fever'?"

Reply—This is an inflammation of the skin of legs, heels, and coronets of horses' feet when these parts are subjected to long-continued irritation. The skin surface becomes reddened and slightly swollen and area is painful to touch. It may be itchy and the horse may rub and bite it. Treatment consists in clipping hair off affected area and washing with warm soap solution. Then apply following lotion twice daily:—Lead acetate, loz.; zinc sulphate, 6 drams; water, 1 pint. Shake thoroughly before applying.

Taplan Conference: "Is it an advantage to clip horses?"

Reply—Yes. They "dry out" quickly and do not lose condition so easily. Sore shoulders are not so common, mainly because loss of condition does not occur. They are not so subject to lice and are easily kept clean.

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THE VIABILITY OF SEEDS.

[*The Bulletin of Miscellaneous Information* (No. 6, 1933) issued by the Royal Botanic Gardens, Kew, contains an article by MR. J. H. TURNER on the *Viability of Seeds*, extracts of which are published below. Throughout the original the names of authorities are acknowledged for statements concerning the various cases mentioned.]

Little was known about the vitality of seeds of wild plants until De Candolle, in 1832, observed that "certain portions of soil, which, by reason of terracing work, were exposed to the air after several centuries, covered themselves the first year with a multitude of individuals belonging to certain species, sometimes uncommon in the vicinity." He concluded that the seeds of these species had remained viable for considerable periods in the soil.

Although much has been written regarding this subject since the time of De Candolle, the literature is very scattered, and with few exceptions the accounts are based upon observations rather than experiments.

Duvel has shown that the average life of seeds, as of plants, varies greatly with the different families, genera, and species, but there is no relation between the longevity of plants and the viable period of the seeds they bear. Some seeds retain their power of germination for a few days only, such as the willows and poplars; others remain viable for months or even a considerable number of years. The life period of any species of seed, provided that it has been thoroughly matured, is largely dependent on environment. Climatic influences play an important part, and loss of vitality is especially marked in the case of seeds stored in places of high temperature and humidity.

BURIED SEED.

Only a limited number of cultivated plants produce seeds which retain their vitality for any length of time when buried in the soil, but the seeds of many plants known as "weeds" are capable of living in the soil for extended periods. Duvel found that seeds of the cultivated sunflower, when buried for a year at three different depths, all decayed, whilst those of the wild sunflower retained their vitality, and gave a germination of 66 per cent. at the maximum depth of 3ft. Many seeds are better preserved the deeper they are buried. At 3ft. below the surface, the amount of moisture is always more uniform, the supply of oxygen is greatly lowered, and the temperature is much reduced. The majority of seeds germinate best when subjected to daily alterations in temperature, and as these alterations do not take place at a depth of 3ft. below the surface there is a better preservation of vitality as a result of the more dormant condition of the seed.

It is well known that on the soil of old pastures and woodlands freshly turned up, or on the mud of drained ponds, plants previously unknown in that locality appear. Some of these may have risen from seeds recently transported, but others must have grown from seeds which have lain dormant in the soil for frequently a very lengthy period. A striking illustration of this was afforded during the War by the countless plants that appeared in devastated areas. The upheaval of the ground by continuous shelling brought innumerable dormant weed seeds to the surface, where they germinated, and so completely covered the ground that all appeared to be a level plain.

Hill, in the "Flora of the Somme Battlefield," says: "In July poppies (*Papaver Rhoeas* L.) predominated, and the sheet of color as far as the eye could see was superb; a blaze of scarlet unbroken by tree or hedgerow. Here and there long stretches of chamomile (*Matricaria Chamomilla* L.) broke into the prevailing

red and monopolised some acres; and large patches of yellow charlock were also conspicuous, but in the general effect no other plants were noticeable, though a closer inspection revealed the presence of most of the common weeds of cultivation . . . Charlock (*Sinapis arvensis* L.) not only occurred in broad patches, but was also fairly uniformly distributed, though masked by the taller poppies. Numerous small patches were, however, conspicuous, and these usually marked the more recently dug graves of men buried where they had fallen . . . No doubt in the ordinary operations of ploughing and tilling of the ground in years before the war much seed was buried which has been brought to the surface by the shelling of the ground and subsequent weathering. In this connection the presence of charlock on the more recently dug graves, where the chalk now forms the actual surface, is of interest, since it adds further proof of the longevity of this seed when well buried in the soil." The appearance of charlock on earth thrown up by shells and in shell craters when there was no trace of it on the undisturbed ground was remarked by other botanists during the War.

Farmers often object to deep ploughing, especially on light soils, as it may "bring up the charlock." A field had been seeded down to grass, and kept as a hay field and pasture. Sixteen years after the elimination of the seed source, a heavily laden wagon was taken across this field after a hard frost and thaw; the wheels sinking deeply tore up the ground, bringing much subsoil to the surface. In the following spring the furrows were filled with charlock, and when they flowered there were two parallel yellow ribbons marking the irregular course taken by the wagon. There was not another charlock to be seen in the field. After being under grass for 24 years, the field produced fumitory, poppies, and charlock in abundance directly the surface was broken and the subsoil exposed to the atmosphere. Otherwise none of these weeds was ever seen.

A field was laid down in grass in 1869, and so remained until 1893, when *Sinapis arvensis* appeared in patches. Other experiments show that seeds of charlock can retain their vitality in the soil for 40 years, and that although the germination of stored seeds of charlock after 10 years was 24 per cent., those which had been buried for the same period gave a germination of 87 per cent.

Professor E. J. Salisbury relates that during the building of his house on former arable land corn field weeds appeared, and notably plants of the blue pimpernel (*Anagallis foemina* Mill.), a plant now exceedingly rare in that locality.

Pugsley mentions that *Fumaria officinalis* appeared on a heap of earth dug from the foundations of a house. Holmes describes how a house that had been standing for about 100 years was pulled down and the ground left vacant for a time. The following year henbane (*Hyoscyamus niger*) grew luxuriantly amongst the soil that had been exposed by clearing the foundations.

There are many instances of the longevity of buried leguminous seeds. *Ulex europaeus* came up when trenches were dug in land which had been cleared of this plant and cultivated for 25 years. New trees were planted 15 years later, and the gorse re-appeared, i.e., after the seeds had been buried for 40 years. In another instance seeds of gorse were brought to the surface after 25 years, and germinated most abundantly where originally the gorse grew strongest. Further, a gorse bush had been removed from a garden for about 20 years, yet every year on stirring the soil new seedlings appeared.

The appearance of broom (*Cytisus scoparius*) in the bare slopes of a road cut through the grassy, park-like land of Wimbledon estate is described. It seems probable that the young plants may have originated from seed that had remained dormant for a century.

Plants of *Trifolium repens* often appear abundantly in land freshly brought under cultivation, and in the Fen districts white clover comes up so quickly after the land has been drained and ploughed that the inhabitants can scarcely be convinced that it is not a spontaneous product of the soil.

Hard seeds of *Acacia* spp. have been found buried deeply in the soil of eucalyptus forests where there was no other acacias within a mile, and under trees of *Acacia dealbata* seeds buried as deeply as 18in. below the surface gave perfect germination.

A rare example of the sudden rush to life of long-buried seeds occurred at Westonbirt where in the winter a quantity of *Rhododendrom ponticum* was cleared away in a wood, and in the following June the ground was literally covered with the scare blossoms of *Campanula patula*, of which the only specimen previously known at Westonbirt was at the edge of a wood nearly a mile away.

Reference was made to experiments with seeds from soil samples taken from forests that had been growing for known periods on formerly cultivated land. Germination of numerous farm seeds was secured, and it was estimated that some of these seeds had been lying in the soil for 100 years.

Probably the record longevity for any seed is that recorded by Olga, who obtained approximately 100 per cent. germination with "seeds" of *Nelumbo nucifera* Gaertn, which he found on a peat bed buried 2ft. deep with loess in the Pulantien River Valley in Southern Manchuria, the bed being 12½ metres above the present water level of the river. Judging by the age of willow trees (*Salix babylonica*) on the bed of this former lake, and from the rate of lowering of the water level, it is probable that the "seeds" are at least 120 years old, and may be 400 years old, or even older, judging by the rate of erosion. Seedlings raised at Kew were potted and planted in the Victoria Regia pool, where they grew vigorously. The embryo of this plant is kept in an ideal state of quiescence by the hard pericarp, and it is this impermeability of the "seed" which no doubt is the chief factor for its prolonged vitality. Peat appears to be an ideal medium for seed preservation, and its antiseptic properties prevent deterioration through fungal attack.

Experiments with buried seeds were made by Beal in the United States, and at intervals of five years, from 1879-1920, and later of 10 years, seeds in the experiments were tested for germination. Results show that, after being buried for 50 years, seeds of *Brassica*, *Oenothera*, *Polygonum*, *Rumex*, and *Verbascum* still germinate.

Other tests of Duvel (United States) under more natural conditions in pots showed that seeds of 51 species buried at depths varying from 6in. to 42in. gave a good germination after being buried for 20 years. On the whole, the most deeply buried seeds retained the vitality the longest.

Seeds submerged in mud and water also have the power of resting until conditions favor germination. It has been shown that the germination of some aquatic seeds can be delayed four or five years without impairing their vitality, and seeds of many land and water plants will germinate after being kept in mud and water for periods of four to seven years.

It is evident that seeds washed down from the higher reaches of a river will germinate after a prolonged submersion in salt water, and that some seeds will withstand the action of salt water for considerable periods.

STORED SEEDS.

There are numerous instances of the germination of stored seeds. In 1850 Robert Brown, out of curiosity, sowed some seeds from a collection in the British Museum. He succeeded in making several of them germinate, particularly a seed of *Nelumbium speciosum*. It was shown that in four separate experiments with *Nelumbium* 85 per cent. of these fruits had retained their power of germination for 150 years.

Seeds of known age from 25 to 135 years, preserved in the Herbarium of the Natural History Museum in Paris, showed that seven species retained their power of germination after 50 years. The oldest seeds found viable were *Cassia bicapsularis* (87 years), *Cytisus biflorus* (84), *Trifolium arvense* (68), *Lens esculenta* (65), *Stachys nepetifolia* (77), *Lavatera Olbia* (64), *Nelumbium luteum* (56). Seeds of other Leguminosae preserved in loosely corked bottles in Museums in the Isle of Wight and Kew germinated at ages as follows:—

<i>Anthyllus vulneraria</i>	90 years, 4.0 per cent.
<i>Trifolium stratum</i>	90 years, 14.1 per cent.
<i>Trifolium pratense</i>	81 years, 2.6 per cent.
<i>Lotus uliginosus</i>	81 years, 9.6 per cent.
<i>Melilotus alba</i>	81 years, 163 seeds, 1 germinated.
<i>Cytisus scoparius</i>	81 years, 636 seeds, 4 germinated.
<i>Medicago orbicularis</i>	78 years, 22.0 per cent.

Seeds of *Polygonaceae*, *Cruciferae*, *Papaveraceae*, and *Scrophulariaceae*, failed to germinate.

Seeds sent from Kew to Melbourne in 1856, and put aside in a dry cupboard and opened in 1906 were tested.

These tests confirmed other experiments, the *Leguminosae* providing more than half the number of cases of longevity. Further tests showed small percentage germinations of *Goodia lotifolia* and *Hovea heterophylla*, both 105 years old. Ewart formed the opinion that however dry the seeds may be they cannot indefinitely prolong their vitality. Even the most resistant seeds after 50 to 100 years show a pronounced decrease in the percentage germination, and the general trend of the curves is such as to show that the probable extreme duration of vitality for any known seed may be set between 150 and 250 years (*Leguminosae*).

Seeds of *Ribes rotundifolium* may lie dormant in the forest floor for protracted periods, and germinate soon after the ground is disturbed through fires, by logging operations, or by the roots of trees blown down by the wind.

Records are quoted of seeds of *Mimosa pudica* from hermetically sealed bottles germinating after 100 years; *Acacia lophanthia*, 68 years; *Pelargonium*, 50 years; and *Roseda odorata*, 45 years.

Some of the instances of supposed seed viability are unsupported by definite evidence, and the "classical case of seed longevity" described by Heldreich was evidently founded on taxonomic errors. Heldreich suggested that the sudden appearance of a supposed new species, which he named *Glaucium Sepieri*, and of *Silene juvenalis* in the Laurion area was due to their seeds having remained dormant for 1,500 to 2,000 years in the soil under the heaps of old mining debris. An investigation by Dr. Turrill has shown that *Silene juvenalis* is conspecific with *S. subconica*, a not uncommon species in the countries around the

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Agean Sea. There is nothing in the taxonomy or distribution of the *Silene* and *Glaucium* to make it improbable for them to occur naturally in the Laurion district, and in all probability both species were in the neighborhood before the heaps of debris were removed and simply spread on the vacated and denuded ground in the absence of close competition.

MIRACLE OR MUMMY WHEAT AND MUMMY PEAS.

There is no authenticated evidence that wheat taken from undisturbed Egyptian tombs will germinate. An experiment was made at Kew some 30 years ago with grain from a model granary found in a tomb of the nineteenth dynasty and brought to England by Sir E. A. Wallis Budge. Samples were tested under various conditions, and the effect of colored glass was tried in the effort to induce germination, but after three months the grain had turned to dust. Percival states: "I examined a number (of grains) found by Professor Flinders Price in the Graeco-Roman Cemetery at Hawara (about First Century, B.C.) . . . the embryo had become dark brown, its plumule greatly shrivelled, and little of its structure was visible."

In grain from a tomb of the eighteenth dynasty, 1400 B.C., "all the parts were more brittle, and the embryo more completely disorganised than in the grains from Hawara. It is scarcely necessary to observe that the embryos were dead. Professor Petrie tested samples of grain of Graeco-Roman age which he found at Hawara immediately after exhumation. The grains were sown on the banks of a canal in varying degrees of moisture . . . but none germinated."

According to Gain, although Egyptian wheat and barley often have an exterior appearance of good preservation, the embryo has undergone a marked chemical change, and is no longer viable. This change shows that the dormant life of the grain has been long extinct.

Sir E. A. Wallis Budge has accounted for the popular belief in the germination of grain from Egyptian tombs, and explains that for hundred of years the natives of Egypt have used the halls of tombs for the wheat and barley obtained from Syria. Ancient coffins have been packed in this Syrian wheat and sent to England, and such grains will, of course, grow. During the last 30 years the native dragoman and guides have found that tourists will buy "mummy wheat," and they keep supplies in the tombs, carefully hidden, which they dig up under the eyes of the astonished visitor, and offer as "mummy wheat" or "mummy barley."

Cereals are ill adapted for a prolonged period of quiescence. Sifton has shown that Canadian wheat may retain its vitality for 18 years, and that the longevity of oats is greater than that of wheat, possibly owing to the protection of the hulls. Nineteen-year-old kernels of oats gave a germination of 41 per cent.

Percival records an exceptional case of wheat remaining viable for 25 years.

White found that in Australia the germination of wheat is lost after 11-16 years, and that of barley after 8-10 years.

Fanciful tales are current with regard to "miracle" or "mummy" wheat, *Triticum turgidum* var. *mirabile* Korn and "mummy peas," *Pisum sativum* var. *umbellatum* (Mill.) Ser.

Miracle wheat is the commonest branched form of *Triticum turgidum* met with in South Europe and the North African coast. It is usually cultivated as a curiosity. Fasciated forms of the pea, similar to the so-called mummy pea, are figured by Tabernaemontanus in his *Herbal*, published in 1590, and Miller in his *Gardeners' Dictionary*, eighth edition, 1771, described the form under the name *Pisum umbellatum*, rose or crown pea.

The misleading name "mummy pea" is equally applied to the non-fasciated form, sometimes grown in cottage gardens. It is popularly asserted that miracle wheat and mummy peas originate from Egyptian tombs, and that such seeds germinate when sown, but in every instance the statements prove to be without foundation.

GOVERNMENT EXPERIMENTAL ORCHARDS, BLACKWOOD AND FULLARTON.

[Paper read by R. FOWLER (*Manager, Blackwood Orchard*) at the Annual Meeting of the Fruitgrowers' and Market Gardeners' Association.]

Science is nothing more than systematic observation, and in the study of horticulture there is a very wide field of investigation still open. The scientist in the laboratory by means of water cultures or by growing trees in well washed sand, watered with nutrient solutions, can tell what fertilisers plants require to make, strong, healthy growth, but to be of any practical benefit, those fertilisers need to be tried in the field under natural conditions, and before the results can be considered as conclusive many factors have to be taken into consideration, and it is here that the horticulturist or field worker has to play his part. In attempting to do manurial experiments, for instance, upon apple trees, the results generally have been imperfect and the experimental error enormous, and these results have been due, in a large measure, to the fact that the experimental materials were not standardised, nor were the plots sufficiently replicated to reduce variations due to soil conditions to a minimum. The field experiment should be the inspiration for the more intensive pursuit of detail in the laboratories, and the demonstration plot or extension trial would seem to be essential for translating the general principles elucidated in the field experiment to purely local conditions.

It is not the purpose of this paper to discuss all the phases of the investigation of a horticultural problem, but rather to describe some of the field experiments carried out at the Experimental Orchards, and to outline briefly those recently initiated.

Experiments of a more or less permanent character are as follows:—

(1) Apple, pear cherry, and peach stock trials. (The peach stock trials have been completed, and the trees removed, as they had reached a stage when they were no longer profitable, either from the point of view of fruit production or experimental data.)

(2) Manure trials with apples, pears, and peaches, and also autumn and spring manuring of apple trees.

(3) Tillage or cultivation tests.

(4) Various pruning tests with all varieties of fruit trees.

(5) Pruning in conjunction with thinning tests and its relation to biennial cropping.

(6) Apple stock trials in their relation to bitter pit.

(7) Experiments for the better control of codlin moth and other injurious insects and fungus diseases. In addition, there has recently been added another series of manure trials at Blackwood covering 20 plots of six trees, each manure trial to be replicated four times, together with pollenisation trials, pruning trials, and various methods of planting. Material is being worked up for an apple stock trial to test the comparative value of Northern Spy, Winter Majetin, Seedling, and own root stocks for the leading commercial varieties of apples.

At Fullarton, extensive citrus root stock trials, vine stock trials, and experiments with 12 varieties of almonds have been set out. Though this list does not cover all the experimental work undertaken, it will give some idea of the work in progress.

STOCK TRIALS.

It has long been realised that the influence of stock on scion and conversely, scion on stock, has a most important bearing on the future wellbeing of the tree, and is a most important problem in connection with fruit growing. It is no exaggeration to say that the success or failure of the orchard may depend on choosing the

right stock on which to work the trees, particularly with cherry, pear, and peach orchards. With the apple—as the Northern Spy stock is almost exclusively used—the difference is not so marked, though there is a great deal of controversy still as to whether the Spy is the best stock to use for apples.

CHERRY STOCKS.

In the tests set out at Blackwood, three each of five commercial varieties are worked on four different stocks:—Mazzard, Mahaleb, Kentish, and a combination of Kentish and Mazzard. Though there is still a difference of opinion as to the



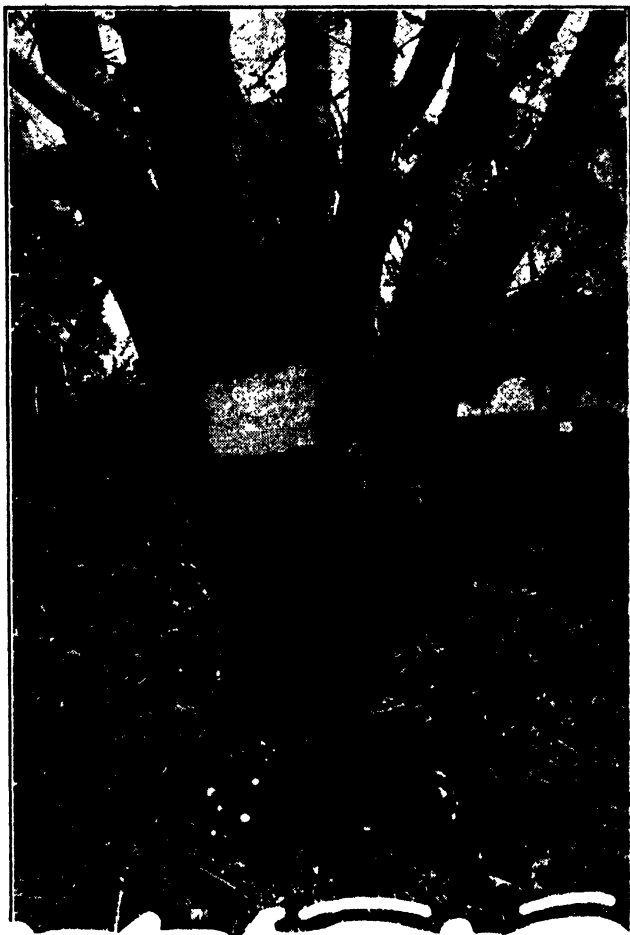
Block 1.

Early Lyons on Mazzard. Note absence of point of union.

best stock for cherries, a glance through the trees at Blackwood will show that under local conditions the superiority of the Mazzard stock is outstanding. This stock comes from the wild sweet cherry (*Prunus avium*). It grows to a great height, and varieties worked on it make large trees, very uniform in growth, with clean, straight boles showing little or no indication of where stock and scion were united (see block 1). This stock also does not sucker. Trees worked on Mazzard are larger,

thrifter, and more productive when they come into bearing than on any other stock, and from present indications their productive life should be much longer than on other stocks. Some varieties are somewhat shy at first on Mazzard, but eventually they become profitable.

The Mahaleb stock (*Prunus mahaleb*) comes from Central Europe and Asia, where it grows in its wild state. It is quite different in appearance from the Mazzard and Kentish with leaves more like those of the apricot than the cherry. This stock has a dwarfing effect on varieties worked upon it, but generally trees on this



Block 2.

Early Purple Guigne Cherry worked on Mahaleb stock.

Note point of union.

stock come into bearing earlier than on Mazzard. The point of union between stock and scion is very marked, the stock generally outgrowing the scion (see block 2). Of the five varieties worked on this stock at Blackwood, St. Margaret is the only one that appears likely to thrive on it, as the four other varieties are showing signs of decay, and four trees in the row are dead. This stock may be better than the Kentish, but it is not so good as the Mazzard.

The Kentish cherry (*Prunus cerasus*) or sour pie cherry, has been used as a stock for many years, but in the tests it has proved very unsatisfactory. Trees worked on Kentish stocks rarely make good trees, though they come into bearing earlier than on Mazzard, with a tendency to over-crop with some varieties. The stock-scion union is very imperfect, the scion outgrowing the stock (see block 3); just the reverse of the Mahaleb stock. The Kentish stock, being of a dwarf character, produces much smaller trees than Mazzard or Mahaleb stocks, and it would appear that the life of the trees will be shorter than on the Mazzard. The Kentish stock also suckered sadly for many years.



Block 3.

Florence Cherry worked on Kentish stock.
Note point of union

With the combination stock—where the Mazzard root stock was used to give a strong growing habit and longevity to the tree, and the Kentish was worked directly on to the Mazzard with a view to inducing the earlier fruiting habit—the results have been rather interesting. The trees have grown as well as those worked directly on to the Mazzard, and they have produced rather better crops of fruit which ripen a little later than on the Mazzard, but the small intermediate piece of Kentish wood between the Mazzard stock and the upper portion of the tree has not developed to the same extent as the stock or scion, and has formed a small constricted area or waist a few inches above ground level (see block 4), and it would seem that in time the effect of this will be to shorten the life of the trees.

PEAR STOCKS.

Three each of four varieties of pears worked on pear seedlings and quince stocks were used in this test. The varieties on the seedling stocks have made fairly large trees; the stock scion union is perfect, and the trees are now cropping well, though for a few years the crops were lighter on this stock than on the quince, due to the fact, no doubt, that the trees were growing much more strongly. It would also seem that the size and quality of the fruit is better on the seedling stock than on the quince. The pear seedlings or free-growing stocks, as they are termed, are at



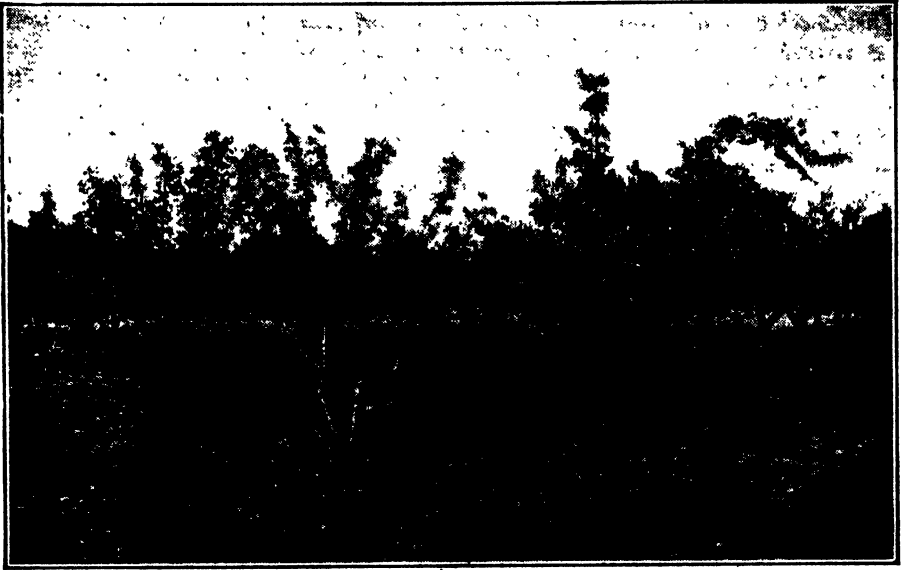
Block 4.

Early Lyons on Kentish on Massard.

Note constricted area of point of union.

present wholly provided from collections of seedling pears, the seed being obtained mostly from France. The seeds are collected from the pomace in the manufacture of perry. Like all seedling stocks, they show considerable differences, not only in vegetative characters but in root systems.

The quince stock is used for dwarfing purposes; probably the best type for general use being the true Anger's quince, and in the tests at Blackwood the trees are much smaller on this stock than on the seedlings. There would seem to be one



Block 5.

Note two apparently dead trees in foreground. These are Bourre Easter Pear worked on Quince stock. Same variety in background worked on Pear seedling.



Block 6.

Glou Moreau Pear worked on Pear Seedling.

serious disadvantage in using quince stocks for pears. Certain varieties of pears will not "take" directly on the quince, and of the varieties tried at Blackwood, the Beurre Easter is a complete failure on this stock. Stock and scion united, but the trees will not grow, though they may live for some years. Marie Louise, Souvenir de Congres, and Josephine de Malines are other varieties which are reputed to do badly on quince stocks. Now that the pear woolly aphis has made its appearance, it will soon be necessary to seek a pear stock resistant to this insect as is the Spy stock in the case of the apple. Some preliminary investigations have been made in this respect by the Horticultural Branch working in co-operation with Mr. H. N. Wicks.

It is hoped by a process of selection and elimination to obtain eventually a stock more or less resistant. Research is also being made in other directions, for it is realised that the future of the pear industry depends to a great extent on the solution of this problem.

PEACH STOCKS.

In this test there were four varieties of peaches—Red May, Elberta, Salwey, and Nicholls's Orange Cling—two of each on five kinds of stocks, viz.:—almond, Myrobalana plum, peach, apricot, and peach almond. Trees on the almond stocks grew well for some years, but the stock-scion union was very imperfect; large callouses developed which gummed excessively; the trees eventually developed dry rot so badly that large limbs broke off through their own weight, and at the time they were removed these trees were almost dead.

On the Myrobalana plum stocks the peach varieties almost without exception failed to grow at all. Stock and scion united, but only grew for a year or so. There was one notable exception in this section, and that was a Salwey peach, which developed on the plum stock equally as well as anything in the test. This tree grew so well that it was rather suspected that it had been planted deeply and had developed its own root system, but this surmise was found to be incorrect when the tree was removed, as plum suckers soon grew from the roots allowed to remain in the soil. This seemed to indicate some peculiar affinity between this particular plum stock and the peach, and to further test this point a number of stocks from suckers sent up by this plant have been raised vegetatively in the nursery.

On the peach stock all varieties grew well. The stock-scion union was perfect, and at the time the trees were removed they were in a sound, healthy condition with no signs of dry rot in the limbs when cut up. The apricot proved a failure as a stock for peaches, and the peach-almond hybrid, though better than the apricot, seemed to have no commercial value as a stock.

It would seem from the tests at Blackwood that the peach makes the best stock for the peach, and that trees worked in this way will have a longer productive life than when worked on other stocks. In some situations, and under certain soil conditions, the almond might prove a good stock, but that would be a matter to determine when planting, in view of soil conditions.

APPLE STOCKS.

These stocks have been tested more in relation to the incidence of bitter pit in the fruits than from the point of view of suitability of the various root stocks. Through the courtesy and generosity of the Fruit Division of the New South Wales Department of Agriculture we have secured a collection of the selections developed at East Malling of apple, cherry, and plum stocks. These comprise 12 trees each of English No. 1, Broadleaf Paradise, Very Dwarfing Jaune de Metz, Paradise No. IX., Semi-dwarfing Doucin No. 11, and Paradise No. 12, 13, 15, and 16; three types of Mazzard cherry stocks, F 1¹, 1² and 1³ and five types of plum stocks, Myrobalana "B," Black Damas "C," Brompton, Pershore, and Common Mussel—180 trees in all.

These have been planted in new land and it is intended from these mother stocks to raise vegetatively sufficient stocks on which to work a number of trees of the principal commercial varieties of the above kinds of fruits. These trees may then be distributed in the various fruitgrowing districts, and their suitability for our conditions thoroughly tested. Similar work is, by mutual arrangement between the different horticultural sections, also being carried out by the other State Departments of Agriculture, and should lead to very interesting and profitable results to the fruitgrowing industry of the Commonwealth.

At Blackwood we started two or three years ago on some preliminary research work in connection with Northern Spy apple and Myrobalana plum stocks. Northern Spy stocks were selected by District Horticultural Instructors from all apple-growing parts of the State and, with the co-operation of the owner, seven types of Myrobalana seedling stocks were selected from large beds of seedlings at Mr. H. N. Wicks's nursery. It is proposed to work up vegetatively numbers of these stocks and test their value with our more important commercial varieties of fruits on the same lines as with the East Malling stocks.

The importance of the root stock in the future well-being of the tree and orchard cannot be over-emphasised, and to obtain the best results it is essential that trees should be worked on the tested and most suitable stocks. It is possible to suit special soil conditions and situations by varying the type of root-stock to influence such characteristics as size of tree, health, vigor, fruitfulness, length of life, and resistance to disease. The stock may even influence the time at which the fruit-producing stage is reached, and even the intensity of color and flavor of the fruit.

MANURE TRIALS.

These were started at Blackwood on 1-year-old trees as far back as 1909, so that they have now been in progress for 24 years. There are three Cleopatra apples, three Glou Morceau pears, and three Elberta peaches in each test. There are 12 tests in all; three being check or control rows, and eight receiving applications of artificial manure and one of stable manure. A buffer or barrier row separates each test. To supply the three essential plant foods—nitrogen, phosphoric acid, and potash—sulphate of ammonia, superphosphate, and sulphate of potash respectively have been used, mostly in combinations in the following quantities per tree where these substances are specified in the schedule:—

Period.	Stable Manure.	Super.	Sulphate of Ammonia.	Sulphate of Potash.	Lime in combination.	Lime alone.
1909-1916...	56lbs.	1lb.	4ozs.	4ozs.	2lbs.	2lbs.
1917-1923...	70lbs.	1½lbs.	5ozs.	5ozs.	2½lbs.	2½lbs.
1924-1929...	1cwt.	2½lbs.	2lbs.	1½lbs.	5lbs.	7lbs.
1930-1933...	1cwt.	3½lbs.	3½lbs.	1½lbs.	5lbs.	7lbs.

The manures have been applied in the spring a few weeks before the buds burst into active growth. Our practice has been to spread it on the surface of the ground, covering an area equal to the spread of the branches, and keeping 2ft. or so from the stem of the tree. Immediately after spreading the manures have been ploughed in to a depth of 4in. to 5in. The data collected for the first few years covered measurements of the annual growth, circumference of the stem 9in. from the soil, and the weight of the crop. For some years, since the trees settled down to bearing, the two latter records only have been taken, but the crop records have been worked out in four grades to indicate the size and quality of the fruit, also its freedom from disease.

DATA RELATIVE TO APPLE TREE MANURE TRIALS—TEN-YEAR PERIOD, 1924-1932.
GOVERNMENT EXPERIMENT ORCHARD, BLACKWOOD.

COMPARATIVE YIELDS PER ACRE IN BUSHELS BETWEEN MANURED AND UNMANURED TREES.
Yield per Acre, 429.8bush., Calculated from the Mean Average Yield per Tree from Nine Unmanured Trees used as a Comparative Basis.

Test No.	Manures Applied.	Mean Average Yield per Tree over a Ten-Year Period in Lbs.	Mean Average Yield per Acre over a Ten-Year Period in Bushels.	Increase in Bushels per Acre over from Unmanured Trees.	Decrease in Bushels per Acre over from Unmanured Trees.	Remarks.
1	No manure	167.15	417.85	—	11.95	Bushels per acre calculated on the basis of 100 trees to the acre and 40lbs. per bushel of apples. All apples included.
2	Super.	154.12	385.3	—	44.5	
3	Super. and lime	169.58	423.95	—	5.85	
4	Super. and sulphate of potash	156.72	391.8	—	38.00	
5	Super., sulphate of potash, and sulphate of ammonia	198.81	497.0	67.2	—	
6	No manure	142.19	355.4	—	74.4	Quantities of manures applied as under:—
7	Lime, super., sulphate of potash, and sulphate of ammonia	253.9	634.75	204.95	—	
8	Lime	195.37	488.4	58.6	—	
9	Sulphate of ammonia and sulphate of potash	173.11	432.77	2.97	—	
10	Super. and sulphate of ammonia ..	224.35	560.87	131.07	—	
11	1cwt. stable manure	181.62	454.05	24.25	—	1923— Super. Potash. Sulph. Lime Alone. 1½lbs. 5ozs. 2½lbs. 2½lbs.
12	No manure	206.42	516.05	86.25	—	1924-29— 2½lbs. 1½lbs. 2lbs. 7lbs.
Average annual yield per acre from unmanured trees over 10-year period = 429.8bush.				1930-32— 3½lbs. 1½lbs. 3½lbs. 5lbs. 7lbs.		
Average annual yield per acre from trees receiving sulphate of ammonia over 10-year period = 531.35bush.						
Increase presumably due to sulphate of ammonia = 101.55bush. per acre. (Calculated from the mean average yield from 12 trees).						

In connection with the apple trials (Table 1), taking the average mean yield per acre from the nine unmanured trees as a comparative basis, it will be seen that super when used alone shows no increase over the unmanured trees, but actually less; and super and lime, though better than super alone, also actually less. When potash is added to super the yield is still decreased. The first increased yield per acre is shown when sulphate of ammonia is added to super and sulphate of potash, and the yield is further increased when lime is added to super, sulphate of ammonia, and sulphate of potash. Lime by itself alone shows an increased yield. When sulphate of potash is added to sulphate of ammonia the yield is considerably decreased in comparison with other tests in which sulphate of ammonia is used. Sulphate of ammonia added to super increased the yield considerably. Stable manure, on the other hand only increased the yield slightly.

Stated briefly, it would seem from the results of the last 10 years manuring at Blackwood that the use of superphosphate alone is uneconomical, that potash unless combined with superphosphate and sulphate of ammonia rather tends to decrease than increase the yield, and that nitrogenous manures when added to superphosphate or superphosphate and potash appear to give increased yields. It is where nitrogen has been applied that any increase in yield is shown, but whether this would be so if nitrogenous manures were used alone is not definitely shown in the Blackwood tests, as phosphoric acid and lime are the only compounds applied alone to separate tests.

In California, for instance, it is found that in any experimental work with nitrogenous fertilisers it is most important to provide adequate supplies of available phosphate and potash, and nitrogenous fertilisers will not produce the best results if the soil is deficient in these or other nutrients. These deductions are drawn purely from the crop data, and may not be altogether reliable for very many reasons. There are two main sources of error in field experiments.

(1) The inherent variation in the material that is dealt with—that is, in the trees themselves—and the variation which is due to outside factors such as soil and soil moisture conditions, and it is a difficult matter to estimate what is known as the “co-efficient of variability” due to these factors. A point to be noted is the effect of the fertilisers on the trees themselves. There are good grounds for believing that if a tree which is satisfactorily constituted makes good, healthy growth that satisfactory yields will result, and so long as the trees can be kept in this condition the results should be satisfactory. Where it is found that the application of fertilisers results in increased vigor in the tree itself it would seem reasonable to assume that crop yield will also improve.

In the tests at Blackwood trees receiving nitrogenous manures are much more vigorous and healthy than others under different treatments. From a study of the crop data it would seem also that nitrogenous manures increase the yield at least in the case of Cleopatras in the “off” year. In the tests to determine the best time to apply manures—autumn or spring—one set of trees receives a dressing in spring and another set in autumn. The test has been running for four years. From the data so far collected neither treatment seems to have any advantage over the other. An American experimenter sums up the position with regard to manuring fruit trees very clearly in the statement that, “Manuring has not made good trees into super trees, but it has made poor trees good, or kept good trees from becoming poor.” As previously mentioned, another comprehensive series of manure trials has been set out in which an attempt has been made to conform to standards now considered indispensable if the results are to have any scientific value.

SPRAYING TESTS.

Many reports have been published in connection with various spraying tests at Blackwood for different pests and diseases. The work in progress at the present time deals more particularly with Codlin Moth and Green Peach Aphis control. Another insect that appeared in great numbers last season, the Apple Leaf Hopper, is being closely watched with a view to control measures being adopted later on if deemed necessary.

Codlin Moth control experiments were started in 1925-26, and have been carried on every year since. Tests have been made to determine:—

- (1) If increased amounts of arsenate of lead would give increased control.
- (2) If the addition of ovicides such as Black Leaf 40 or Lime Sulphur would give more effective control.
- (3) If other substances, such as calcium arsenate, are more effective than arsenate of lead.
- (4) If the use of spreaders make any difference in control.
- (5) If the use of white oils increases efficiency.
- (6) The minimum amounts of white oils and arsenate that might be used without impairing efficiency with a view to reducing arsenical residue and spraying costs.
- (7) The use of other proprietary compounds such as "Destruxol," extract and emulsion, "Pysect," and "Clensel."
- (8) Testing various lures and methods of catching Codlin Moths to ascertain phases in the life history of the pest.
- (9) The use of chemically treated bandages for killing codlin grubs, &c.

All these points have been fully discussed in Departmental Bulletins.

GREEN PEACH APHIS.

Collaborating with Dr. Davidson, of the Waite Institute, the life history of this insect under our climatic conditions was worked out, and numerous sprays tried for its control. At Dr. Davidson's suggestion some years ago a quantity of tar distillate spray was imported from England, and this spray is now looked upon as the most effective winter wash to use against this insect. This season we are trying 10 different winter washes for the control of green aphid. One report on this subject has been published, and later on other reports will follow.

In this address some of the work being done at the Experimental Orchards at Blackwood and Fullarton has been briefly outlined with a view to stimulating interest in this work. The value of scientific research work is often underestimated and undervalued by the average farmer or fruitgrower. One of the outstanding features of modern industrial life has been the ease with which production in the secondary industries can be increased, and this is due to the fact that large, wealthy industrial concerns can employ trained specialists to improve methods of production and eliminate waste, and the increased profits constitute a sufficient reward. The farmer or fruitgrower, however, cannot afford to employ specialists or research workers, and even if he did no pecuniary reward awaits him to compensate him for the time and money devoted to the work. A new manufacturing process is rapidly adopted when discovered, but with farmers or fruitgrowers working as individual units scattered over a very large area ideas travel very slowly, and for these reasons the world over Governments have found it necessary to undertake research work, and also provide for the dissemination of new ideas.

APRICOT PRUNING EXPERIMENT AT LIGHT'S PASS.

[By J. B. HARRIS, Dip. Hort., District Horticultural Instructor.]

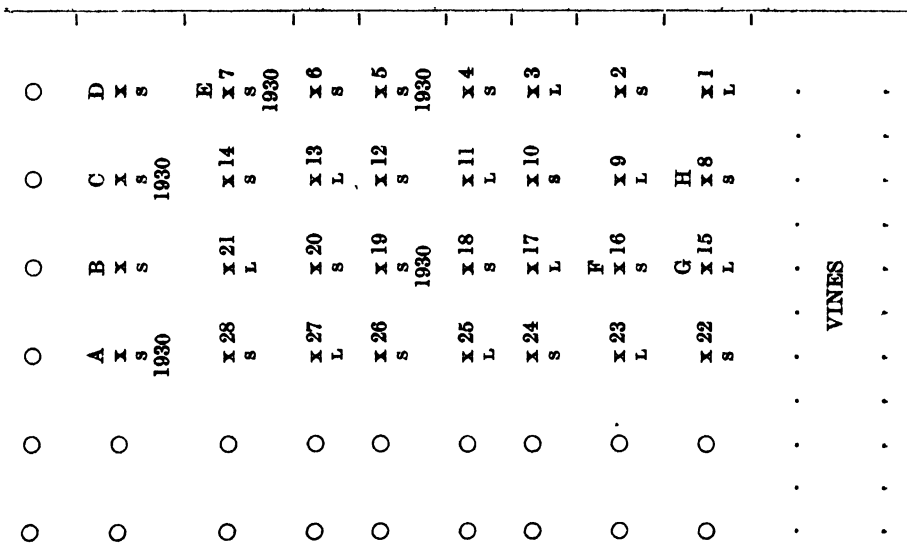
An experiment suggested by the Chief Horticultural Instructor, Mr. Geo. Quinn, to determine the relative values of the long and short leader systems of pruning when applied to Moorpark apricot trees was commenced in the orchard of Mr. P. B. Boehm, at Light's Pass, in August, 1930.

Prior to that date it had been suggested that the disease or physiological disturbance commonly known as "Gummosis," which attracted much attention by its prevalence throughout the district a few years back, might be partly due to a sap congestion in the vicinity of large cuts which are necessitated by the removal of very strong shoots and surplus limbs when the short or hard pruned leader system is followed.

At the time of writing, however, none of the trees have developed Gummosis with the accompanying "die back" as described in *The Journal of Agriculture* for July, 1932, and as it is commonly known in the Barossa district. The only evidence of gum which has so far appeared being a slight exudation of gum in two cases where a larval borer, probably *Maroga gigantella*, had attacked the trees.

Some interesting data, showing comparison of crop harvested and growth of the trees has, however, been recorded, and it is the intention to tabulate here these records, and to publish additional records from time to time, together with any records of gumming which may occur.

The layout of the plot is shown by the accompanying plan (Fig. I.), which also shows a history of the pruning of each tree since the 1930 winter pruning season, when the trees, which were planted in July, 1928, had made two seasons' growth. At the time of planting and during the following winter all the trees were short pruned.



Key to Fig. I.—x Denotes trees under test. ○ Denotes adjacent trees not included in test. ————— Denotes boundary fence. x/s Denotes trees which have been always "short" pruned. x/L Denotes trees which have been

"long" pruned in 1930 and each subsequent season. x/s/1930 Denotes trees which, in accordance with the alternating layout of the trees under test, should have been long pruned. These trees were short pruned in 1930 on account of weak growth, but have been long pruned each subsequent winter.

As six of the trees in the plot as originally set out—all of which were planted as "Moorpark"—have produced evidence by the nature of their growth and fruit that they are not of true Moorpark variety, it has been decided to eliminate them from future records. These trees are marked A, B, C, D, E, F, and include three long pruned and three short pruned trees.

The short leader system of pruning consists of selecting the most suitable growth for the extension of the main or secondary arm—generally this is a shoot from the highest bud, or an adjacent bud, on the leader left last year—and cutting it back to approximately one-third or one-fourth of its entire length. This tends to produce from one to three very strong growths, one or two of which have to

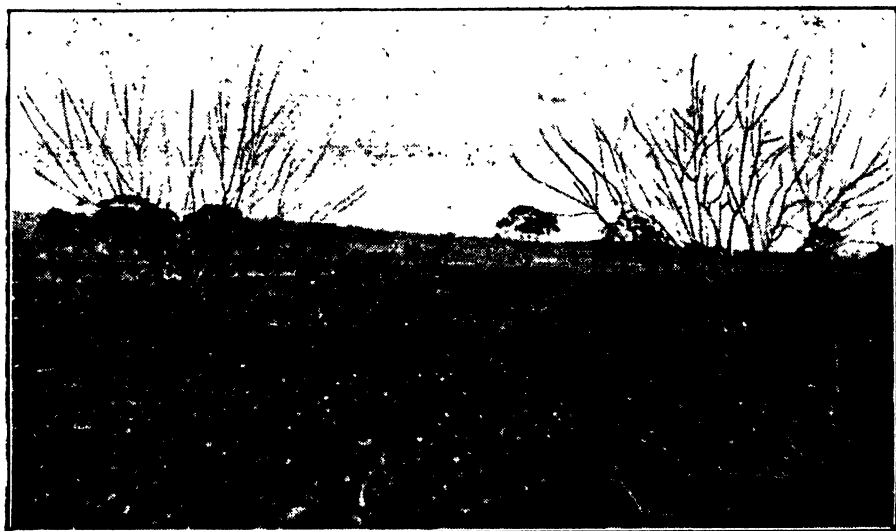


Figure II.—Long and Short Pruned Apricot Trees on Experimental Plot at Mr. B. Boehm's, Light's Pass, showing comparative size before pruning on 1/8/33. Short Pruned on left. Long Pruned on right.

be removed at their base, which involves heavy cutting during the following winter unless they are removed during the summer pruning. In either case the production and subsequent removal of these shoots seems to involve a sacrifice of the productive powers of the tree, a sacrifice which may, perhaps, be advantageously avoided.

The long leader system of pruning consists of leaving the leader unpruned until such time as it has produced a strong shoot from its own median region (i.e., about midway between its tip and its base), which it will readily do if left unpruned. This strong shoot which, in an entirely unpruned tree, would probably take the lead until weakened by another arising from its own median region, may be discerned as an outstanding green shoot about the month of November,



Figure III.—Apricot Tree in "Short Pruned" test, before Pruning on 1/8/33.



Figure IV.—Apricot Tree in "Short Pruned" test, after Pruning on 1/8/33.



Figure V.—Apricot Tree in "Long Pruned" test, before Pruning on 1/8/33.

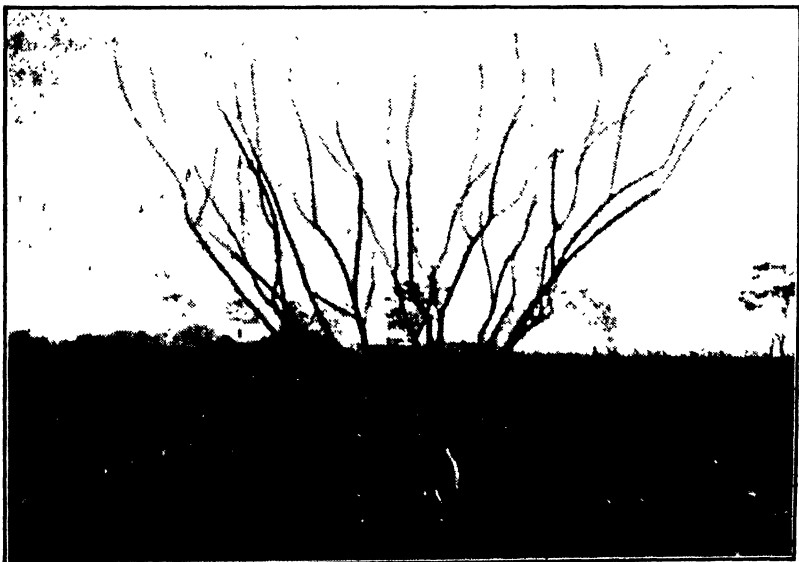


Figure VI.—Apricot Tree in "Long Pruned" test, after Pruning on 1/8/33.

and the original leader may be cut back to the green shoot then, or the cutting back of the original leader may be left until the dormant winter season. In either case the selected leader is not "topped." This method of leader treatment, to which the name "long" pruning is applied, gives rise to a number of spurs along the leader rather than to the production of a few strong shoots as in the case of "short" leader pruning.

Fig. II. shows the comparative size, before pruning, of a "short" and a "long" pruned tree—trees H and G on the plan (Fig. I.)—on August 1st, 1933.

Figs. III. and IV. show the short-pruned tree H both before and after pruning on August 1st, 1933.

Figs. V. and VI. show the long-pruned tree G both before and after pruning on August 1st, 1933.

Crop Records.—The trees commenced bearing in the 1931-32 growing season, but as the crop throughout the district was disastrously affected by frost very little fruit was picked in January, 1932. The amount of fruit then picked was not recorded, but the fact was noted that the few fruits picked were almost all from the ends of leaders on the long-pruned trees. In January, 1933, the crop harvested from 16 long-pruned trees was 311lbs. net, whereas the crop from the short-pruned trees was 105lbs. net. The crop records in this case were supplied by Mr. P. B. Boehm, the owner of the orchard, who personally supervised the harvesting and weighed all the fruit picked.

Growth Measurements.—For the purpose of recording the comparative growth of the trees under the two different systems of pruning the circumference of the trunks at a height of 2in. above ground level was measured on October 5th, 1933, and the following record made. The trees were numbered as shown on the plan, trees A, B, C, D, E, F, being not included in this record:—

Tree No. 1 = 15"; 2 = 11 $\frac{1}{2}$ "; 3 = 16 $\frac{1}{2}$ "; 4 = 13 $\frac{1}{2}$ "; 5 = 12 $\frac{1}{2}$ "; 6 = 13 $\frac{1}{2}$ "; 7 = ";
8 = 14 $\frac{1}{2}$ "; 9 = 17 $\frac{1}{2}$ "; 10 = 14 $\frac{1}{2}$ "; 11 = 17"; 12 = 13 $\frac{1}{2}$ "; 13 = 15"; 14 = 13 $\frac{1}{2}$ "; 15 =
15 $\frac{1}{2}$ "; 16 = "; 17 = 16 $\frac{1}{2}$ "; 18 = 13 $\frac{1}{2}$ "; 19 = 11 $\frac{1}{2}$ "; 20 = 13 $\frac{1}{2}$ "; 21 = 13 $\frac{1}{2}$ "; 22 = 15 $\frac{1}{2}$ ";
23 = 16 $\frac{1}{2}$ "; 24 = 14 $\frac{1}{2}$ "; 25 = 16 $\frac{1}{2}$ "; 26 = 17"; 27 = 15 $\frac{1}{2}$ "; 28 = 13 $\frac{1}{2}$ ";

Thus the average girth of all trees under test is 14.673in.

The average girth of long-pruned trees is 15.288in.

The average girth of short-pruned trees is 14.057in.

As an indication that the disparity in averages is not due to single individual large or small trees it can readily be calculated that there are among the 13 long-pruned trees 10 trees above the girth average of the whole plot, whereas among the 13 short-pruned trees there are 10 trees below the girth average of the whole plot.

It has been said by some observers of the long leader system of pruning that it induces more abundant cropping during the early life of the trees at the expense of the crops of later years; how far this is so is a matter for extended trial, which may possibly lead to some modification of the system in later years. It should also be noted that the system is most applicable to young, vigorous trees.



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THE AGRICULTURAL FEATURES OF *PHALARIS TUBEROSA* AND ALLIED FORMS.

[By H. C. TRUMBLE, M.Agr.Sc. (Agronomist, Waite Agricultural Research Institute).]

A. INTRODUCTION.

The species of the *Phalaris* group, commonly known as the canary grasses, are for the most part adapted to climatic conditions of the Mediterranean type. A notable exception is *P. arundinacea* L. which inhabits the northern temperate regions. The remaining forms of agricultural importance are found chiefly in the Mediterranean zone, Chili, and in California, where conditions of winter rainfall and summer drought prevail.

According to the *Index Kewensis* 26 species of the genus *Phalaris* have been recorded. There is none indigenous to the Cape Province of South Africa or to Southern Australia, where the climatic conditions are similar to those of Mediterranean countries, and suitable for the development of *Phalaris* species.

Only two species have been cultivated extensively in the Northern Hemisphere. The annual canary grass (*P. canariensis* L.) has been grown for several centuries in Mediterranean countries for its grain, the destiny of which provides an ornithological label for the group. The perennial reed canary grass (*P. arundinacea*) has proved a valuable hay and pasture species on wet soils in both Europe and North America. The genus has attracted attention in Southern Australia because *P. tuberosa* L., a closely related form, has proved a suitable basis for pasture improvement over a comparatively extended area.

A total of eight *Phalaris* species has been grown and studied at the Waite Institute. Of these *P. tuberosa* has been outstanding, but *P. coerulescens* Desf. has given promising results in trials of a preliminary nature. Both forms are winter-growing perennials from the Mediterranean region. The remaining perennial species, *P. arundinacea*, is unsuited to the climatic conditions at Adelaide, owing to the summer incidence of its growth. The remaining five species—*P. canariensis*, *P. minor* Retz., *P. paradoxa* L., *P. Lemmoni* Vasey. and *P. angusta* Nees.—are suited to the climatic conditions of the South Australian wheat belt, but are not sufficiently permanent under grazing to justify their use as pasture plants. *P. angusta* appears to be adapted to swampy or sub-swampy areas of a saline nature.

The tribe Phalarideae contains in addition to the *Phalaris* group the *Ehrharta* species (veldt grasses) of South Africa and *Microlaena stipoides* (Labill.) R.Br. (weeping grass) of Southern Australia. All three genera inhabit regions with temperate winters and dry summers where seeded pastures are as yet comparatively rare. An agriculturally important characteristic of the tribe is the readiness with which the single mature floret falls from the spikelet, resulting in shedding of the "seeds" at maturity.

B. HISTORICAL.

(a) *Use of Phalaris arundinacea in temperate countries.*

P. arundinacea was apparently first investigated in Sweden, where Hesselgreen (1) reported on its palatability to ruminants and to horses in 1749. There is evidence that this species was in general use as a fodder plant in Southern Sweden at the time. It has apparently been cultivated to a limited extent in Western Europe for a century, and in North America for 50 years. In the United States an expansion in the acreage of this grass has been recently observed (2).

The agricultural characters of *P. arundinacea* and the results of agronomic trials with this species have been described by Schoth (2), and more recently by Wilkins and Hughes (3). These publications are of interest because many of the results obtained with *P. arundinacea* agree closely with South Australian experience of *P. tuberosa*. The most striking points of agreement are as follows: (1) the susceptibility of the seedlings to competition from weeds and other grasses; (2) the longevity of the established stands; (3) their comparative freedom from intrusive weeds, diseases, or insect attack; (4) the importance of cutting before flowering to obtain good quality hay, and (5) the readiness with which the mature seeds fall. In both species commercial seed frequently possesses a low rate of germination, due chiefly to harvesting at an immature stage in order to avoid shattering.

The essential differences between the two grasses under the conditions at the Waite Institute are as follows:—(1) The two species differ in the incidence of their seasonal development; (2) the seeds of *P. arundinacea* are small (560,000 per pound), germination and establishment are slow; whereas the seeds of *P. tuberosa* are larger (about 300,000 per pound), and the germination and establishment of this species are more vigorous; (3) the foliage of *P. arundinacea* tends to be rather fibrous compared with that of *P. tuberosa*, which is finer, denser, and more succulent. Both species are capable of hay yields comparable to those obtainable with winter cereals. Seed production in each grass varies from 30lbs. to 150lbs. per acre.

The reason given by American workers for the limited cultivation of *P. arundinacea* is the readiness with which the seed shatters as it ripens, rendering harvesting difficult and the seed costly. The seed of *P. tuberosa* has been comparatively expensive for the same reason. Selection for non-shattering and high seed producing types of *P. arundinacea* is in progress in the United States (2).

(b) *Phalaris arundinacea* in South Australia.

Phalaris arundinacea, whilst not adapted to South Australian conditions generally, has displayed a high degree of vigor and permanence in small trials on the irrigated swamps of the Murray River (4). At the Waite Institute, individual plants persist as perennials despite the dry summer conditions, but are low in productivity. The importance of this species in Southern Australia lies in its obviously close relationship to *P. tuberosa*. Jenkin has recently shown (5) that the two species may readily be inter-crossed, and the cross has also been effected at the Waite Institute. Jenkin carried his hybrids to the fourth generation, and produced fertile segregants of agronomic value. The evident close relationship between the two forms suggests interesting possibilities in the breeding of hybrid forms, particularly for irrigated areas.

(c) *Early history of Phalaris tuberosa* in Australia.

The development of *P. arundinacea* in temperate countries, although limited, has been clear cut and positive. On the other hand, the use of *P. tuberosa* has been attended by confusion, and the origin of the grass as developed in Australia is wrapped in obscurity. Since the recognition of its agricultural value at Toowoomba, Queensland, towards the end of the last century, many conflicting reports and views concerning its history have appeared.

The Mediterranean form of *P. tuberosa* (previously known as *P. nodosa* and *P. bulbosa*) was described by Linnaeus in 1771. Representatives of this type were collected by the writer in Morocco and in Palestine during 1928, and have been found to differ from the Australian types in agricultural features, being considerably earlier in flowering, taller, coarser, more stemmy, less robust, and less densely tillered. The spikelet and general botanical characters, however, are essentially the same, although the appendage of the first sterile floret—a feature

of the Mediterranean types—is frequently absent in material of Australian origin. The Mediterranean forms of both *P. tuberosa* and *P. coerulescens* appear to have been regarded as too coarse to be of value as pasture plants.

The types of *Phalaris tuberosa* now grown in Australia, or material capable of giving rise to these types, was apparently introduced into Queensland in 1884. A packet of seeds labelled *Phalaris commutata*—a name which has since been abandoned by taxonomists—was obtained, together with samples of various other grasses, from the United States Department of Agriculture. The original sample of *Phalaris* was apparently collected in Italy and grown for some years at New York before being sent to Toowoomba. The grasses received from America were sown in the nursery of the Toowoomba Botanical Gardens, but “the frost killed all . . . except *Phalaris commutata*.” The ground was required for other purposes, and the grass was removed and deposited on a rubbish heap, after which it was apparently forgotten until a vigorous development was observed several years later. Seed from these plants was subsequently distributed from Toowoomba to the various States of the Commonwealth, to South Africa, to California, and even to Italy.

Whether the agriculturally valuable types of *Phalaris tuberosa* now in use are to be found in Mediterranean countries, or whether these were produced from the imported material by selection, mutation, or hybridization during the years following introduction can only be determined by plant exploration in the Mediterranean region itself together with controlled hybridization experiments. That the Australian types have been derived by the hybridization of less valuable forms or species has been suggested by Ewart (6) and by Kennedy (7). The theory was rejected fairly recently by Allan and Zotov (8) on the basis of lack of evidence to support it, but Jenkin (5) still more recently contends that the theory of hybrid origin is not unreasonable, and suggests hybridization between *P. arundinacea* and the Mediterranean *P. tuberosa* followed by back-crossing to the latter as the mode. The author, whilst agreeing that the theory of hybrid origin is not unreasonable, does not support Jenkin's suggestion regarding the mode on the following grounds:—

Firstly, the hybrid forms produced by Jenkin and illustrated in Plates Ib, IIa, and IIc of his paper (5) are by no means identical with the majority of forms included in a comprehensive collection of Australian types grown at the Waite Institute. In particular, the lobed inflorescence depicted in Plate IIc is unlike the typically spike-like, non-lobed panicle which characterises Australian material; in fact Plate IIg, which depicts Jenkin's *P. tuberosa* parental type is remarkably similar in its shape and non-lobed character to the most typical forms of the Waite Institute collection. Jenkin's parental *P. tuberosa* was obtained from Messrs. Vilmorin-Andrieux et Cie., of Paris, under the name “*Phalaris (nodosa vel bulbosa)*, Toowoomba Canary Grass,” and this, according to Messrs. Vilmorin “came from a sowing made in 1904.” As this was the very year in which publicity was given to the Australian *Phalaris* and the names “*nodosa vel bulbosa*” and “Toowoomba” have been used by Messrs. Vilmorin, it is not entirely unlikely that Jenkin's seed was originally obtained from Australia. The material personally collected by the writer from the Mediterranean does not correspond in all respects with the Vilmorin material, and the hybrid types of Jenkin are of a character intermediate between *P. arundinacea* and the Australian forms rather than identical with the latter.

Secondly, there are evident affinities between the annual *P. minor* and the perennial *P. tuberosa*, and much confusion between the two species has occurred in Australia in the past. Both these species and *P. arundinacea* possess 28 somatic chromosomes and 14 bivalents in the heterophytic metaphase.*

**P. minor*—F. S. Oldham, unpublished data, Waite Institute, 1932.

Sufficient evidence has been accumulated at the Waite Institute to indicate natural hybridism between *P. minor* and one or other of the perennial forms, and hand crosses between *P. arundinacea* and *P. minor* have been readily effected during the past season. Pending further evidence from the progeny of these and other hybrids, the role of hybridism in the evolution of Australian *P. tuberosa* must still remain hypothetical, and the question an open one.

Thirdly, whereas the theory of hybrid origin is attractive, there is still the evident possibility that the Australian forms are variants or ecotypes isolated from populations of *P. tuberosa* occurring naturally in the Mediterranean region.

(d) *Conflicting taxonomic views.*

A crucial point in the differentiation of *Phalaris* species has been the nature of the sterile florets at the base of the single fertile floret within each spikelet. In the annual *P. minor* the first sterile floret consists of a minute scale without an inner appendage, whereas the second sterile floret possesses a conspicuous appendage within the scale. In the Mediterranean specimens of *P. tuberosa** and in many of the Australian specimens, both scales contain an appendage. The Australian types, however, vary considerably in this character, and the appendage of the first sterile floret may be well developed, minute, or entirely absent as in *P. minor*. Lack of appreciation of this fact has resulted in much confusion taxonomically.

Thus Hackel, the noted European agrostologist, described the grass as a new species, *P. stenoptera* Hack., owing chiefly to the absence of this appendage in material sent to him by Ewart; whereas Kennedy, whilst accepting the name *P. stenoptera*, found that the appendage was present in his material, and explained the discrepancy on the supposition that Ewart had sent seeds of *P. minor* and the vegetative parts of *P. tuberosa* to Hackel. With this explanation Allan and Zotov, in their survey of the taxonomic position based partly on work by Hubbard, agree. The explanation is entirely incorrect, however. Sterile florets similar to those of *P. minor* do occur on perfectly normal plants of *P. tuberosa*, and in fact some promising agricultural strains of this species produce "seeds" of this type. Individual plants of *P. tuberosa* moreover yield progeny which show a range of second sterile florets varying from appendage absent to appendage well developed. This character, therefore, cannot be used as a means of species differentiation, and Ewart's specimens were probably authentic, and not mixed as was suggested by Kennedy.

It remains to explain the occurrence of seeds with *P. minor* characteristics on typical *P. tuberosa* plants, and this must await further investigation. The following information is suggestive, however.

Seeds of the original material grown at Toowoomba and supplied by the Curator, Mr. R. R. Harding, to Dr. Kennedy showed first sterile florets with appendage well developed, minute, and absent. The same condition was apparently found in specimens subsequently grown at Davis, California.

Of two specimens forwarded to Mr. Bailey at the Brisbane Gardens one proved to be *P. arundinacea* and the other *P. tuberosa*.

Commercial seeds of *Phalaris* have been notoriously mixed for many years; this has led to confusion and a restricted use of the grass.

Seeds of *P. arundinacea* from Southern France have produced plants of both *P. arundinacea* and *P. tuberosa*.

Hybrid forms have occurred in the Waite Institute collection, which have given rise to both perennial and annual types.

* Very limited material of *P. tuberosa* has so far been obtained from Mediterranean sources direct.

Simple contamination or mixing of *Phalaris* seeds has probably occurred fairly frequently, being facilitated by the resemblance between the inflorescences of the various forms and the readiness with which the mature seeds shatter. The definite cases of hybridism and segregation which have occurred, however, indicate that the three types—*P. arundinacea*, *P. tuberosa*, and *P. minor*—will inter-cross, and cytological evidence supports this view.

(e) *History of Phalaris tuberosa in Southern Australia.*

The history of *P. tuberosa* in Southern Australia appears now to be fairly well defined. It first came under notice in the Southern States in November, 1904, when an extract of a report by the Curator of the Toowoomba Gardens, drawing attention to the agricultural possibilities of the grass, was published in the *Garden and Field* of November 19th of that year (9). Portions of this extract referred to the importation of "*Phalaris commutata*" in 1884, its persistence as sole survivor of frosty conditions, its removal to a rubbish heap, and its subsequent spread to various parts of the nursery. It was noted that "During the 1893 flood the roots were in a bog for six weeks, and the only difference it made was the foliage was slightly yellow, but kept growing all the time."

The report concluded with a recommendation that "a plot of ground be prepared outside the nursery, convenient to public view, and that this grass be planted for the purpose of distribution, and that publicity be given that plants can be obtained at the gardens."

This apparently is the earliest authentic record of the grass so far as Southern Australia is concerned, and was the first occasion on which *P. tuberosa*, or *P. commutata* as it was then called, came under the notice of the agricultural community in this State. It appears that various people wrote for the seed, which was sown in South Australia for the first time in 1905.

The grass received much publicity during the next few years, and samples of the seed were sold at prices ranging from 5s. to £1 per ounce. There is evidence that numerous small plots were sown more than 20 years ago in different parts of South Australia, Victoria, and New South Wales. In South Australia the majority of these are persisting at the present time in the winter rainfall belt, receiving over 17in. of rain per annum.

Extensive areas of *Phalaris tuberosa* have been established by relatively few growers, however. In South Australia until very recently only one farmer, Mr. G. K. G. Warren, of Springfield, Williamstown, possessed more than a few acres of the grass. Mr. Warren's father, the late Mr. William Warren, sowed half an ounce of the seed during the early years of its introduction, and following a high degree of success, collected seed first by hand, then by scything, a tarpaulin being dragged along to catch the falling sheaves and the readily shedding seed. By gradually extending the area under the grass, approximately 100 acres were ultimately established, and this until 1930 comprised the only appreciable area of the grass on any one farm within the State. During the last three years, however, following the successful establishment of five acres by Mr. L. J. Cook at the Government Experimental Farm, Kybybolite, and successful trials carried out in various parts of the State by the Department of Agriculture and by the Waite Institute, the area sown with this grass has been considerably extended.

In Victoria, Mr. Alan F. Wilson established 16 acres in 1919, and with seed from this stand gradually extended the area until at the present time approximately 100 acres have been established.

In New South Wales the grass has been grown to a greater extent than in the southern States, particularly in the tablelands districts where it is valued for its winter development and resistance to summer drought. Several growers have

submitted seed samples to the Waite Institute per favor of the Agrostologist, Mr. J. N. Whittet, and these have been grown during the past two seasons. Little difference in regional type was evident, but all samples gave rise to typical variants of *P. tuberosa*.

The drought-resistance, autumn development, and adaptability to grazing conditions of *Phalaris tuberosa* became apparent at the Waite Institute during the progress of early trials carried out in 1925, 1926, and 1927, when this grass was known as *Phalaris bulbosa* L. In 1928, and again in 1929, areas of 1—4 acres were sown with seed bought commercially as *P. bulbosa* (= *P. tuberosa*), which, however, proved to be the annual species *P. minor*. This experience had been gained as early as 1909 by G. T. Griggs, of Meadows (S.A.).

In 1929 the general position in South Australia was hopeless. From seedsmen at the time nearly half the samples obtained were pure *P. minor* or mixtures of *P. tuberosa* with *P. minor*. It was found impossible to identify with absolute certainty every seed of either species, as the characters normally employed, such as color, shape, pubescence, and the presence or absence of the appendage to the first sterile floret were found to be so inconstant, particularly in *P. tuberosa*, that certain identification from seed characters alone was not in all cases possible.

The only thoroughly reliable character has been the pink root tip character (10) for *P. minor*. This is positive for *P. minor* or its F1 hybrids. So far, in over 300 samples tested, no pink root tips have been observed on true non-segregating *P. tuberosa* types, nor have any seeds giving rise to white tips produced true breeding *P. minor*.

The pink root tip character has enabled elimination of *P. minor* to be readily effected, and during the last three years, 1930-32, a definite expansion in the use of the grass in South Australia has been made possible by the location and use of reliable sources of truly perennial and persistent types of *P. tuberosa*.

C. THE ROLE OF *PHALARIS TUBEROSA* IN THE DEVELOPMENT OF PASTURES IN SOUTHERN AUSTRALIA.

(a) *Environmental factors and objectives.*

The climatic conditions under which the pasture investigations of the Waite Institute have been carried out are representative of an extensive region in Southern Australia. The environmental conditions of this region are described in separate publications (11, 4); the principal differences between this type of environment and that characteristic of temperate regions such as Western Europe, New Zealand, and South-Eastern Australia are the more arid summers and more favorable winters of the former. Owing to the failure of European pasture plants such as cocksfoot, white clover, red clover, and English types of perennial rye-grass in this environment, other species have been sought. The search for suitable pasture types has been conducted with the following essentials in view:—

1. Persistence under comparatively arid summer conditions.
2. A capacity for adjustment to widely varying soil types.
3. Persistence and stability under grazing and varying conditions of management.
4. A capacity for high production under grazing and over a sustained period of the year.
5. Aggressiveness and ability to compete with naturalised plants.

(b) *Phalaris tuberosa* as a suitable perennial grass type.

Trials carried out under widely varying soil and climatic conditions and reported on elsewhere (4) have indicated that the Hawke's Bay (New Zealand) type of perennial rye-grass, *Phalaris tuberosa*, Wimmera rye-grass and subterranean clover form a suitable basis of pasture types for the region under review. In these trials *Phalaris tuberosa* has been the only species to persist vegetatively at all centres. Under conditions of high soil fertility and effective summer rainfall, perennial rye-grass of the Hawke's Bay or reliable Western District type has proved more productive under grazing than *Phalaris tuberosa* during the first three seasons of the pasture, but the latter species is more drought-resistant and more resistant generally to adverse climatic conditions and declining soil fertility.

In comparison with the two annual species, subterranean clover and Wimmera rye-grass, the annual period of production of both *P. tuberosa* and perennial rye-grass is considerably wider and the stability of the pasture greater.

The particular advantages of *Phalaris tuberosa* lie in its drought-resistance, permanence and stability when established, its adaptability to varying soil types—provided that the subsoil is reasonably deep and retentive of moisture—and its adaptability to varying conditions of management, ranging from rotational grazing to pure hay.

(c) *Reasons for the restricted use of Phalaris tuberosa during previous years.*

In view of the advantages given above, it becomes pertinent to ask why, during the fifty years since its initial introduction into Australia or the thirty years since its first popularization, the grass has not been more widely used.

The readiness with which the seeds shed at maturity, and the poor capacity for spreading on non-cultivated land, have both seriously restricted the use of *P. tuberosa*. There is evidence that in South Australia, where the conditions are well suited to its development, the grass was becoming popular shortly before the war, and the intervention of the war period 1914-18 probably acted as a check on its development, especially from the point of view of the younger and more enterprising generation. During the post-war period the unfortunate confusion between *P. tuberosa* and the annual *P. minor* has led to a general lack of appreciation of the qualities of the perennial species. Perhaps the most important and most fundamental of the several inhibitory factors, however, has been the little realised fact that *P. tuberosa* is highly sensitive to competition, particularly from the rye-grasses, during the year of establishment. Many failures with this species have been due to its inclusion in mixtures containing comparatively large quantities per acre of rye-grass. Investigations at the Waite Institute have recently shown that in order to obtain a vigorous development of *Phalaris tuberosa* in the first season it is necessary to eliminate from the mixture or greatly restrict the seeding of rye-grass, which forms the basis of most pasture mixtures.

Additional agents of suppression are vigorous weeds such as Cape dandelion (*Cryptostemma calandulacea*), barley grass (*Hordeum murinum*), wild oats (*Avena fatua*), and soursob (*Oxalis cernua*). The presence of these plants in poorly prepared or weedy ground effectively inhibits the establishment of *Phalaris tuberosa*. Where these have been eliminated by careful soil preparation the expense involved in establishing the pasture has usually been appreciable, and the invariable inclusion of rye-grass in the mixture is readily understandable. Owing to the high price of *Phalaris* seed (until recently 5s. 6d. to 7s. 6d. per lb.), its frequent low viability and unproven claims, it is perfectly natural and rational that perennial rye-grass or Wimmera rye-grass should be included as a safeguard, if not as the chosen basis of the pasture.

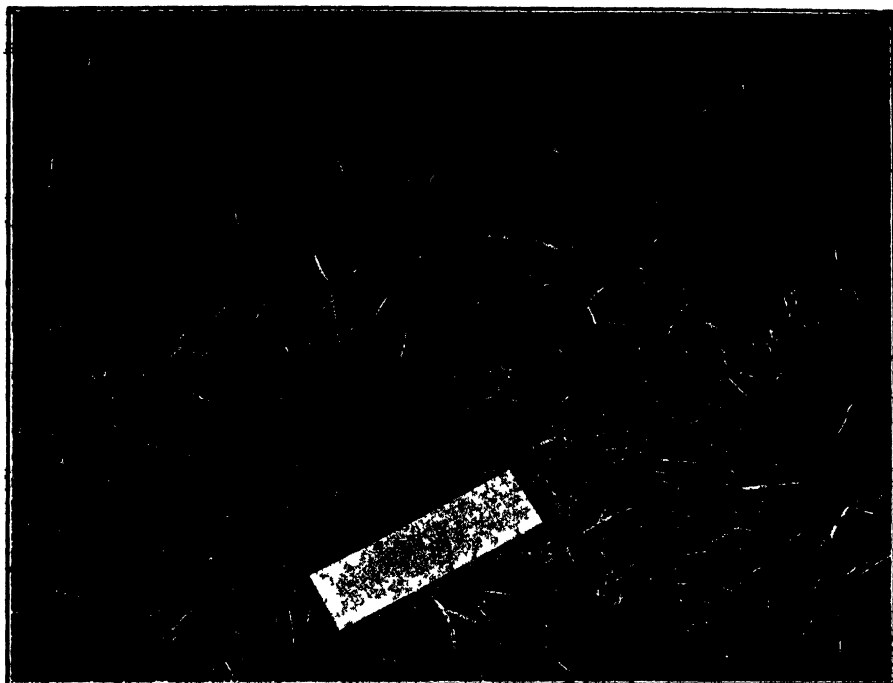


Figure 1.—Pasture sown May, 1931, with *Phalaris* 50 per cent., rye-grass 50 per cent. Herbage, 1931, contained *Phalaris* 7 per cent., rye-grass 93 per cent. Herbage, 1932, contained *Phalaris* 35 per cent., and rye-grass 65 per cent.



Figure 2.—Pasture sown May, 1931, with *Phalaris* 75 per cent., rye-grass 25 per cent. Herbage, 1931, contained *Phalaris* 21 per cent., rye-grass 79 per cent. Herbage, 1932, contained *Phalaris* 65 per cent. and rye-grass 35 per cent.

The competitive effect of perennial rye-grass is shown in Figs. 1, 2, and 3. It is shown by Cashmore (12) that differences in the structure of the root systems of the two species help to explain the depressing influence of the rye-grass.

D. THE AGRICULTURAL FEATURES OF *PHALARIS TUBEROSA*.

(a) Seed germination.

The seed germination of commercial samples is usually between 40 and 70 per cent., and rarely much above 70 per cent. Quite frequently the viability is below 40 per cent., but the seed in these cases is probably several years old, or has been harvested in an immature condition. Samples picked by hand at the Waite Institute invariably give a viability of 90 to 100 per cent., whereas samples harvested by a field implement such as the binder or stripper give lower values. These, and the low values of commercial samples generally, appear to be due to the presence of immature seed unavoidably harvested owing to its readily shattering nature.

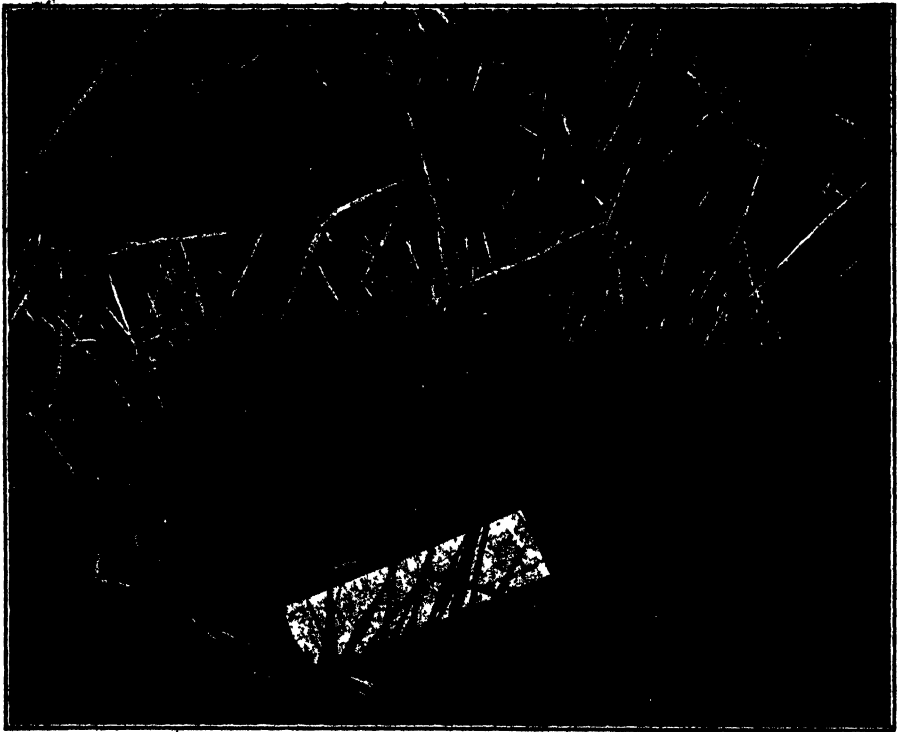


Figure 3.—Pasture sown May, 1931, with *Phalaris* 100 per cent.

Figures 1-3.—Development of three swards at the Waite Institute during August, 1932. Each was sown in May, 1931, with the same number of viable seeds per plot (approximately 16 lbs. total seed per acre), but with varying proportions of *Phalaris tuberosa* and perennial rye-grass.

The optimum range of temperature for the germination of *P. tuberosa* seeds is 15 to 25°C. Alternating temperatures are apparently not necessary. Higher figures are usually obtained in sand or soil than on filter paper, due to the fact that the "seeds" are rather flat or lens-shaped, and tend to be enveloped in a film of water, which excludes air, when the seeds are placed on filter paper. This is particularly true of poorly filled grains. By using sieved sand at 60-70 per

cent. moisture saturation and maintained at 15-25°C. the maximum germination percentage is attained. This renders the detection of pink tips (*P. minor*) difficult, however, and in routine tests conducted at the Waite Institute the samples are germinated both in sand and on filter paper.

The results of an investigation in which seed samples of varying origin were tested on filter paper as against sand are given in the following table:—

TABLE I.—*Showing the Viability of Representative Seed Samples of Phalaris tuberosa from Varying Sources, (1) Germinated on Filter Paper, (2) Sown in Sand.*

Sample.	Details.	Year grown	Percentage Germination.					
			Filter Paper.		Sand.		Relative value obtainable on Filter Paper with Sand at 100.	
			7 days.	21 days.	7 days.	21 days.	7 days.	21 days.
Gb 81-1 ...	Waite Institute, hand picked	1931	83	93	93	95	90	98
Gb 91	Commercial seed	1930	41	54	50	57	82	96
Gb 122 ...	A. F. Wilson (Vic.), commercial seed	1930	23	45	48	53	48	77
Gb 124	Waite Institute field sample A	1931	72	90	88	94	82	96
Gb 125 ...	Waite Institute field sample B	1931	21	48	74	84	28	57
Gb 127 ...	A. F. Wilson, hand picked, green	1931	6	13	26	30	24	43
Gb 129 ...	A. F. Wilson, hand picked, almost mature	1931	14	22	27	32	52	68
Gb 132 ...	A. F. Wilson, mature, machine threshed	1931	23	36	44	48	53	74
Gb 133 ...	A. F. Wilson, mature, hand picked	1931	38	59	90	94	43	63
Gb 140 ...	A. F. Wilson, commercial bulk seed	1931	38	54	61	66	63	81
Gb 256 ...	Glen Innes, N.S.W., hand picked	1931	54	67	80	85	67	78
Gb 296 ...	N.S.W. certified seed	1932	53	67	72	74	74	91
	Mean		39	54	63	68	62	79

Odds that mean germination percentage in sand is significantly greater than that on filter paper:—At 7 days, 9999 : 1; at 21 days, 1110 : 1.

The effect of temperature on the germination of *P. tuberosa* was investigated by means of a multiple temperature incubator of fourteen compartments. The mean temperature of each compartment for the period of the test is given in Table II. The fluctuation in temperature was slight; the maximum amplitude was 2.0°C., but in most cases the total fluctuation of any compartment was less than 1.5°C., or 0.75°C. from the mean. Petri dishes 9cm. in diameter were each provided with 50 gms. of sterilised quartz sand of 1mm. diameter or less, maintained at 70 per cent. of its water-holding capacity. Each test consisted of duplicate lots of 100 seeds, and an incubation period of 21 days was allowed.

The following table summarises the results obtained:—

TABLE II.—*Showing Percentage Germination of Phalaris tuberosa at 7 and 21 Days, and Number of Days Taken to Reach 40 per cent. and 90 per cent. Viability.*

Mean temperature °C.	4.0	7.5	12.0	13.5	14.5	16.5	17.0	18.5	21.5	23.5	25.5	27.5	31.5	33.0
PERCENTAGE VIABILITY.														
7 days.....	—	—	1	25	77	96	90	92	92	90	89	85	18	—
21 days.....	—	60	91	95	97	98	94	93	93	92	90	67	20	—
DAYS TO REACH 40 PER CENT. AND 90 PER CENT. VIABILITY.														
40 per cent.	—	21	11	8	7	5	5	4	4	3	3	3	—	—
90 per cent.	—	—	17	11	8	7	7	5	5	5	8	—	—	—

After-ripening is frequently necessary with *P. tuberosa* seed, particularly when grown in cool moist habitats, or harvested in an unusually cool moist summer. Seed harvested from a Victorian locality during the 1930-31 season and again during the 1932-33 season gave, when germinated at the Waite Institute some weeks after harvest, unusually low germination percentages. During the subsequent storage period, however, the samples gradually improved in viability. The germination figures for the two samples are given in Table III.

TABLE III.—*Showing Improvement of Certain Samples of Phalaris tuberosa after Harvest.*

PERCENTAGE VIABILITY AFTER 21 DAYS' INCUBATION AT VARYING DATES.							
Sample.	Date of Harvest.	Feb. 24th, 1931.	Mar. 12th, 1931.	April 17th, 1931.	Jan. 23rd, 1932.	Feb. 10th, 1933.	Mar. 31st, 1933.
Gb 91	Jan., 1931	15	30	61	57	—	—
Gb 276	Jan., 1933	—	—	—	—	30	—
Gb 290*	Jan., 1933	—	—	—	—	—	57

* Gb 290 represented seed of Gb 276 dried off in the sun.

After-ripening is apparently necessary only where the seed has developed under relatively cool moist conditions, and may be hastened by exposing to warm, dry conditions after harvest.

The evidence concerning germination indicates that satisfactory germination may be attained over a fairly wide range of temperature—10 to 28°C. (50 to 80°F.)—with an optimum temperature in the neighborhood of 20°C. (68°F.). The seeds are sensitive to unfavorable conditions of excess moisture or inadequate aeration, as evidenced by filter paper results, and unsatisfactory germination occurs in water-logged soil or where the seeds are not sown fairly close to the surface. In practice the seeds should be thoroughly covered but not to a greater depth than $\frac{1}{2}$ in. on loamy or heavy soils, and not deeper than $\frac{1}{4}$ in. on sandy soils. Harvested samples may be low in viability, due to harvesting as little as two or three days before the optimum stage, and after-ripening may be necessary in the case of seeds which have developed under cool moist conditions. After-ripening does not occur in seeds harvested in a green condition, however, but is only effected in fully developed and apparently mature seeds.

(b) Establishment and Seedling Development.

The seedling development of *P. tuberosa* is vigorous compared with that of perennial grasses such as cocksfoot, *Danthonia*, Yorkshire fog, and perennial veldt grass, but it is only half as vigorous as that of perennial rye-grass (12), which in turn is considerably less active in establishment than Wimmera rye-grass.

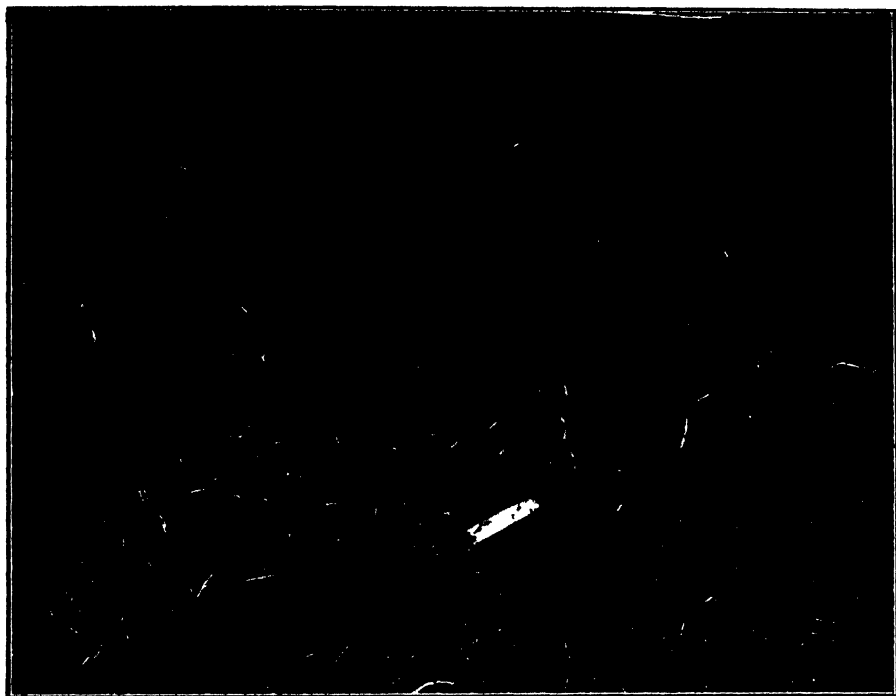


Figure 4.—Development of *Phalaris tuberosa* at Gepp's Cross on May 10th, 1932.
Sown as a pure sward on June 4th, 1931.



Figure 5.—Development of *Phalaris tuberosa* and Dwalganup early subterranean clover
at Gepp's Cross on May 10th, 1932. Sown as a mixture on June 4th, 1931.

The sensitiveness of *P. tuberosa* to competition has been established by the work of Trumble and Davies (4). To their evidence must now be added the data of Cashmore (12), which show that the inclusion in the seeds mixture of only 8lbs. or 12lbs. per acre of perennial rye-grass tends to suppress very effectively the establishment of *P. tuberosa* and to reduce its yield during the first and second seasons to negligible quantities. Furthermore, as little as 4lbs. per acre of perennial rye-grass sown with 12lbs. per acre of *P. tuberosa* depressed the yield of the latter by 75 per cent.

The nature of the depressing influence of rye-grass on *P. tuberosa* during the year of establishment is at present under investigation. Whilst the structure of the root system is of evident importance in permitting greater physiological activity on the part of the rye-grass in the surface layers of soil, the roles of (1) competition for nutrients and (2) depression arising from the root respiration of the rye-grass have not yet been fully investigated.

From the practical point of view it is essential that seedlings of rye-grass or cereal cover crops be eliminated or employed with great caution in the establishment of *P. tuberosa*. Moreover, weed competition should be reduced as much as possible. On the other hand, the presence of a suitable legume, such as subterranean clover, in the higher rainfall country bordering the wheat belt, early subterranean clover in the cereal areas, and white clover under irrigation is desirable and definitely advantageous to the grass, even on soils of moderate to high fertility. Evidence of the value of early subterranean clover at Gepp's Cross (South Australia) on a rainfall of 18in. is shown in Figs. 4, 5, and 6. Detailed evidence of the value of legumes in association with permanent grasses is given in a separate publication (4).

(c) *Seeds rates and methods of establishment.*

Owing to the relatively small size of *P. tuberosa* seeds (approximately 300,000 per lb.) heavy seed rates are not usually required. Even if the germination is as low as 30 per cent., each pound of seed will contain 90,000 viable seeds, or sufficient to provide two viable seeds per square foot of soil. With seed of good viability, there are generally 220,000 viable seeds per lb., or sufficient to supply five viable seeds per square foot. The establishment rate under reasonably favorable conditions and in the absence of competition is usually about 40 per cent., so that theoretically 1lb. of seed per acre is capable of providing 1-2 plants per square foot, according to viability. On fertile soils 4 vigorous seedlings per square foot appear to be ample, indicating seeding rates of 2-4lbs. per acre. On poor sandy soils 1-2lbs. per acre or even less, when established with subterranean clover, may be found satisfactory provided good seed is employed and sown effectively, with due regard to tilth and depth of seeding.

Adverting to the work of Cashmore cited above, a seeds rate of 16lbs. per acre produced 22.2 seedlings per square foot during the first season. After the succeeding summer period, and at the commencement of the second winter these had thinned out to 3.0 plants per square foot, but provided a sward of 100 per cent. ground cover (*vide* Fig. 3) during the second winter. There appears to be no necessity for high mortality, which here occurred to the extent of 87 per cent., because in a collection of 25,000 single plants of true *P. tuberosa* set out 2 to 3 links apart at the Waite Institute, no single death has occurred during the past three years. The mortality found in dense seedlings is probably due to inter-plant competition for water, nutrients, soil, oxygen, and light. With sparse seedlings in the absence of competition from other plants and under suitable environmental conditions, mortality is low to negligible. Sparse seedlings, moreover, permit a higher degree of individual plant vigor—a desirable feature under conditions of summer

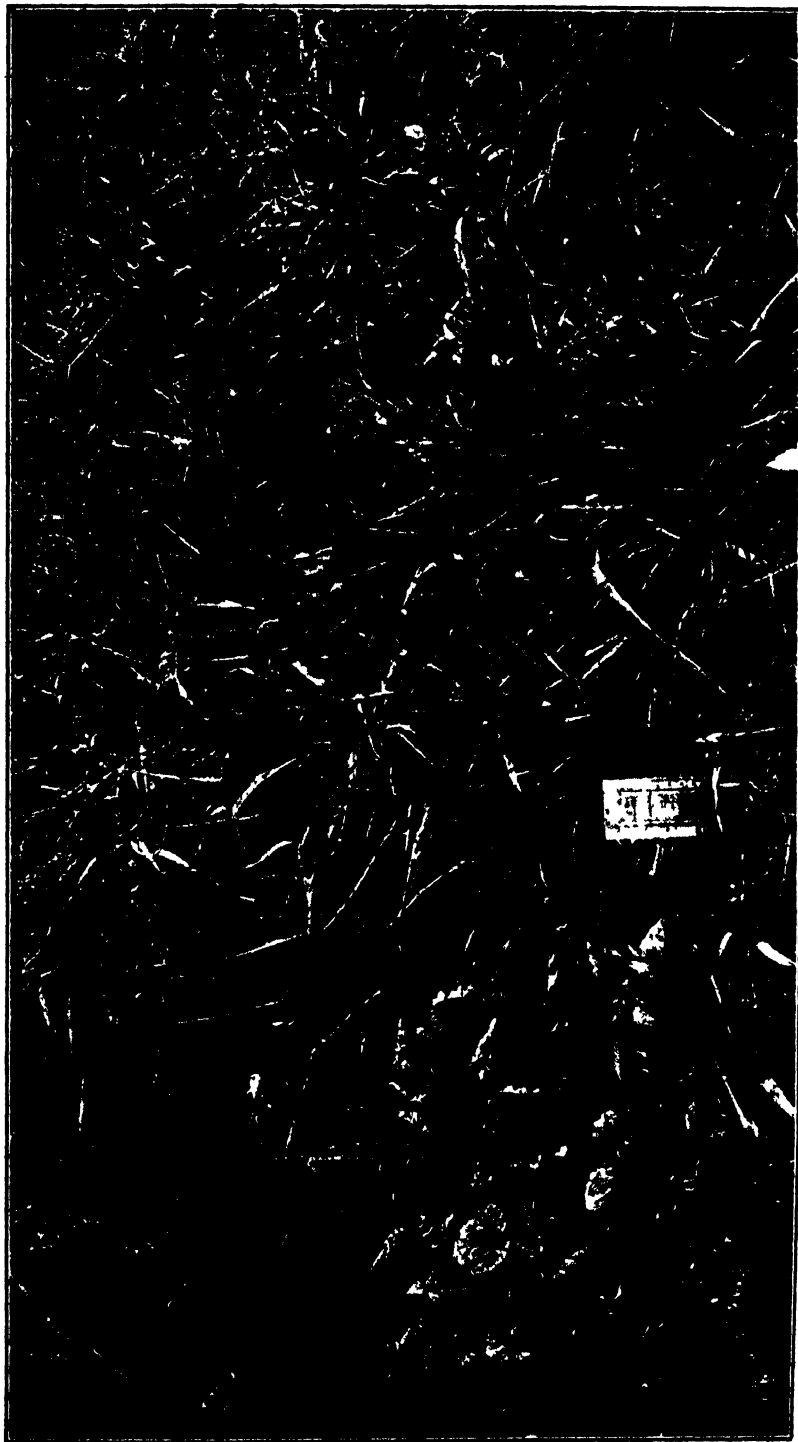


Figure 6.—The effect of early subterranean clover on the development of *Phalaris tuberosa*, along the edge of an adjoining plot of the latter on July 24th, 1933. The plots were established on June 4th, 1931.

drought. All of this points to seeds rates considerably lower than those employed in temperate countries, and lower than the rates until recently thought to be necessary in South Australia. Their adoption in the case of *P. tuberosa* presupposes the absence of competition from weeds or other grasses, and is made possible by the comparatively favorable temperatures of autumn and early winter in Southern Australia, and by the capacity of single plants of *P. tuberosa* to attain an ultimate diameter of several feet by means of sub-aerial rhizome development.

P. tuberosa seed may be effectively established by mixing with superphosphate immediately before sowing and applying to the soil surface by means of a drill or fertiliser distributor. It is preferable not to sow the seed in drill rows. The seed should be allowed to drop on to a well-prepared surface of a slightly cloddy nature, or ridge-rolled. Light brush harrowing with a chain, wire-netting, or boughs is usually sufficient to cover the seed, which must not be buried deeply. Seeding should be carried out as early as possible after the break of weather in autumn.

A method commonly employed at the Waite Institute is to sow the seeds at the rate of 150 per square foot or 1oz. to 14 square yards in seed boxes or nursery beds in March-April, six to eight weeks before the break of weather. An ounce of seed, sown and watered carefully, will provide sufficient seedlings to plant an acre if the seedlings are planted at 2ft. x 2ft. intervals. The method enables vigorous plants to be obtained during the first year, and planting may be deferred until well into the winter if difficulties are experienced in preparing the land. It also permits planting under water-logged conditions, and in subterranean clover land if desired. The cost of seed per acre in this case is negligible, but the cost of planting is a serious item. There is probably some scope for this method on small, intensively cultivated areas, particularly where *P. tuberosa* is being subjected to preliminary trial, and where small capital rather than lack of labor restricts the utilisation of the grass. Planting with root cuttings is effective but tedious.

Whether the grass is sown or hand-planted, a suitable strain of subterranean clover should be sown with the *Phalaris* at the rate of approximately 4lbs. per acre, if pasture legumes do not already occupy the land.

(d) Productivity and persistence.

Total production in the seeding year is usually low, and infrequently exceeds 10cwts. per acre of hay. Two or three intermittent grazings of short duration are advantageous in restricting competition from annual plants which tend to dominate the pasture during the spring. Grazing during the first year should be adopted solely in the interests of the developing *Phalaris* plants, as these are established with a view to occupation for many years. Grazing should not be commenced until the seedlings possess at least three tillers per plant, usually about 10 weeks after seeding, and a reliable guide in stocking is to maintain a cover of grass approximately 2in. to 4in. in height. Neither hard grazing nor allowing the pasture to get away is desirable during the first year, but the latter is not injurious if weeds or associate grasses are absent.

In the second year the plants are thoroughly established and capable of withstanding comparatively heavy grazing. The first 12 months after seeding comprise the critical period of the pasture. Plants which survive this period are usually permanent. Under systematic stocking, pastures of *P. tuberosa* and subterranean clover under favorable conditions have been found capable of maintaining relatively large numbers of livestock—upwards of four sheep per acre. Alternatively yields of 2 tons to 4 tons per acre of good quality hay are obtainable. Compared with other pasture plants, *P. tuberosa* is most prominent during the autumn and winter

months. Its development at the Waite Institute is more evenly distributed over the year than any other species except *Danthonia*. At Adelaide the grass is dormant from early January to the end of March, but in more favored areas the period of dormancy is shorter.

One of the most characteristic features of *P. tuberosa* is its drought-resistance. A second feature of importance is its capacity to persist on soils of widely varying fertility, including poor sandy types, provided the subsoil conditions are suitable. On the poorer types its yield is low so long as the fertility remains low, but its persistence enables it to take immediate advantage of increases in soil fertility resulting from the development of annual clovers, such as subterranean clover, growing in association with it. In trials conducted by the Waite Institute at various centres in South Australia, *P. tuberosa* has been the only species to persist throughout a period of four seasons. These trials have been carried out under rainfall conditions varying from 18in. to 32in. and on widely varying soil types, including the very poor podsolised types found at Kybybolite, Mount Compass, and Inman Valley. The evidence that the majority of plots established prior to 1914 are still persisting indicates a high degree of longevity. Many of these plots are unproductive owing to poor soil fertility or the absence of management, but the plants established so long ago have persisted under adverse climatic conditions, including the drought of 1914, and this evidence provides much justification for the selection of the grass as a basis with subterranean clover for pasture development under certain conditions in South Australia. Of particular interest is a small patch of *P. tuberosa* established on sandy "heath" country on the property of Mr. T. P. Bell, Tintinara, approximately 20 years ago. The soil type is considered too poor for pasture grasses generally, but supports evening primrose, and the rainfall conditions, 18in. per annum, are not sufficiently favorable for ordinary subterranean clover. The *Phalaris* plants have been continuously grazed by rabbits, but are still persisting, though their yield is low. It has also become established among uncleared heath scrub near by.

(e) Management.

The cardinal features of first-year management are (1) reduction of competition by thorough soil preparation and intermittent grazing in late winter; (2) the provision of superphosphate, 1½cwt. to 2cwts. per acre, and a suitable associate legume, such as commercial or Dwalganup early subterranean clover, 4lbs. per acre; (3) sowing before mid-winter, with due regard to the provision of surface conditions suitable for germination (*vide* p. 414); and (4) the use of good, viable seed of true perennial *P. tuberosa* at a seed rate of 1lb. to 4lbs. per acre.

Faulty management during the year of establishment may result in total failure or permanent injury to the stand.

Management during the second and subsequent seasons presupposes the maintenance of fertility by annual dressings of superphosphate and reasonable clover development.

The relative values of varying forms of grazing management have yet to be worked out in practice, but the results of Richardson, Trumble, and Shapter (13) and of Cashmore (12) in this connection are very significant.

In the former paper it was suggested as a result of pot culture experiments that a system of three defoliations per annum could be expected to give better results from the point of view of productivity maintenance than more frequent defoliations. In these tests, however, cuts were made systematically at regular intervals, and where five cuts were imposed, herbage was removed during the spring-early summer period—a critical time in relation to drought-resistance and autumn regeneration.

More recent investigation carried out under field conditions by Cashmore has confirmed in general the conclusions derived from the pot culture experiments, but has further shown that *P. tuberosa* is particularly sensitive to defoliation during the spring and early summer. At this time there is a marked downward movement, of nutrients (13) which probably assist in the development of the root system during the later stages of growth and facilitate autumn regeneration. The downward movement of reserves is indicated by obvious enlargement of the basal internodes towards the end of September, several weeks before panicle exertion (heading) at Adelaide, and continues till the end of December when the plants mature. It is thus evident that defoliation between the middle or end of September and the middle or end of December is bound to restrict downward movement, thereby limiting the accumulation of reserves, and *per se* both drought-resistance and vigor of autumn regeneration. The practical outcome would therefore seem to be as follows:—(1) Grazing, preferably on an intermittent basis from autumn to spring (mid-September at the Waite Institute); (2) complete spelling from mid-spring to early or mid-summer; (3) the utilization of the final development—(a) as hay, cut at the heading or flowering stage, (b) for seed production, or (c) as mature standing herbage in the manner usually followed with “natural” pastures. Actually this procedure would fit in very conveniently with “natural” pastures of an annual character, which are invariably under-grazed during the flush period in spring, and over-grazed during the autumn period of shortage. The utilisation of *P. tuberosa* as an adjunct to natural pastures would be of particular value in supplementing the supply of feed during the late autumn and winter, and in providing hay or mature herbage superior in quality to much of the herbage produced by natural pastures. Thus the spelling of *P. tuberosa* in spring and early summer is not only readily possible owing to the abundance of natural feed at that time, but would actually prove an advantage in enabling more effective use to be made of the natural pastures, tending to lessen the wastage caused by the development of large quantities of inedible seeds and fibre.

(f) *Seed production.*

The seed production of *P. tuberosa*, whilst considerably less than that of the rye-grasses grown under similar conditions, is of a moderate order, and not poor as is popularly supposed. The reputation the grass has for low seed production is probably derived largely from its readily shedding character and uneven ripening. The yield of seed per plant is usually from 2 to 5 per cent. of the total weight, compared with 10 to 30 per cent. in the rye-grasses, but it is rare to obtain more than 100lbs. of seed per acre in practice owing to harvesting difficulties.

Capacity for seed production varies with the strain, and early flowering types are the heaviest yielders in this respect. The species is normally cross-pollinated, and it is significant that the types which flower early tend towards the erect, stemmy growth form, and the later maturing plants to a leafier, denser type, low in seed production. It has been possible, however, to isolate desirable leafy types which flower sufficiently early to permit satisfactory seed production at the Waite Institute.

Harvesting operations are beset with many difficulties, and there is room for skill and originality in avoiding loss by shedding. Two alternative methods are available:—(1) Cutting with the binder, followed by stooking and threshing; and (2) removal of the heads by means of a stripper or header harvester. Whatever method is used, modifications of the ordinary cereal machines are necessary.

The principal advantage that the binder offers is an opportunity of obtaining the maximum yield of seed. The crop should be cut when the seeds of the upper portion of the inflorescence are mature and commencing to drop. Seeds are liable to be threshed on to the canvas of the binder and deposited on the ground; hence a detachable trough placed below the rear roller of the lower canvas is advisable to retain this seed, which is usually the heaviest. Moreover, the sheaves lose

appreciable quantities of seed when ejected from the machine to the ground, and a sheaf carrier is necessary to avoid this second source of loss. At the Waite Institute, the sheaves are laid out spoke-wise on tarpaulins made from secondhand cornsacks*, and when cured are carted to a stationary stripper, power-driven, the mature inflorescences only being passed through the machine. The principal disadvantages of the binder method are the number of handlings required and consequent loss of expediency, and the liability to garner the seeds of weeds or other plants growing in association.

The combined harvester offers the most expeditious method, and this is of paramount importance in taking off appreciable areas. Furthermore, as *P. tuberosa* is generally taller than associate plants such as *Lolium* species, *Festuca myuros*, and docks (*Rumex* spp.) any implement which harvests only the heads tends to collect a clean sample. On the other hand, this method appears to yield rather less seed per acre, and unless care is taken to harvest at exactly the right stage a large proportion of green seed may be collected, resulting in low viability of the sample.

In order to secure a comparison of the seed yields obtainable using the above two methods, an acre of *P. tuberosa* at the Waite Institute was subdivided on the ABBA system into 12 plots each 1/25th acre, with "buffer" plots to allow tracks to be cut by the machines. The six "A" plots were cut with the binder at the stage described above, and the sheaves were subjected to the operations already discussed. The six "B" plots were stripped when all but the lower spikelets of the inflorescence had matured. Owing to favorable weather conditions, including an absence of hot dry weather and severe winds, comparatively little seed had shed before stripping was commenced. During the stripping process, however, appreciable quantities of seed were lost. Although the area was fed off with sheep until early September, the crop at harvest was rather more than 5ft. in height. The machine employed was a standard stripper with a maximum comb lift of 3ft. 6in. Had it been possible to raise this comb to the leafless portion immediately below the inflorescence, much choking of the machine could have been avoided and less seed lost. On the other hand the weather conditions were exceptionally favorable for the retention of seed by the inflorescences, and considerably more seed might have been lost prior to stripping.

The seed in all cases was cleaned by sieving and the use of a small blower with controlled draught. This produced an excellent sample. The results of the test, in terms of the yield of seed per acre, percentage viability and number of seeds per pound are given in the following table:—

TABLE IV.—Showing Yield of seed (Lbs. per Acre), Percentage Viability, and Number of Seeds per Pound when Harvested by (a) Cutting and Threshing, (b) Stripping.

Method of Harvesting.	Yield of Seed. (Lbs. per Acre).	Mean Viability.		Mean No. of Seeds per lb.				Wght. per Bush. (lbs.) July, 1933.
				Total.		Viable.		
		Feb., 1933.	July, 1933.	Feb., 1933.	July, 1933.	Feb., 1933.	July, 1933.	
(a) Cutting and threshing	119.73	63.9	78.7	388,017	353,822	247,943	278,458	43.6
(b) Stripping	92.37	67.3	79.0	341,304	327,746	229,698	258,919	50.4

Odds that the mean yield of seed obtained by cutting and threshing is significantly greater than that obtained by stripping—38.7 : 1.

*This method was suggested by Mr. Alan F. Wilson, of Beaconsfield, Victoria.

The yield of seed and number of seeds per pound were significantly greater in the case of the "cut and threshed" series, which produced 27.36lbs. per acre and 46,713 seeds per pound more than the "stripped" series. There was, however, no significant difference in the percentage viability of the two types of seed. It is of interest to note the improvement in viability of both lots between February and July, providing a further illustration of after-ripening in this species.

The total yield of grass was approximately 2 tons per acre. In addition to this yield the acre had carried 100 sheep for 10 days during the autumn and winter months.

E. CHARACTERS RELATING TO THE DROUGHT RESISTANCE AND PRODUCTIVITY OF *PHALARIS TUBEROSA*.

(a) *Function of the root system and basal internodes.*

The seedling plant of *P. tuberosa* produces relatively few main roots which, however, rapidly penetrate the soil to an appreciable depth. At the Waite Institute, first year penetration through a heavy subsoil clay has reached a vertical distance of 76in. (12). The roots whilst small in number are poorly branched, and sparsely occupy the surface soil during the year of establishment. This permits the free entry of weeds, and also accounts for the suppressing effect of perennial rye-grass, which tends to occupy effectively the surface layers of soil.

The basal internodes beneath the soil surface are prominent morphologically, and, together with the root system, provide a means of storage for food material which is used by the plant for the production of herbage in the following autumn. In terms of dry weight the root system was found to comprise 30 per cent. and the basal internodes 20 per cent. of the plant (13); thus approximately 50 per cent. of the total dry weight of the plant may be underground. Of the total nitrogen and phosphoric acid present in the plant at maturity, 57 per cent. of both nutrients was present in the underground portion. More nitrogen was present in the roots than in the basal internodes, whereas more phosphoric acid was contained in the basal internodes than in the root system.

Autumn regeneration takes place entirely from the basal nodes of the underground portion of the stems, which bear external buds, three or four to each tiller. The development of both stem buds and root buds during the autumn following establishment is vigorous, enabling the plants to occupy the ground effectively at an early stage under favorable conditions for growth. The established sward is of a dense turf-like nature, and when vigorous is highly resistant to the entry of annual weeds.

(b) *Water requirement and drought-resistance.*

The transpiration of *P. tuberosa* is, as Maximov has shown in many plants of a drought-enduring character, comparatively active. Expressed as the transpiration ratio the water requirement appears to be higher than that of the cereals and of Wimmera rye-grass, and slightly higher than that of perennial rye-grass.

The transpiration ratio for *P. tuberosa* was determined at the Waite Institute during 1925, 1931 and 1932. In each of these three seasons Cape barley was grown under similar conditions, and a comparison of the two plants is given in the following table.

TABLE V.—*Showing Transpiration Ratios for Barley and P. tuberosa, Waite Institute, 1925, 1931, 1932.*

	1925.	1931.	1932.
Cape barley	269	233	312
<i>Phalaris tuberosa</i>	529	527	602
<i>Phalaris tuberosa</i> with barley at 100 .	196	225	193

It would thus appear that the water requirement of *P. tuberosa* is comparatively high in relation to that of cereals; for each unit of dry matter produced *P. tuberosa* transpires approximately twice as much water as barley. It is evident therefore that the drought-resistance of this grass cannot be associated with water economy.

An important feature of *P. tuberosa* is its capacity to enter a condition resembling anabiosis, or suspended animation prior to the onset of dry conditions. In addition, the root system has been found to extend materially in penetration (12) and to increase in dry weight (13) after the flowering stage, although there is little increase in the stem development during the final period. Associated with these features is the close coincidence of the plant's life cycle with the periodicity of the Mediterranean type of climate.

The advantages of deep root penetration are threefold, enabling the nutrients of a large area of soil to be exploited, additional moisture to be gained, and more favorable temperature relations to be secured. Evidence from the Waite Institute soil temperature records shows that the temperature of the top inch of soil may vary from 32°F. to 130°F. in the Adelaide district. On the other hand, the amplitude at 2ft. is only 34°F., with a mean annual temperature of 65°F. Records obtained by Smith (14) at Davis, California, indicated similar temperature changes at 2ft. and in the surface layers, and showed that at 6ft. the mean annual temperature was also 65°F., the maximum annual amplitude 18°F., and the lag compared with surface temperatures 8 weeks. This lag indicates that when the surface soil is under extremes of temperature the subsoil at 6ft. is fairly close to the optimum for growth.

It is of interest to note that the main roots, particularly in the upper soil layers, develop a woolly covering and a corky inner cylinder, which completely insulate them from loss of water to the surface soil, which becomes hot and dry during the summer months.

Contact between the root system and the relatively cool moist layers of the deeper soil strata is apparently essential for summer persistence. If the roots are cut at 6in. below the soil surface—an operation which was performed at the Waite Institute during the 1931-32 summer—the plants fail to survive. If the entire root system is exposed to normal summer atmospheric conditions, the plants also succumb. A series of 88 single potted plants of *P. tuberosa* were treated in 11 different ways during the 1932-33 summer, using eight replications per treatment. Thirty-two plants were washed out at maturity, and the root system freed from soil. The plants were immediately stored in tins in four places, (1) in a cool store at 33-35°F., (2) in a basement at 64-72°F., (3) in a room at 58-74°F., and (4) in a glasshouse at 45-110°F. When replanted in the following autumn all plants were found to be dead. Similarly, plants allowed to remain in pots under the above four temperature conditions, with the soil just dry enough to prevent growth, failed to live throughout the summer. Finally, 24 pots were provided with artificial subsoils by removing the bottoms of the earthenware pots and allowing the roots to penetrate a quantity of ordinary soil at a favorable moisture saturation, and placed in an 8in. enamelled pot of 7 Kg. capacity. A layer of gravel 1in. in thickness was placed between the "subsoil" of the enamelled pot, and the soil of the bottomless earthenware pot, and the roots were allowed to penetrate the "subsoil" eight weeks before maturity. Pots of this series were placed under three of the various temperature conditions, none being placed in cool storage. In all cases, however, the plants died, being incapable of regeneration in the following autumn.

It appears evident that some factor in addition to moisture and temperature enters into the process of summer dormancy in *P. tuberosa*, and an explanation may be found in the oxygen relations of the root system. Provided that the plant

is in a growing condition, oxygen is necessary for root respiration. When the whole of the stem and the upper portion of the root system is in a condition of complete dormancy, however, anabiosis of the protoplasmic growing points in the deep subsoil layers can probably only be induced by a high partial pressure of carbon dioxide or by reduced oxygen supply leading to a suppression of activity. In the "subsoil" series described above, favorable conditions of aeration in the small quantity of soil used may have been responsible for the complete mortality recorded.

The nature of the subsoil would therefore appear to be of paramount importance in determining the drought-resistance of *P. tuberosa*, particularly in regard to moisture retentivity, temperature, and the exclusion of the air.

(c) *Chemical composition.*

The chemical composition of *P. tuberosa* at varying stages of growth and under different frequencies of cutting has been worked out in detail by Richardson, Trumble and Shapter (13).

The main feature is the wide variation in composition with the stage of growth of the plant. During the early vegetative stages the herbage is particularly rich in protein and minerals, but after panicle exertion the percentages of protein and minerals fall rapidly, resulting in mature herbage of comparatively low feeding value.

There is actually less nitrogen and phosphoric acid in the herbage at maturity than at an earlier growth stage. No loss of nitrogen and phosphoric acid is sustained by the plant system as a whole; downward migration to the underground portion of the plant accounts for the loss sustained by the herbage.

With respect to potash, however, a substantial and absolute loss was found to occur from all portions of the plant during the final stage of growth. This loss, which represented 27.8 per cent. of the total intake, must be regarded as a migration of potash from the plant to the soil, and may be due to diffusion from the root system at the stage when physiological activity ceases.

Under varying cutting treatments it was found that the yields of herbage, basal internodes, and roots were considerably reduced by increasing the number of cuts. Cutting five times reduced the yield of herbage by 54 per cent. and the root system by 78 per cent.

The yields of protein and phosphoric acid in the herbage were increased, however, by each treatment involving more than one cut. The maximum yield of protein, three times that of the single cut series, was obtained under five cuts; the maximum yield of phosphoric acid, 63 per cent. greater than that of the control, under two cuts.

The water requirement per unit of dry matter was not significantly different under frequent cutting from that of the single cut series, but the water required per unit of nitrogen and/or phosphoric acid was greatly reduced by increasing the number of cuts. The practical application of this, in areas of low and uncertain rainfall, is obvious, but the lessened vigor and drought-resistance of the plant arising from too frequent defoliation, particularly in the spring, must be recognised.

(d) *The relation of management to productivity, drought-resistance, and persistence.*

In the light of the evidence discussed above, effective management in the case of *P. tuberosa* would appear to be governed by a suitable compromise between intermittent grazing, aiming to produce nutrients at low water cost on the one hand, and spelling to enable sufficient root development and food storage to occur before summer on the other. A system of autumn and winter grazing, followed

by resting in late spring and early summer, such as has been already suggested (p. 414), would provide such a compromise. It is important to note that in the case of a hay cut carried out at the heading stage to ensure hay of high quality, this must be obtained to some extent at the expense of early development in the following autumn. The requirements of particular cases will determine which is most important, but it is probable that the maximum hay yield (in terms of nutrients) and the maximum autumn development cannot both be obtained under the same system of management. To ensure maximum autumn development the herbage should be allowed to dry out entirely.

At the Waite Institute the method of management adopted has been to conduct three to four grazings at intervals of approximately seven weeks between April and September, and to spell the pasture from the middle of September onwards. If hay is taken, this is cut in early November, and a fairly long stubble is left. Harvesting for seed production is carried out at the end of December, whereas if the herbage is grazed as dry feed during the summer and autumn, stock are allowed access towards the end of January.

The persistence of the grass is affected adversely by injudicious management and a decline in soil fertility, due to insufficient top-dressing with superphosphate and the absence of pasture legumes. On the other hand, the range of adaptability to both varying management and varying soil fertility is extremely wide.

Where *P. tuberosa* has been established for many years it is liable to become sod-bound as in the case of *Paspalum dilatatum*, a summer-growing grass of similar growth-form in the vegetative condition. This is due, however, as in the case of *Paspalum*, to an excess of carbohydrate reserves in relation to nitrogen, and can readily be avoided by mechanical renovation, the application of nitrogenous fertilisers accompanied by rotational grazing or by due regard to the development of associate legumes.

F. SOME AGRICULTURAL FEATURES OF *PHALARIS CANARIENSIS*, *P. MINOR*, AND *P. COERULESCENS*.

The cultivated canary grass (*P. canariensis*) has become more prominent in recent years than formerly owing to an increase in the price of imported canary seed following an increased tariff on this commodity. Canary grass may be grown over much of the wheat belt in Southern Australia, and is adapted to the methods of cultivation employed for wheat and barley. The seeds are considerably larger than those of *P. tuberosa* or *P. minor*—60,000 per pound as compared with 300,000 per pound. Twenty pounds per acre is a satisfactory seeding rate, and the yields usually obtained vary from 10bush. to 15bush. per acre. The weight of a bushel is approximately 60lbs. The seeds shed readily, but not so readily as those of *P. tuberosa* and *P. minor*. Care must be exercised in harvesting, however. The grass is of little value apart from its seed production, and is useless for pasture development.

Wild canary grass (*P. minor*) is the most widespread species of *Phalaris* in the cultivated areas of South Australia, and is found throughout the wheat belt. When grown on fertile soils under conditions of cultivation this species is capable of producing high yields of succulent herbage. *P. minor* is similar in seasonal yield and persistence to Wimmera rye-grass, but the herbage is of a more succulent nature. With Wimmera rye-grass available this species is unnecessary, and in view of the confusion it has caused and is liable to cause with *P. tuberosa*, it must be regarded as an undesirable species.

P. coerulescens is a grass with several attractive characteristics. Like *P. tuberosa* it is perennial and highly drought resistant. The growth-form is more erect, and the tillering capacity per plant is poorer, but the leaves are finer and rather more leathery in texture. Flowering and maturity are considerably earlier than in *P. tuberosa*. The water requirement is, moreover, appreciably less. It appears to be sensitive to competition, as in the case of other *Phalaris* species. Although not as productive as *P. tuberosa*, *P. coerulescens* is worthy of further trial, particularly under conditions too arid for *P. tuberosa*.

A comparison of the development and water requirement of the two perennial winter-growing species of *Phalaris* was made in pot cultures during the 1932 season. The seeds of both species were sown in boxes on April 1st, and three seedlings were planted per pot on July 13th, 1932. The plants were carried through to maturity, and the technique employed was the same as that commonly used at the Waite Institute.

The results of this investigation are shown in the following table:—

TABLE VI.—Showing the Comparative Development and Water Requirement of *Phalaris coerulescens* and *P. tuberosa* under Similar Conditions in Pot Cultures, Waite Institute, 1932.

	Date of Flowering.	Date of Maturity.	Transpiration (Kg.).	Dry Matter Production (gm.).			Transp. Ratio.
				Herbage.	Basal Internodes.	Root System.	
<i>P. coerulescens</i>	Nov. 1	Dec. 8	69.93	86.82	59.18	24.43	479
<i>P. tuberosa</i>	Nov. 22	Dec. 27	89.23	120.09	28.22	45.99	602

The flowering of each species was about three weeks later than occurred in the field owing to glasshouse conditions.

The earlier maturity of *P. coerulescens*, which closely coincides with that of the two annuals, *P. canariensis* and *P. minor*, is illustrated by these results. The quantity of herbage produced and the dry weight of the root system were both appreciably lower in *P. coerulescens* than in *P. tuberosa*. On the other hand, the development of the basal internodes was considerably greater in the former. The basal internodes, particularly the lowest, become conspicuously swollen as early as the seedling stage in *P. coerulescens*, and provide a useful means for the identification of this species in the vegetative state. The water requirement is significantly lower in *P. coerulescens*, probably as a result of its earlier maturity. Further investigation of this species is warranted.

The major taxonomic differences of these species are described by Allan and Zotov (8) and by Gardner and Meadly (15). It is not proposed to enter further into the taxonomic discussion here. Comparatively little data concerning their identification from vegetative characters has been given, however, and the following information may prove of value:—

All species of *Phalaris* appear to possess colored sap, which shows as a purple or pinkish exudation when the young shoots are cut across near the base with a sharp knife. This characteristic has not been found in any group other than the *Phalaris* genus. The leaves are usually quite glabrous, bluish green, and the leaf shoot is rolled in the bud. The principal vegetative features on which identification may be effected are included in Table VII.

TABLE VII.—Showing the Principal Vegetative and Growth Characters of Selected *Phalaris* Species.

	<i>P.</i> <i>arundinacea.</i>	<i>P.</i> <i>tuberosa.</i>	<i>P.</i> <i>coerulescens.</i>	<i>P.</i> <i>minor.</i>	<i>P.</i> <i>canariensis.</i>
Habit	Rhizomic perennial	Soboliferous or shortly rhizomic perennial	Erect soboliferous perennial	Divaricate annual	Erect annual
Incidence of growth ..	Summer	Winter	Winter	Winter	Winter
Vegetative characters—					
(a) ligule	Short	Long	Extremely long	Long	Appreciable to long
(b) ribs of leaf blade	Acute, in pairs	Almost absent	Acute	Broadly convex	Acute
(c) tillering	External	External	External	Internal	Internal
(d) basal internodes	Normal	Swollen, oval	Swollen, rounded	Normal	Normal
(e) stem and sheath colorations	Green	Green	Purple	Purple	Green
Approximate date of flowering at Adelaide	*	Early Nov.	Early Oct.	Early Oct.	Early Oct.
Seed production	Poor	Moderate	Poor to moderate	Liberal	High
Time taken for germination to commence at 20° C. (days)	4	3	1½ to 2	2½	2

* Many samples of *P. arundinacea* do not flower at Adelaide. During the 1931 and 1932 seasons a few plants have flowered in late November and in December.

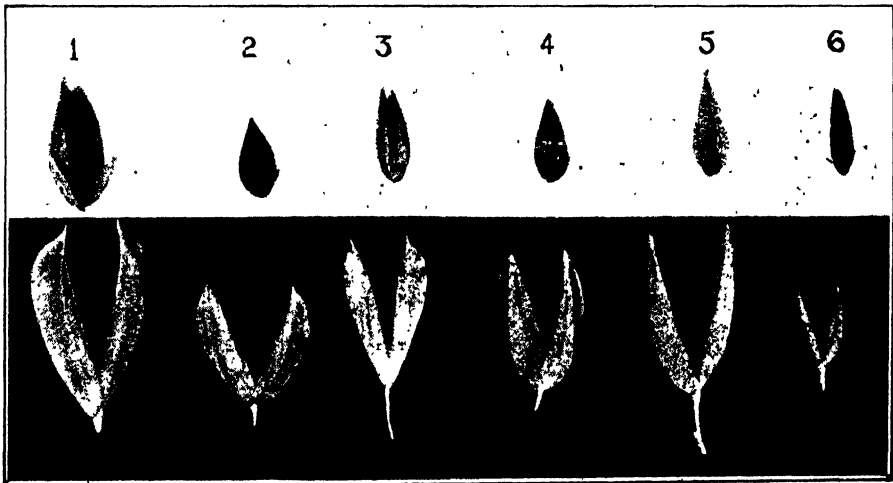


Figure 7.—Representative "seeds" and outer glumes of *Phalaris* species—1. *P. canariensis*. 2. *P. minor*. 3. *P. coerulescens*. 4. *P. tuberosa* (from an improved agricultural strain). 5. *P. tuberosa* (ex Palestine). 6. *P. arundinacea*.

The "seed" and glume characters of these species are shown in Fig. 7, and the seedling characters in Fig. 8.

It is obvious that the vegetative characters normally employed, and particularly the size and shape of ligule, prominence of ribs on the leaf blades, the degree of swelling of the basal internodes, and sheath colorations are liable to vary with

the environment, but the above characters have so far been found reliable at Adelaide. To these may be added the pink root tip character for *P. minor*, which is a useful guide in the identification of seedlings.

As the distribution of *P. canariensis* is not extensive, except where specifically grown for seed, and the two perennials *P. arundinacea* and *P. coerulescens* are rarely to be found outside testing stations, the differences of importance are those between *P. tuberosa* and *P. minor*. The pink root tip character for *P. minor* has so far proved the most reliable single characteristic at the Waite Institute, but the differences in type of tillering and in permanence are important in the field.

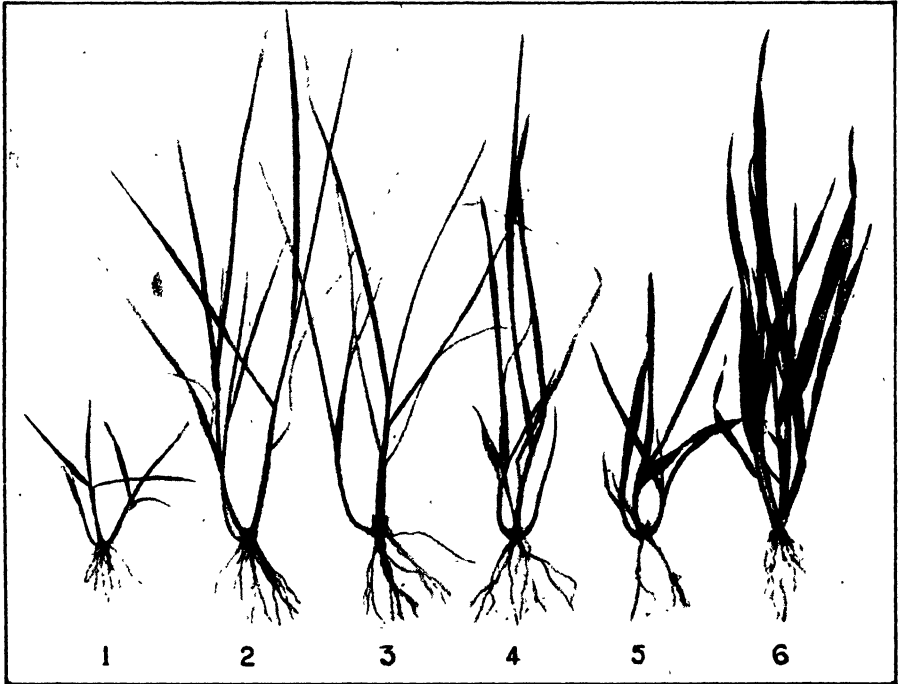


Figure 8.—Representative seedlings of *Phalaris* species 12 weeks after seeding—
1. *P. arundinacea*. 2 and 3. *P. coerulescens*. 4 and 5. Two distinct strains of *P. tuberosa*. 6. *P. minor*.

SUMMARY AND CONCLUSIONS.

The species of the *Phalaris* group, commonly known as the canary grasses, are adapted to the agricultural areas of Southern Australia receiving liberal winter rainfall and periodic summer drought.

The most valuable form for the seeding of permanent pastures is *Phalaris tuberosa* L., as developed from material grown at Toowoomba, Queensland, towards the end of the nineteenth century. A second perennial species, *P. coerulescens* Desf., is worthy of further investigation, particularly under conditions too arid for *P. tuberosa*.

The principal features of *P. tuberosa* are its capacity for production during autumn and winter, its drought-resistance, stability, adaptability to widely varying soil types, adaptability to varying conditions of management, and its capacity to grow in association with subterranean clover.

Reasons for the restricted use of this grass in South Australia during previous years include a tendency to shed the seeds readily at maturity, a poor capacity for spreading on non-cultivated land, and an unfortunate confusion between *P.*

tuberosa and the annual *P. minor*. Furthermore, the perennial species is highly sensitive to competition, particularly from the rye-grasses, during the year of establishment.

The structure and depth of penetration of the root system are probably important in relation to both drought-resistance and susceptibility to competition during the first year.

Sustained productivity in swards of *P. tuberosa* is greatly dependent on soil fertility. A suitable associate legume and continued applications of soluble phosphate are desirable.

Low seeds rates are indicated. On well-prepared land of good fertility 4lbs. per acre of reliable seed is sufficient. On poor soils 2lbs. per acre or less may be sown in conjunction with a suitable pasture legume.

Intermittent grazing from autumn to mid-spring, followed by spelling until early or mid-summer, and the utilisation of the final development as hay, for seed production, or as mature standing herbage, appears to be an effective method of managing *P. tuberosa*. The accumulation of basal reserves in early summer is of paramount importance for regeneration during the following autumn.

Seed production is of the order of 30lbs. to 150lbs. per acre. Cutting and threshing gave a significantly higher yield of clean seed than stripping. The relative merits of the two methods of harvesting are discussed.

Seed which has matured under relatively cool moist conditions may require a period of after-ripening.

The drought resistance of *P. tuberosa* is not associated with a low transpiration rate, but appears to be governed by its deep rooting habit and a capacity to enter a condition of anabiosis, or suspended animation, prior to the onset of dry conditions. Associated with these features is the close coincidence of the plant's life cycle with the periodicity of the Mediterranean type of climate.

Some agricultural features of a number of allied forms are discussed.

ACKNOWLEDGMENTS.

The author desires to express his thanks to Mr. A. B. Cashmore, B.Sc., for his co-operation and assistance in breeding work now in progress, and from which much information on the agronomic side has been obtained. Thanks are also due to Miss R. Pulford, who carried out the germination tests, to Messrs. D. L. Parker and E. J. Leaney, who have rendered assistance in the pot culture house, the laboratory, and the field, and to Mr. A. D. Cocks, who made the various photographs.

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DAIRY INDUSTRY PRICES.

ROYAL COMMISSION REPORT TO HIS EXCELLENCY THE GOVERNOR.

[A Royal Commission, consisting of Messrs. W. J. Dawkins (Chairman), Professor A. J. Perkins, and J. W. Wainwright, was appointed in January to inquire into and report upon the disparity between the prices paid by the consumer for dairy produce, the London parities of dairy produce, and the prices received by dairymen for milk and cream, the cause of such disparities, and the remedies therefor. The report is dated October 20th, 1933, and portion of it is quoted below. It is proposed to complete the report in subsequent issues.]

SCOPE FOR THE INQUIRY.

The inquiry has as much as possible been confined to matters relevant under the terms of reference, namely, "To inquire into and report upon the disparity between the prices paid by the consumer for dairy produce, the London parities of dairy produce, and the prices received by dairymen of South Australia for milk and cream; the causes of such disparities, and the remedies therefor." Subsequently to the receipt of these terms of reference, a suggested Bill for the Control of the Milk Supply of the Metropolitan Area was also submitted by the Honorable the Chief Secretary for examination and report.

In the course of these inquiries, several minor questions came under notice, and although some of these questions could not, perhaps, be strictly brought within the terms of reference, when deemed to be of sufficient importance to the inquiry to warrant investigation, they have been dealt with accordingly.

SOURCE OF THE EVIDENCE.

The evidence upon which this report has been based was secured from verbal statements, correspondence, printed reports, commercial books and statements, and visits of inspection.

Evidence was tendered by individual dairymen and milk vendors, by associations of vendors and producers, the Metropolitan County Board, the Central Board of Health, butter and cheese factory proprietors and officials, officers of the Department of Agriculture, and by other interested parties, who came forward voluntarily.

Evidence was also taken in Melbourne from local controlling authorities, milk vendors and distributors, factory proprietors, &c., and in the course of inspection of the premises of milk vendors and dairy farmers supplying the metropolitan area of Melbourne.

Your Commissioners were supplied with numerous reports and statements from the sister States, Commonwealth Departments, New Zealand, and England; and for these they desire to express their indebtedness. Outstanding among these publications is probably the Report of the Commission for the Re-organisation of Milk, issued in England in January, 1933.

Subsequent to their visit to Melbourne, your Commissioners inspected several dairies and shops licensed to sell milk within the metropolitan area, and some dairies outside the metropolitan area, with a view to testing the value of evidence submitted by several witnesses as to the sanitary conditions under which milk, cream, and butter were being handled and sold in Adelaide.

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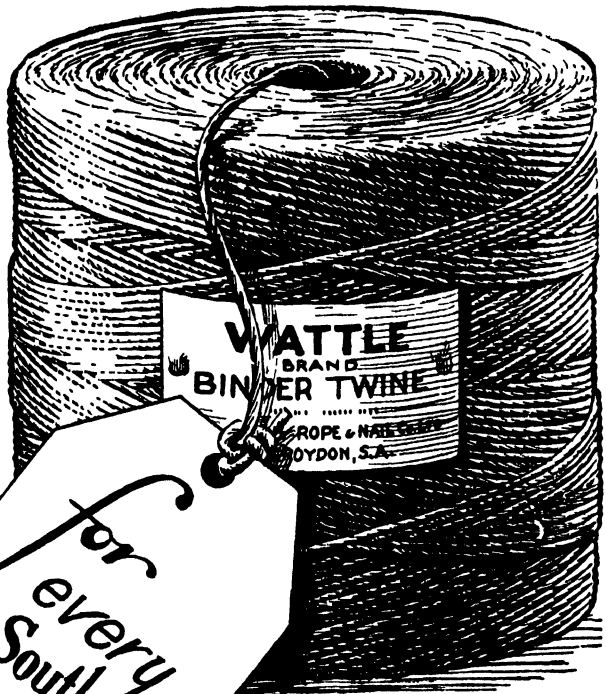
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In order to confirm or correct their personal views on the matter, it was deemed wise to secure those of a competent outside observer, and accordingly the services of Mr. David Rutledge, Senior Dairy Supervisor of the Victorian Department of Agriculture, were obtained, and he was asked to inspect and report upon some of the dairies supplying milk to the metropolitan area.

THE RELATIONSHIP OF DAIRY PRODUCTS TO PUBLIC HEALTH.

The draft Bill for the control of milk in the metropolitan area submitted for consideration and report, provided that such control, including sanitary supervision, should be exercised by a board consisting in the main of nominees of dairy-men, distributors, and vendors. Hence, it follows that should the Bill be enacted questions of hygiene on the farm, in the dairy, or on the milk cart, upon which the well-being of the community might be dependent, would be left in the inadequately trained hands of specially interested parties. Inquiries into the probable results of these proposals were therefore made.

All the competent authorities that your Commissioners have consulted on the subject appear to be of one opinion as to the danger to public health of careless or unhygienic handling of milk and dairy produce generally. It is recognised that the conditions under which milk is usually produced and handled render it specially liable to bacterial and organic contamination; and that its natural composition and relatively high initial temperature make of it an ideal medium for rapid bacterial growth. Moreover, milk is the natural foodstuff of infants, and is often fed to them in the raw state. Hence, milk—more than any other human foodstuff—should be adequately protected from contamination at all stages. In this connection, the Chairman of the Board of Health (Dr. A. R. Southwood) has been good enough to prepare a statement, which sets out very clearly the dangers to which the community is exposed by the careless or unhygienic handling of milk, and to which special attention is directed.

The conclusions of Dr. Southwood's statement may be summarised as follows:—

1. That the following diseases are frequently spread by milk:—Tuberculosis, typhoid fever, scarlet fever, diphtheria, septic sore throat, abortus fever, diarrhoeal and dysentery diseases of infants and adults.

2. That infection of milk by organisms responsible for these diseases may arise from contact with human beings handling the milk, or from cows.

3. That in America 8.3 per cent., and in England 9.5 per cent. of samples of milk examined have been found to be tubercle-infected.

4. That cream, butter, buttermilk, ice cream, sour milk, fresh cheese, and other milk products may convey all the infections contained in the original milk from which they were prepared.

5. That milk products are frequently made from the left-over milk, or milk that is otherwise unsaleable.

6. That adequate pasteurisation is the simplest, cheapest, least objectionable, and most trustworthy method of rendering milk safe.

7. But that pasteurisation is not a substitute for efficient inspection.

8. That inspection should give cleaner and better, but not necessarily safe milk; that adequate pasteurisation completes the work of inspection by eliminating the dangers that the latter cannot see.

9. That bovine tuberculosis should be dealt with by regular tuberculin testing of cows, by the building up of tubercle-free herds, by routine clinical examination of cattle by competent veterinary surgeons, by the testing of milk by microscopic and biological methods, and by the education of cow-keepers in the prevention of bovine infection.

For the above and other reasons, and having in mind evidence given as to the unsanitary conditions under which cows are frequently housed and milked, the carelessness with which milk is frequently handled in shops or on carts, and the unhygienic fashion in which milk is usually ladled out at back doors, your Commissioners have no hesitation in affirming that to place the control of the milk supply of a large city in the hands of specially interested parties would not be in the best interests of the community.

SUBDIVISIONS OF REPORT.

In South Australia the dairy products said to be subject to disparity in prices can be limited to:—

1. Whole milk;
2. Butter; and
3. Cheese.

The manufacture of cheese is more or less localised in the South-East, and as no complaints were received concerning cheese prices, this report deals with whole milk and butter only.

1. WHOLE MILK.

In the report of the Re-organisation Commission for Milk, 1933, England, it is stated that the main objects in view have been as follows:—

- (a) The strengthening of the position of producers by enabling them to negotiate as a solid body with one voice and with adequate information, and by ensuring that negotiated agreements are universally observed.
- (b) The prevention of undercutting of the liquid market, and the provision of satisfactory arrangements for the sale of milk for manufacture.
- (c) The improvement of the quality of the milk supply.
- (d) The stimulation of the demand for milk for liquid consumption.
- (e) The recognition of the service rendered by producers who cater primarily for the liquid-milk market.
- (f) The development of the manufacture of milk products; and
- (g) The co-ordination of the efforts of all concerned—producers, distributors, and manufacturers—to secure prosperity for the whole milk industry of the country, with adequate safeguards for the interests of the consuming public.

The English Commission, after a lengthy examination of the position, submitted comprehensive recommendations for the re-organisation of the milk supply of England and Wales. Your Commissioners have had to take into consideration the incidence of local conditions, and whilst their recommendations are less far-reaching than those of the English Commission, they have been very largely based upon the same underlying principles.

A. THE METROPOLITAN MILK SUPPLY.

The milk supply of the Adelaide metropolitan area is derived partly from the metropolitan area itself and partly from adjoining country districts. The main outside sources of supply lie between Adelaide and Gawler, in the neighborhood of Mount Barker and Woodside, the Mount Lofty Ranges, the Meadows district, Myponga, and adjoining the River Murray, from Tailem Bend to Mannum.

During the past five or six years there has been a marked increase in the number of cows kept within the metropolitan area. The latter have risen from 3,900 to 5,800 head, an increase of nearly 50 per cent. This increase has naturally led to corresponding decrease in the quantity of milk previously supplied by country districts.

Nevertheless, the milk supply from the metropolitan area is very far from constant from one end of the year to the other. Normally, maximum supplies are available during the months of September, October, and November, whilst minimum supplies usually occur towards the end of summer and in early winter. These limits, however, vary considerably with the character of the seasons, which may be early or late, dry or wet, and with the price of fodders, which may have the effect of extending or restricting the period of maximum supplies. In this connection the low prices recently obtaining for hay, bran, pollard, &c., may be said to have been partly responsible for the increase in the number of cows kept within the metropolitan area.

It follows that the call on country districts for milk will vary according as metropolitan supplies rise or fall. At times it represents considerably more than 50 per cent. of metropolitan requirements; at times it falls below 50 per cent.

It is held by some that this more or less haphazard arrangement is all to the advantage of the metropolitan supplier, but to the disadvantage of the country supplier, who is called upon to meet the former's deficiencies, which vary within very wide limits from year to year. It is argued that country supplies should be based upon definite yearly contracts, involving approximately equal monthly supplies from one end of the year to the other.

B. SUPERVISION AND CONTROL.

The supervision and control of dairy farms, milk vendors, and milk shops is carried out under powers given by the Food and Drugs Act, 1908, on the one hand, and the Dairy Industry Act, 1928, on the other. Under this arrangement several authorities may hold jurisdiction over milk in the various stages of its production and distribution, namely:—

1. The Metropolitan County Board has complete control within confines of the Metropolitan County District.

2. The Department of Agriculture is responsible for every dairy farm outside the metropolitan area which supplies milk in bulk to any factory or milk vendor, whether for wholesale or retail trade, or the milk from which is used in manufacturing dairy produce.

3. The supervision of farms supplying both the metropolitan area and retailing milk in the locality is in the hands of the Local Board of Health, when the latter functions; and, if not, in those of the Central Board of Health. Hence, under existing arrangements, 50 per cent. or thereabouts of the milk intended for metropolitan consumption does not come under the control of the Metropolitan County Board until it has crossed the borders of the metropolitan area.

It appears to-day to be a recognised principle in all progressive countries that the authority controlling the milk supply of large centres of population should be in complete control from the farm to the consumer. Hence, the existing divided control in the metropolitan area of Adelaide makes it very difficult to protect consumers effectively from the lurking dangers of contaminated milk. Doubtless, when the legislation at present in force came to be adopted, it was not realised at the time how far afield the metropolitan area would eventually have to seek its milk; but remedial legislation on the subject appears to have been long overdue.

C. COSTS OF DISTRIBUTION OF MILK.

The price which could be paid to the producer of milk is very largely governed by distribution costs incurred between the premises of the producer and those of the consumer, and accordingly, special attention has been paid to the question, and much information has been collected on the subject.

Whole milk for human consumption is at the present time being purchased at city treatment plants at 6d. to 8d. per gallon. This milk is subsequently sold to vendors at 8d. to 10d. per gallon, and by the latter to domestic consumers at 16d. to 24d. per gallon. The shop prices for this milk vary from 1s. to 1s. 8d. per gallon.

Transport costs from dairy farm to the city vary with distances, and appear to range up to 2d. per gallon. The handling and treatment of this milk at the large depots costs from 1½d. to 2d. per gallon, and up to this point there appears to be little scope for reduction in costs. Present costs of distribution incurred by milk vendors in supplying domestic consumers are approximately between 8d. to 14d. per gallon, with a probable average of 1s., contrasted with which the producer receives as low as 4d. to 5d. per gallon. It is at this point—the final distribution costs of milk vendors—that economies that could lead to improvement in prices paid to producers seem feasible.

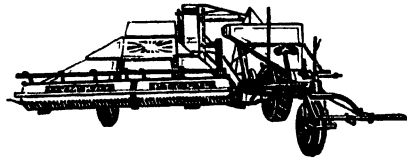
1. *The Morning Milk Round.*—The evidence of all milk vendors tends to show that, apart from a few exceptional cases, there has been very considerable reduction in the quantity of milk delivered per individual round during the past few years. The reduction of a 30gall. to 40gall. round to 20galls. and less may be taken to be typical of what has taken place in most cases. Obviously this reduction in the amount of milk delivered per individual round has led to corresponding increases in costs per gallon of milk delivered; and equally obviously increases in costs of delivery per gallon have led to reduction in prices that could otherwise have been paid to producers, without raising or lowering prices paid by consumers. The total costs involved in calling upon customers on the morning round vary from 1d. to 1½d. per call. Including all operations, such as preparation, washing, grooming, calling, &c., the time so occupied is approximately two to three minutes per individual call.

The heavy reduction in the quantity of milk delivered per individual round is principally attributable to the intensive competition of new vendors, who, for various reasons, have been attracted into the trade within recent years. Figures supplied

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by the Metropolitan County Board indicate that since 1928-29 milk vendors within the metropolitan area have risen from about 700 to about 950; and shops licensed to sell milk, from 187 to 366. The amount of milk delivered daily for home consumption within the metropolitan area is in the neighborhood of 13,000 to 14,000 gallons, and the number of vendors and shops participating in this delivery is 950 and 360 respectively. The average is, therefore, not much more than 10 galls. per distributing agency.

Attention is drawn to the fact that figures supplied by the Victorian Department of Agriculture show that, on a population basis, Adelaide has at present four times more licensed milk vendors than Melbourne.

Your Commissioners, after careful inquiry into the matter, are very definitely of the opinion that it is both possible and practicable to bring about important reductions in existing costs of delivering milk for home consumption in the Adelaide metropolitan area, and that, under efficient control of the milk supply, such reductions should ensure to the milk producer his fair share of accruing benefits. In this connection various proposals have been urged upon the Commission by interested parties, and all of these have received careful consideration. Your Commissioners do not, however, think it necessary to review them *seriatim*, but prefer confining themselves to recommendations that appear to be practicable.

2. *Reduction in Costs of Delivery of Milk for Domestic Consumption.*—Economies of approximately £40,000 per annum could be realised in costs of delivery of milk to home consumers if the following practices were adopted:—

(a) By making it possible that the daily rounds of milkmen should extend over smaller areas than at present; and

(b) By abolishing the afternoon delivery of milk.

(a) *Limiting the Rounds of Milkmen to Smaller Areas.*—In the above connection there are the conflicting interests of two parties to be taken into consideration—the interests of consumers and those of vendors. Generally, in the matter of both quality and price, consumers may be said to be sufficiently protected by the operation of trade competition, supported by adequate supervision. Hence, it follows that it is to the interest of both consumers and producers that healthy competition, coupled with adequate supervision, should be restored in the milk trade of the metropolitan area, and towards this end the reduction in the present number of licensed vendors by one-quarter or one-third appears desirable. Concurrently, adequate pressure should be brought to bear upon the balance of vendors to handle milk under the most hygienic conditions possible.

Consideration has been given to the suggestion that each vendor's licence should limit his field of operation to a well-defined area; or, alternatively, that the metropolitan area should be "zoned" into a number of restricted areas, within each of which a limited number of vendors would be allowed to operate. Neither of these proposals can be recommended, as it is considered undesirable that the natural wish of the householder to select his own milkman should be unduly limited by the licensing authority. But, apart from this aspect, the method of fixing definite boundaries between adjoining areas offers serious difficulties in application.

The desired results could best be secured by limiting the number of licensed vendors and cowkeepers within the metropolitan area to numbers which can be shown to be adequate for the efficient economical supply of milk; but all existing holders of licences under the Metropolitan County Board have certain vested rights which should not be overlooked. Hence, it is recommended that:—

(1.) Early opportunity be taken to announce publicly that in the event of re-organisation in control of milk consumed within the metropolitan area, all vendors' licences in force at the time of the issue of this report will and shall be recognised; but that all licences issued subsequently to such date shall not be recognised.

(II.) The licensing authority shall take into consideration the advisability of increasing the value of licensing fees, and that in the matter of vendors, licence fees should be based upon the number of carts used.

(III.) The premises of all cowkeepers, shops, and vendors operating within the metropolitan area, together with their methods of delivery, shall be carefully scrutinised, and that all those failing to come up to prescribed standards of sanitation and hygiene shall be given reasonable time to comply with the regulations, and that failure to do so shall lead to definite cancellation of the licence.

(IV.) Both vendors and premises shall be separately licensed; and no transfer of licences shall be recognised unless authorised by the licensing authority.

(V.) The licensing authority should be given statutory power to decline to issue licences if it considered that it is not in the public interest to do so.

In the past the practice of buying out redundant vendors has apparently been availed of to some advantage in limiting the number of vendors to the requirements of the community. Latterly, however, the pressure of the economic position has been such, and the numbers of redundant vendors so great, that no vendor, however well established, could afford to buy out any of his competitors; and should he have been foolish enough to make the attempt, a new crop of competitors would have sprung up on the morrow; but if existing licence holders were given the assurance that no new licences would be issued for a definite period of time, or only until such time as, in the opinion of the licensing authority, the requirements of the metropolitan area rendered necessary the issue of additional licences, then well-established vendors would gradually buy out redundant vendors, and progressively bring down the number to the requirements of the business. In addition, when individual rounds extended over too wide an area, owners would in most cases exchange portion of their rounds with adjoining vendors. This would have the effect of consolidating individual rounds, and lead to considerable decrease in costs of distribution.

Hence, it is anticipated that reduction of licences on the lines indicated above should lead to a gradual solution of the present difficult position without inflicting any injustice upon persons now employed in the industry, or providing a fund for compensation payments.

(b) *Abolition of the Afternoon Delivery.*—At present the afternoon delivery of milk in the metropolitan area is confined to between 20 per cent. to 30 per cent. of customers served in the morning, and then only on ordinary week days. Very little afternoon milk is delivered on Saturdays, Sundays, or public holidays.

The main objection to the afternoon delivery is that it adds very considerably to costs of distribution. This point may be illustrated in the following way:—In the first place, if milk at present delivered in the afternoon were added to the usual morning delivery it would have the effect of reducing proportionately the costs per gallon of the morning delivery. Secondly, the quantity of milk distributed on the afternoon round is so small that in the great majority of cases it would be questionable whether the amount received for milk in the afternoon were even equal to costs of delivery. In other words, afternoon milk may be said to be generally given away, with at times something thrown in. In one instance examined by your Commissioners the actual costs of calling exceeded 3d. per customer, whereas the amount received per afternoon customer was actually less than 3d. It follows that the milk delivered in the afternoon did not even pay the costs of calling on customers.

The fact that so limited a number of householders take advantage of the afternoon delivery seems to show that in rare instances only can this second delivery be considered necessary. Moreover, the requirements of those who cannot do without afternoon milk can easily be met by the numerous shops and dairies scattered

over the metropolitan area, which sell milk at any time of the day. It is true that the abolition of the afternoon delivery may add to the difficulties of householders who are not accustomed to keep milk for any length of time, particularly in summer. Strict cleanliness and judicious scalding can, however, overcome all these difficulties. Moreover, the absence of an afternoon delivery will compel vendors themselves to adopt more hygienic methods than are at present in vogue. The vendor whose milk will not keep will lose his customers.

It is pointed out that even Broken Hill, with its hot, dusty conditions, had recently done away with the afternoon delivery, and had it not been for the existing intensive competition within the metropolitan area, it is probable that a similar course would have been adopted voluntarily in Adelaide.

The afternoon delivery of milk adds considerably to the difficulties and costs of the dairying industry, inflicts unnecessary labor upon a set of people who have already to work very long hours, and in present circumstances helps to make of it a "sweated industry." Hence, it is recommended that licensed vendors be prohibited from delivering afternoon milk to domestic consumers of the metropolitan area, except for such cases as are shown to be necessary. This reform is advocated on the same principle as the 6 o'clock closing of shops.

D. RE-ADJUSTMENTS IN THE MILK INDUSTRY.

In the paragraphs that precede an attempt has been made to show the extent to which economies are possible in present costs of delivery of milk for domestic purposes; but it is certain that producers will not benefit from these economies so long as the metropolitan area remains open to the uncontrolled competition of country surplus milk. At the present time milk is being distributed within the metropolitan area at the rate of 13,000galls. to 14,000galls. per day; that is to say, at the rate of about 5,000,000galls. per annum, or 10 per cent. of a total State production of 50,000,000galls., and it is safe to say that the metropolitan area is within easy marketable reach of four to five times its normal milk requirements. This surplus milk usually finds an outlet as butter or cheese, but latterly at deplorably low prices, namely, 4d. to 5d. per gallon. In the circumstances, it is inevitable that any conditions that lead to temporary improvement in the financial returns of metropolitan cowkeepers and country suppliers should have the following tendencies:—

(a) Increase in number of cows milked within the metropolitan area.

(b) More intensive competition of surplus country milk.

And the general consequence of these two tendencies would be that in a very short while the price realised by country suppliers would be very little above current butterfat prices, and that realised by metropolitan cowkeepers would be butterfat prices plus mean cost of delivery and treatment of country milk in Adelaide.

The position may be illustrated as follows:—

Let us suppose that the price to the consumer is 3d. a pint, or 2s. a gallon, and that as a result of the economies suggested the costs of delivery are reduced from an average of 1s. to 8d. per gallon. In the latter case the metropolitan cowkeeper who distributed his own milk would realise 1s. 4d. per gallon at his dairy.

The country supplier, on the other hand, with freight at 2d. and treatment at 2d., would realise 1s. a gallon on the farm.

Prices such as these would immediately attract the competition of free-lance dairymen, and within a very short period of time the country supplier would be back to 5d., the metropolitan cowkeeper to 9d., and the consumer to 1½d. a pint.

Adjustment of prices is best left to the free play of competition, unless it can be shown that unregulated competition results in conditions that are prejudicial to the welfare of the community.

The evidence given by witnesses shows definitely that unsatisfactory conditions exist in the milk supply of the metropolitan area, and prevalent insanitary methods attaching to producing, handling, and delivering milk, not only justify but render advisable early legislation to establish better control in the interests of producers, vendors, consumers, and the dairy industry generally. The prime objective in this connection should be that the supply of milk to the metropolitan area should be adequate in quantity and unimpeachable in quality, and that the retail price thereof should be as low as possible. In other words, the interests of consumers must take precedence of those of distributors and vendors, and even of the dairying industry generally. There has been no lack of metropolitan milk in the past; nor is there reason to anticipate shortage in the future; and all that need be said under this head is that restrictive measures of the future should be so controlled as not to affect the adequacy of the metropolitan supplies. Improvement in standards of quality, on the other hand, will necessarily imply more vigorous enforcement of measures of hygiene and sanitation upon producers, distributors, and vendors alike; but these measures cannot be adequately enforced until those who are reasonably efficient can obtain adequate remuneration for the production, distribution, or delivery of milk of adequate quality; and, unfortunately, adequate remuneration cannot be obtained until such time as competition in supply has been regulated in accordance with the principles outlined herein.

(To be continued.)

(In the next instalment the Commission's report will deal with the claims of householders for a higher unit value, types of milk for human consumption, control of prices, and quality in milk.)

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LAKE ALBERT HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR SEPTEMBER, 1933.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during Sept.	Per Cow during Sept.	Per Cow December to Sept.	Per Herd during Sept.	Per Cow during Sept.	Per Cow December to Sept.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
6/B	19-67	18-43	19,312½	981-82	4,827-38	810-11	41-18	215-69	4-19
6/C	21	13-47	12,288	584-12	5,282-83	495-55	23-53	228-49	4-09
6/F	24	23-83	25,303½	1,058-00	6,997-65	1,286-71	53-84	350-97	5-02
6/H	28	26	25,260	902-14	6,026-57	1,214-20	43-36	289-04	4-81
6/Y	11-83	6-93	4,762	401-94	3,454-47	190-79	16-10	152-20	4-01
6/II	24	14-60	10,728	447-00	5,927-53	457-98	19-08	253-50	4-27
6/LL	25-37	22-07	13,951½	549-92	5,471-03	551-22	21-73	209-36	3-95
6/OO	22-90	14-63	13,884	604-10	7,338-90	579-06	25-29	324-49	4-19
6/PP	15	12-37	6,629	441-93	5,286-89	334-09	22-27	287-28	5-04
6/QQ	22-20	17-10	16,816½	734-97	7,013-69	714-23	32-17	304-52	4-38
6/RR	28	22-77	22,072½	788-30	6,720-08	865-14	30-90	283-03	3-92
6/TT	21-77	14-10	13,002½	594-57	5,827-99	572-66	26-18	249-74	4-40
6/VV	23-47	19-80	20,890	890-07	6,980-23	668-92	37-02	320-70	4-16
6/XX	27	21-63	16,333½	604-94	6,022-29	661-93	24-52	256-32	4-05
6/YY	29	22-63	14,313	493-55	4,393-65	651-13	22-45	217-80	4-55
6/ZZ	28	18-97	13,255	473-39	5,702-32	646-78	23-10	261-44	4-88
6/AAA	20	18-20	16,152½	807-62	3,211-87	831-14	41-56	169-10	5-15
6/BBB	27-13	21-50	18,231	671-98	6,438-09	773-09	28-50	263-11	4-24
6/CCC	22	17-03	12,046	547-54	5,470-88	476-88	21-68	227-32	3-96
6/DDD	25	19-13	15,048	601-92	5,982-36	625-20	25-01	263-01	4-15
6/EEE	27	25-83	27,639	1,023-66	8,150-22	1,029-84	38-14	333-87	3-73
6/FFF	29-53	24-43	22,288½	754-77	6,912-98	872-40	29-54	289-63	3-91
6/GGG	22-97	22-17	18,590	809-31	7,959-72	690-00	30-07	314-39	3-71
Means	23-69	19-03	16,445-50	694-23	6,042-37	704-33	29-73	265-54	4-28

NARRUNG HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR SEPTEMBER, 1933.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during Sept.	Per Cow during Sept.	Per Cow October to Sept.	Per Herd during Sept.	Per Cow during Sept.	Per Cow October to Sept.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
5/C	35	31-83	23,836	681-03	6,523-20	1,129-28	32-27	331-37	4-74
5/D	35	34	24,795	708-43	6,687-84	1,263-00	36-08	357-09	4-94
5/E	42	31-50	23,329½	555-46	5,616-27	1,199-76	28-57	295-75	5-15
5/P	36	33-37	30,381½	843-93	7,410-51	1,402-34	38-95	369-64	4-62
5/R	68-63	52-77	32,894½	479-21	3,776-44	1,340-35	19-52	157-53	4-08
5/S	18	17-67	11,205	622-50	5,094-59	588-73	32-71	251-34	5-25
5/Y	27	21-43	16,658½	616-97	6,201-03	882-07	32-67	331-09	5-31
5/Z	34	30-40	27,470	807-94	8,367-75	1,339-47	39-40	409-13	4-88
5/EE	18	16	13,755	764-17	7,125-77	647-72	35-98	356-29	4-71
5/GG	20-40	17-03	8,065	395-34	4,080-70	391-42	19-19	198-70	4-85
5/II	29	21-50	17,747	611-97	6,508-94	880-53	30-36	327-26	4-96
5/JJ	24	21	18,165	756-87	6,932-62	808-18	33-67	304-28	4-45
5/KK	19	15-47	9,741½	512-71	5,070-70	465-56	24-50	238-26	4-78
5/NN	24-60	22-47	21,861	888-06	6,561-80	1,012-92	41-18	303-03	4-63
5/OO	21-53	18-57	13,921	646-58	5,999-04	599-70	27-85	270-61	4-31
5/QQ	22	19-37	11,636	529-31	5,546-56	678-82	30-88	306-64	5-83
5/RR	21-73	18-97	11,376	523-51	4,491-15	615-96	28-35	246-00	5-41
5/SS	21-27	20-27	13,222	621-62	5,333-89	609-39	28-68	249-80	4-61
5/TT	12	10-97	10,305	858-75	6,645-98	507-89	42-32	338-09	4-93
5/UU	17-70	13-83	9,933½	561-21	5,056-75	449-59	25-40	228-74	4-53
5/VV	28	25-07	17,990	642-50	7,692-76	796-48	28-45	330-05	4-43
Means	27-37	23-50	17,537-52	640-66	5,957-33	838-57	30-63	290-57	4-78

THE HILLS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR SEPTEMBER, 1933.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during Sept.	Per Cow during Sept.	Per Cow July to Sept.	Per Herd during Sept.	Per Cow during Sept.	Per Cow July to Sept.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
7/E .	26-60	18-57	10,360	369-47	1,140-99	423-16	15-91	47-81	4-08
7/H .	7-80	5-83	4,031½	516-86	1,451-61	189-85	24-34	69-82	4-71
7/K .	16	12-97	10,549	659-31	2,000-74	385-15	24-07	77-50	3-65
7/L .	35-27	26-08	17,748½	503-22	1,537-84	827-94	23-47	74-95	4-66
7/P .	25	24-13	19,706	788-24	2,175-80	916-81	36-67	103-29	4-65
7/T .	16-57	10-17	8,314	505-07	941-20	359-88	21-85	42-28	4-36
7/Y .	24-33	17-83	14,041	577-11	1,484-55	600-39	24-68	64-87	4-28
7/AA	14	11-67	7,810	557-86	1,253-75	326-56	23-33	54-88	4-18
7/KK	21-07	14-30	15,846	752-06	2,024-17	658-60	31-26	85-54	4-16
7/MM	39-17	33-53	29,959½	764-86	2,124-33	1,108-37	28-30	79-59	3-70
7/PP	20	13-97	13,288	664-40	1,563-54	713-99	35-70	83-32	5-37
7/TT	18	14-43	10,638½	591-03	1,560-68	463-41	25-74	68-95	4-36
7/UU	21	12-37	8,801½	419-12	1,026-64	393-83	18-99	46-66	4-53
7/VV	15-90	13-90	12,132	763-02	2,074-85	557-99	35-09	96-91	4-60
7/XX	20-77	16-03	13,321	641-35	1,884-61	677-64	32-63	96-09	5-09
7/YY	23	15-43	6,771½	294-41	1,060-41	307-42	13-37	48-47	4-54
7/BBB	71	62-43	43,816½	617-13	1,818-36	1,992-11	25-98	84-08	4-55
7/Ccc	16-70	13-90	9,540½	571-29	1,496-65	444-20	26-00	72-24	4-06
7/DDD	12-97	11-07	7,626	587-97	1,629-07	332-67	25-65	76-75	4-36
7/Ere	12	10-90	5,157	429-75	1,350-38	254-73	21-23	67-39	4-94
Means	22-86	17-72	13,472-90	589-43	1,631-85	596-98	26-12	73-90	4-43

METROPOLITAN ABATTOIRS, ADELAIDE

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Journal of Agriculture, January and July, 1921.

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THE GRENADIER WEAVER.

The South Australian Ornithological Association has drawn attention to the escape from captivity of the Grenadier Weaver (*Pyromelana orix*). This bird is an imported finch from Southern Africa, and has been observed in South Australia at Wood's Point, Paradise, and McLaren Flat. At the former locality the birds were noticed by Mr. H. W. Morphett about four years ago, and since then Mr. Morphett has reported that they feed on wild oats growing on banks of a drain in the reclaimed flats. Dr. A. M. Morgan, who paid a visit to Wood's Point, was informed that the birds disappeared in winter, but he points out that *as the males, after the nesting season, change their bright plumage to that of the female, they might easily have been mistaken for sparrows when in that state.* In their native land they inhabit swampy country, and do much damage to grain crops, and Dr. Morgan states that judging by the business-like way in which he saw them stripping the wild oats at Wood's Point, one can imagine what a flock would do in a wheat crop, and it seems likely, unless early steps are taken to eradicate them, that we will soon be cursed with another imported pest.

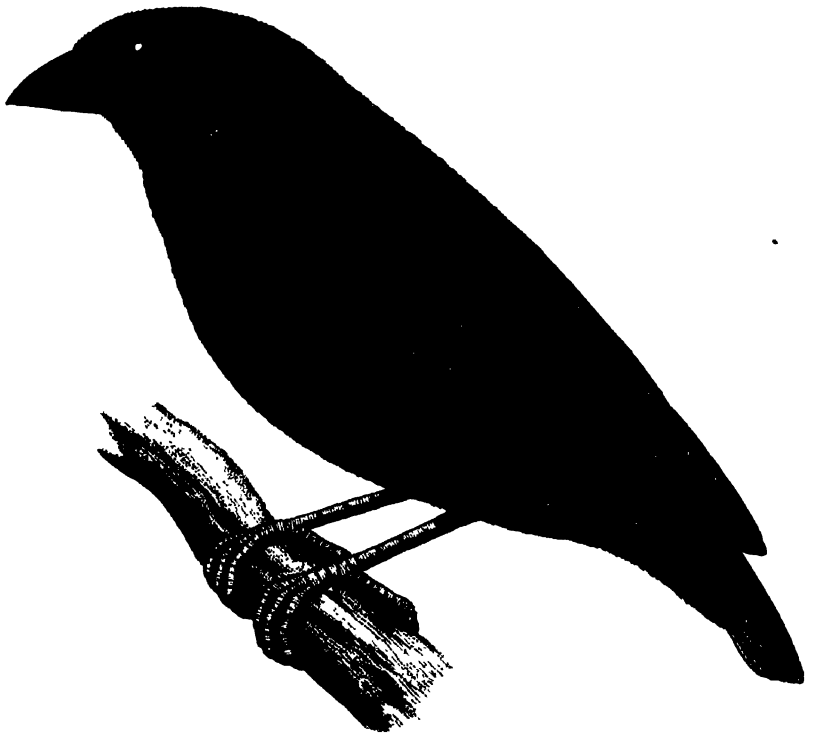
The colored plate opposite gives a description of the male bird in its bright plumage, at this time of the year, after the mating season. In "Foreign Finches in Captivity," A. G. Butler states that the adult male in breeding plumage varies according to age from orange to vermilion, the mantle cinnabar red. As with the allied species the feathers of the neck can be swelled out into a sort of ruff; the forehead, the face (including the eye and ear-coverts), and the front of the throat black; the chest and abdomen black; upper wing-coverts fiery cinnabar red, quills brown, with blackish centres; thighs, axillaries, and under wing-coverts, yellowish brown, quills below pale brown with paler inner web. Length, 4-8/10ths inches. Beak black with browner cutting edges; legs brown; iris dark amber brown. *In winter the male plumage nearly resembles the female, but he is slightly larger and darker in tone.*

The female is described as tawny brown with black shaft-streaks, narrower on the head; wing and tail feathers dark brown with pale tawny edges; a distinct yellowish eyebrow streak; under parts paler than the upper, with narrow black streaks, broadest on the sides and flanks; centre of body below yellowish; quills below dusky, and yellowish inner web. Length, 4-7/10ths inches. Beak reddish horn-brown, the lower mandible paler; legs brown; iris ashy brown.

In Southern Africa the distribution of these birds appears to be confined to narrow limits. They breed among the reeds growing in rivers, supporting the nests on three or four stems. In the winter they congregate in flocks, and do much damage to the grain fields in the neighborhood of the nesting places, but never stray away from that locality excepting when they may occasionally be driven from a district by drought or want of food. The nests are constructed of grasses, domed with a side entrance, about 4ft. or 5ft. from the ground level, and at the water's edge. The nests contain four to five eggs of a pure light-blue color, unspotted.

The behaviour of the male bird in nesting-time is described as being absolutely of such a character as to mock all attempt at description. Dr. Reichenow states:—"One constantly sees the male puff itself out and dance in order to exhibit the full beauty of its magnificent plumage to the plain, modest female clothed in grey. I believe there are no other birds so coquettish as the forms of this Weaver. The coquetry is habitual with them, amounting as one may say to folly; they even waltz when they are not observed by the female, and appear to take the greatest delight in themselves."

Supplement to the "Journal of Agriculture."]



GRENADIER WEAVER, OR "RED BISHOP" (*Pyromelana orix*).

An introduced Finch which may become a serious menace to grain crops in South Australia.

PASTURE IMPROVEMENT EXPERIMENTS IN SOUTH AUSTRALIA.

[By R. C. SCOTT, Supervisor of Experimental Work.]

The pasture experiments conducted by the South Australian Committee of the Australian Dairy Council have, in a number of cases, been in progress for sufficient length of time to allow for the expression of fairly definite conclusions.

However, the work of the pasture seed trials is only in its infancy, and selections of the most promising strains will be made during the coming summer.

The season, generally, has been favorable to the growth of established pastures, but the plants in areas seeded this season have made relatively slow growth. This is due to the cold and dry conditions experienced during the month of June, but as the germination was satisfactory these plants should make good headway with the advent of warmer weather.

The experiments are in progress over a wide range of agricultural conditions, and extend from low rainfall country (16-18in.) in the Northern and Lakes districts to much wetter areas in the Adelaide Hills, South-East, and Southern Eyre's Peninsula districts. In addition, tests with pasture varieties are being conducted on irrigated land at Long Flat.

A brief progress report of the experiments, demonstrations, and grass seed trials is as follows:—

NORTHERN DISTRICTS.

(Gladstone, Saddleworth, Eudunda, and Greenock).

In this area Greenock receives rather higher annual rainfall than the remaining centres, but in all cases the soil conditions are similar. The land is of the red-brown earth class, of good fertility, and capable of carrying heavy cereal crops.

The experiment consists of demonstrations with pasture varieties, and of these easily the most promising are Wimmera Rye Grass and Early Subterranean Clover. *Phalaris tuberosa* has proved fairly drought-resistant, making rapid growth in early autumn.

At Greenock the rainfall is sufficient to permit certified Perennial Rye Grass to persist, and when sown as a mixture with Early Subterranean Clover, a good palatable pasture stand has resulted.

ADELAIDE HILLS DISTRICT.

(Eden Valley, Mount Pleasant, Mount Barker, Bugle Ranges, Meadows, Willunga, and Myponga).

The soil conditions throughout the Adelaide Hills vary considerably, and extend from poor, hungry sands to rich black flats. The tests being conducted include both these types, and consist of pasture variety, pasture mixture, and manurial trials. The result of the experiments dealing with pastures indicates that on the better class lands Perennial Rye Grass and White Clover make the best pasture mixture. On the other hand, where the soil tends to become relatively dry in the summer, or is of lighter texture, Subterranean Clover must replace the White Clover. In the same way, wherever summer conditions render it difficult for a perennial plant to persist, the Perennial Rye Grass must be replaced by Wimmera Rye Grass.

Another very satisfactory mixture consists of *Phalaris tuberosa* and Subterranean Clover. In this connection most success has been attained by sowing the *Phalaris* alone in the first season, and in the following year adding the Subterranean Clover.

It would appear that the weak growth that *Phalaris* makes shortly after germination renders it liable to be crowded out by either weeds in dirty ground or other pasture varieties, if a mixture is seeded.

It is as yet too early to comment upon the manurial trials, except to report that considerably increased growth has followed the applications of sulphate of ammonia, but whether this additional feed has been economically obtained can only be decided when sufficient grazing data is available.

The same remarks apply to applications of agricultural lime made on the wet, sour lands of Meadows, where at the present time such dressings have led to much improved pastures.

EYRE'S PENINSULA.

(Warunda).

Warunda is situated in the higher rainfall area on Southern Eyre's Peninsula, and is essentially pasture country rather than cereal growing land.

The experiments simply consist of pasture variety trials, each fodder being planted alone in a separate plot. As the work was only commenced this season, no remarks are possible, and it remains to be proved whether the permanent plants will carry through the summer, or whether we will have to confine ourselves to the annual types.

LAKES DISTRICT.

(Meningie and Narrung).

The soil conditions in this district are rather different to those in the other areas, where experiments are being conducted. On the whole, the soil is of a red, sandy nature, on which lucerne grows fairly well without irrigation, whilst the flats are made up of heavy black land which, when not well drained, are rather salty. The experiments include pasture variety trials, and an investigation into the best method of handling the lucerne pasture sown on the land.

Wimmera Rye Grass and Early Subterranean Clover have shown the most promise as winter fodders, the latter in particular appearing very valuable for these conditions.

In connection with the treatment of lucerne, most abundant growth has followed light winter tillage with which is associated a top dressing of 10 lb. of superphosphate per acre. On the other hand, tillage without manure has given better results than manure without tillage.

SOUTH-EASTERN DISTRICT.

(Mount Gambier and Hatherleigh).

On the well-drained, fertile soils of Mount Gambier most pasture varieties make strong growth, but in these experiments the best appear to be Perennial Rye Grass, White Clover, *Phalaris tuberosa*, and Subterranean Clover. At Hatherleigh the soil is of the black, sea-mud type, and in our experience no fodders can approach Perennial Rye Grass and Strawberry Clover for this class of country.

IRRIGATION AREA.

(Long Flat).

Pasture varieties have been planted this season on the reclaimed irrigation area at Long Flat. In all cases good germination has been secured, and at present all varieties are making satisfactory growth.

PASTURE SEED TRIALS.

The following report has been submitted by Mr. L. J. Cook, Manager of the Kybyholite Experimental Farm, who is in charge of this work:—

The bulk of the plots of grass strains have withstood the winter conditions of July and August well. Much cold weather has been experienced, rainfall during June and July being exceptionally light, but average falls have been received during August.

The health of grass plants during the period has been very good, there being no noticeable deaths, and the "browning off" has only been slight. Perennial Rye Grass strains suffered more in this respect than *Phalaris tuberosa*, but they recovered well during August.

Following the June grazing, plots made comparatively good winter growth, the *Phalaris* strains making substantial headway.

During the last half of July a careful examination of this winter growth of all strains was made, and selected plants pegged. Amongst perennial Ryes particular attention was paid to healthiness, any plants with a tendency to "brown off" being passed by. Principally, plants with abundant leaf development and close growing crowns were selected. Some with spreading habit of growth and others with more erect growths were marked. A few of the more open types, with more stemmy growth, were noted, with a view to comparison in later seasons.

Short, dump pegs were cut, painted white, and numbered. These have been driven alongside the selected plants, and notes on approximately 120 individual plants recorded.

It is anticipated to collect seed from some of these selections, whilst others will be watched mainly for comparative purposes.

Of the *Phalaris tuberosa* strains, four are showing better than the others; two of those from the Sewage Farm have shown very prolific leaf growth during the winter. Also, the Mount Crawford strain has shown above the average, as well as our local strain of eight seasons' duration, although the plants of the latter show more open in the crown.

It is anticipated to collect seed from these strains during the coming summer, and plant out in isolated plots next season. A small area will be fallowed this spring, and prepared for the sowing of these next autumn.

During August the whole of the plots have been subjected to a good grazing to check the growth of annual weeds, and to maintain the grass species under good pasture conditions.

The annual Rye Grass strains sown this season have made satisfactory winter growth. Two of the seven strains have made quite superior leaf development, while others show rather a spindly and stemmy nature.

The clovers and grasses sown in small trial plots this year have, with a few exceptions, germinated and established well.

DEPENDABILITY.

There are few people who cannot recall some instance where a widow, left sole Executrix, has been badly advised and lost all that she had—where the man whom everyone trusted, speculated with the moneys placed in his care and was unable to make restitution—or where the fortunes of a family have been wrecked by the absconding of a trusted friend.

DO NOT TAKE RISKS—APPOINT

ELDER'S Trustee and Executor Company Limited.

AS YOUR EXECUTOR AND TRUSTEE.

GRADING FARMERS' WOOL.

[By C. A. GODDARD.]

Grading of primary products is one of the most important factors in orderly marketing. In South Australia special attention is given to the grading of butter, dried fruits, and other products, yet a large percentage of the wool produced in the farming areas is sent to market ungraded, and the loss to the producer is tremendous.

It has been estimated that 50,000 bales of farmers' wool were marketed in Adelaide last season ungraded. To appreciate the loss involved it is necessary to know that there are two great sections in the wool textile trade, each requiring different types of wool for economic manufacture. *Firstly*, the worsted trade, which uses only wools that can be economically combed. *Secondly*, the woollen trade, which specialises in short carding sorts. The difference in the limit value of these types is often very wide, and as each type is usually found in the same fleece the importance of grading can be realised. When the wool is graded each type will bring its true value, and the best average price will be obtained by the grower. When the types are marketed together neither section of the trade can purchase them to their own or the grower's benefit. What really happens is that the sorters buy them at a price that will enable them to sort and sell at a profit; these people are really dealers.

It is impossible to estimate accurately the loss due to lack of grading, because the ups and down of a public auction have to be contended with. But after conferring with wool experts closely associated with the industry, I have no hesitation in stating that the loss cannot be less than 1d. per pound. Take the average weight of the bales as 300lbs. This shows the bale loss as 25s., and the total loss on 50,000 as £62,500.

This huge loss is not justifiable, because the farmers could by paying more attention to grading avoid it.

METHOD OF GRADING.

In the grading of produce it is necessary to work on definite grading principles, and wool is no exception. The general principle is always the same, that is, the separation of the inferior from the superior, and the work is based on the five chief manufacturing or commercial principles, viz., length and strength of the staple, and quality, condition, and color of the wool.

Length, strength, and quality in a general way decide the section of the trade in which the wool can be most economically used. Condition affects cost of scouring, and color has a direct bearing on dyeing. Although these principles must form the basis of wool grading, they must be employed in a commonsense and practical way. For example, in practice they simply divide the short from the long, the sound from the unsound, the fine from the coarse, the light from the heavy, and the bright from the discolored.

SHEARING.

The shearing on many farms is done under conditions that make correct grading impossible. It would not be practicable for farmers to set apart a building for shearing unless they owned enough sheep to warrant a shearing shed. Therefore the barn or some other building must be used.

It is absolutely necessary to prepare the building used for the shearing. First of all it must be thoroughly cleaned out, because straw and other vegetable matter is most objectionable in wool. Secondly, reasonable conveniences must be made for the handling of the sheep. A portion of the building should be partitioned off with hurdles to allow a few sheep to be kept in over night. Battens should be

used as a floor in the shed, otherwise a lot of wool will be badly stained. The battens can be made in sections and taken up and stored when shearing is finished. A boarded floor is also required to shear the sheep on. Convenient yards adjacent to the shed are also necessary for yarding and holding the sheep.

The portion set aside for the wool room should contain two bins for fleece wool and one each for bellies and pieces. Temporary bins can be easily and cheaply made with a few uprights and wirenetting. The most important point of all regarding the wool room is the wool table; this should be large enough to take a fleece easily, say, 10ft. long and 5ft. wide. It is on the wool table that most of the grading of a small clip is done. The best plan is to make a table top and rest it on trestles, as this allows of easy storing when shearing is completed. A box press completes the wool room furniture.

FLEECE TREATMENT.

This is the most important factor in the preparation of a small clip for market, because no sheep ever produces a fleece that is even in type, usefulness, and value, and the success of the grading largely depends on correct fleece treatment.

Not only are certain portions of the fleece inferior, but fleece wool correctly treated is always valued on a higher basis than skirtings, therefore any over-skirting, that is, the removal of any good wool, must result in loss to the owner. On the other hand if fleeces are not sufficiently skirted—that is, if short, dirty portions are left on—the whole fleece would be typed as skirty, and certain loss would result. It will therefore be seen that the work must be carefully and accurately done, and each fleece must be treated on its merits to obtain the best results.

The diagram on next page illustrates the portions that require removing on an average farmer's fleece.

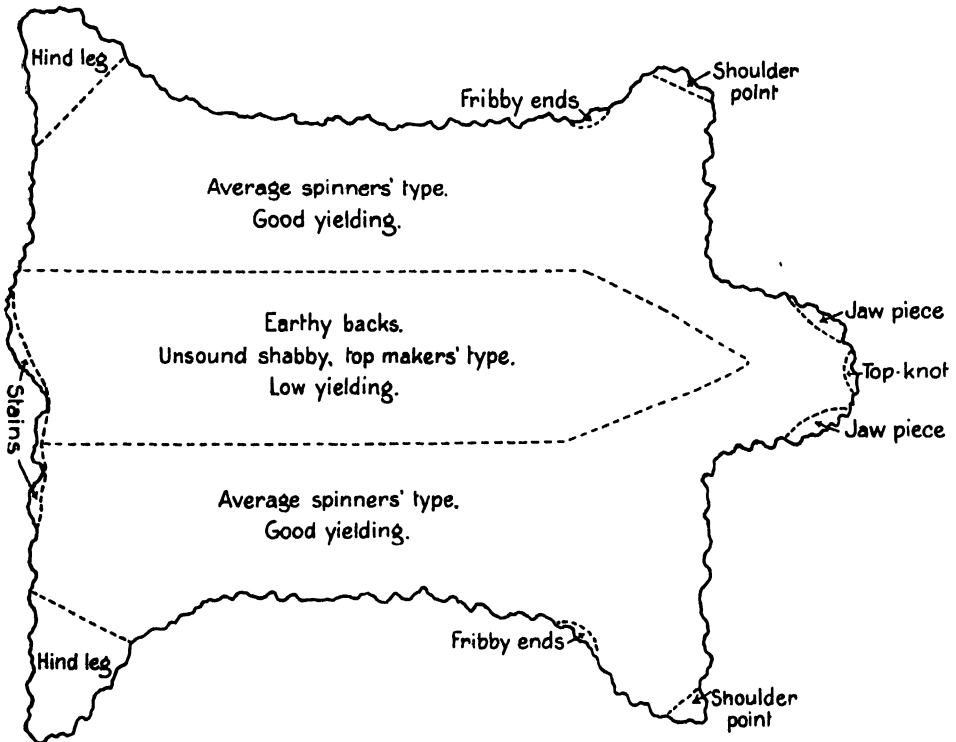
Starting at the head a small portion—the top-knot—requires removal as it is short and fuzzy. The jaw pieces are matted and of low quality. The shoulder points are short and discolored. The frubby ends are really sweat dags from the armpit. It will be noticed that a fairly large piece is removed from the hind leg. This is because the wool on most fleeces runs away badly here, and is short and often hairy. On the britch end any dags and stains must be carefully removed.

We now come to the most important part of fleece treatment, which is the *back*. Most farmers in the wheatgrowing areas use their sheep on the fallows. Consequently the back portion of the fleece becomes heavily impregnated with earth and dirt. The earthy matter absorbs the yolk, making the wool dry, harsh, and tender, and unless the back portion is removed the earthy matter will penetrate right through the clean wool of the fleece, and when the wool is presented for valuation it will all appear as earthy back wool. Another important point is if the backs are left in they will reduce the yield to such an extent that overseas buyers cannot operate on account of the high freight charge. The buyers' calculations are based on the "clean" cost; therefore, unless at least 40 per cent. of clean wool is obtained the freight becomes a heavy charge. This means that unless the wool will give a 40 per cent. yield overseas competition is lost, and the wool will be bought by local scourers at a price well below world's parity.

GRADING THE FLEECES.

Most farmers' clips are small, the average being about eight bales of fleece wool. I will, therefore, deal with a clip of this size. Buyers prefer to secure their supplies in reasonably large lines. And, furthermore, any line of wool

below four bales constitutes a "star" lot, and cannot be offered in the main catalogue. On this account farmers should endeavor to make one main class of fleece wool as large as possible, and at the same time it must be reasonably even according to the classifiable principles—that is, 2½ in. or over in length, sound, medium to fine quality, reasonably light in condition, and a good color. With an average farmer's clip grown in the wheat areas this would mean that approximately 20 per cent. of the fleeces would need to be rejected. The remaining 80 per cent. or six bales should be even enough to be packed together. The 20 per cent. of rejects would consist of extra short, unsound, coarse, extra heavy, and discolored fleeces.



(In this diagram the best portions of the fleece are described as "average spinner's type," but if "burry," as often occurs in farmers' fleeces, this portion would be described as "average top-makers.")

What to do with the rejects is the next question. It will be seen from the above that they will be very mixed, and the only economical way in which they can be sold is to instruct the selling broker to pool them with the bag wools. In this way each different type will be bulked with other wools of the same type, and will eventually be sold at their true value.

PACKING THE ODDMENTS.

The oddments consist of "pieces," "bellies," "backs," "stains" and "locks." In a clip the size of the one under review there would be sufficient to make a bale of bellies over 250lbs. Any pizzle stains from belly wool of male sheep must be carefully removed. The backs would probably fill two bales. The pieces and locks may be packed in the same bale, providing a cap is placed between each sort. The stained pieces should be dried if wet and packed by themselves even if there is only sufficient to fill a bag.

LAMBS' WOOL.

In the preparation of lambs' fleeces for market they should be well shaken over the wool table to remove heavy fribby ends. And any very short fleeces shorn from very young lambs should be put in a bag by themselves, because length of staple is one of the most important factors in the sale of lamb's wool.

PRESSING AND BRANDING BALES.

Bales should be well and evenly filled, neatly sewn with twine—*not binder twine*—always remembering that the minimum weight for a bale of Merino wool is 250lbs. The branding should be neatly done with stencil plates on the cap and the front side, showing owner's brand on the top, description in the middle, and the number at the bottom. The letters and numerals should not be less than 3in. nor more than 4in. high. It is advisable to use the letter A in the description thus—AA for the main class and A for the rejects. When the clip is large enough to separate the ages and sexes—H for hoggets, E for ewes, and W for wethers. The earthy backs should be branded BACKS, bellies BELLIES, pieces PCS., locks LOX, and stained pieces STX. PCS.

STATE OF SOUTH AUSTRALIA.

RETURN OF EGGS AND EGG PULP EXPORTED FROM SOUTH AUSTRALIA TO EACH OF THE STATES AND TO OVERSEA COUNTRIES, FOR YEARS 1930-31 TO 1932-33.

W. L. JOHNSTON (Government Statist).

The Grand Total Exports for each of the years 1930-31 to 1932-33 were respectively £156,632, £232,907, and £306,712. The last year, 1932-33, shows an increase of £73,805 over the previous year 1931-32, and £150,080 over the year 1930-31.

The Grand Total Exports of Eggs in Shell and in Pulp in terms of Eggs in Shell is estimated to have been 3,000,000doz. for 1930-31, 5,200,000 for 1931-32, and 6,300,000 for 1932-33.

The following are the details :—

State.	Eggs in Shell.		Egg Pulp.		Total Value.
	Doz.	£	Lbs.	£	£
New South Wales (Ex B.H.)	514,017	23,360	567,596	17,131	40,491
Broken Hill	109,416	5,882	8,572	237	6,119
Victoria	131,593	6,403	318,986	8,568	14,971
Other States	97,577	6,033	84,240	2,516	8,549
Total Interstate, 1932-33	852,603	41,678	979,394	28,452	70,130
1931-32	1,197,222	56,632	1,164,597	41,219	97,851
Oversea (Direct) 1932-33	3,842,870	198,741	1,100,000	37,841	236,582
1931-32	2,026,220	88,017	1,329,000	47,039	135,056
Grand Total 1932-33	4,695,473	240,419	2,079,394	66,293	306,712
1931-32	3,223,442	144,649	2,493,597	88,258	232,907
Increase	1,472,031	95,770	—414,203	—21,965	73,805

RED COMB EGG ASSOCIATION.

OFFICIAL SINGLE TEST.

EGG-LAYING COMPETITION, 1933-34.

SECTION I.—WHITE LEGHORNS.

Competitor.	Address.	Score to Month ending October 31st, 1933.			
		Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Totals
E. F. Ashmeade	398, Magill Road, Ken- sington Park	(1) 71	(2) 52	(3) 100	223
L. R. Badcock	77, Findon Rd., Woodville	(4) 68	(5) 96	(6) 88	252
C. J. C. Burton	Mallala	(7) 73	(8) 67	(9) 59	199
C. J. C. Burton	Mallala	(10) 64	(11) 49	(12) 85	198
W. A. Carter	2, Grosvenor St., Glandore	(13) 73	(14) 106	(15) 38	217
W. A. Carter	2, Grosvenor St., Glandore	(16) 90	(17) 103	(18) 45	238
B. Cooke	Kanmantoo	(19) 107	(20) 95	(21) 68	270
H. F. Cox	Samson Road, Glanville Blocks	(22) 36	(23) *	(24) 24	60
H. F. Cox	Samson Road, Glanville Blocks	(25) 64	(26) 75	(27) 91	230
L. H. Crawford	Military Road, Grange ..	(28) 35	(29) 84	(30) 75	194
L. H. Crawford	Military Road, Grange ..	(31) 58	(32) 8	(33) 50	116
R. C. Crittenden	William Street, Kilkenny North	(34) 97	(35) 100	(36) 28	225
Chas. H. Day	Box 28, Salisbury	(37) 82	(38) 54	(39) 74	210
J. H. Dowling	Glossop	(40) 89	(41) 79	(42) 63	231
T. Duhring	Mallala	(43) 87	(44) 83	(45) 68	238
T. Duhring	Mallala	(46) 68	(47) 26	(48) 50	144
H. Fidge	313, Cross Roads, Clarence Park	(49) 63	(50) 55	(51) 60	178
V. F. Gameau	Findon Road, Woodville .	(52) 49	(53) 77	(54) 76	202
W. Chas. Slape	Magill Road, Magill	(55) 90	(56) 104	(57) 98	292
G. C. Gavin	Salisbury	(58) 69	(59) 55	(60) 80	204
G. C. Gavin	Salisbury	(61) 96	(62) 70	(63) 88	254
H. H. Hefford	McHenry St., Murray Bdge.	(64) 62	(65) 55	(66) 9	126
H. H. Hefford	McHenry Street, Murray Bridge	(67) 118	(68) 74	(69) 45	237
W. H. A. Hodgson ..	Commercial Rd., Salisbury	(70) 88	(71) 83	(72) 53	216
W. H. A. Hodgson ..	Commercial Rd., Salisbury	(73) 65	(74) 70	(75) 41	176
E. A. Lamerton	Cross Roads, Edwardstown	(76) 58	(77) 35	(78) 91	184
C. H. Lines, jun. ...	Box 75, Gladstone	(79) 85	(80) 104	(81) 34	223
C. H. Lines, jun. ...	Box 75, Gladstone	(82) 89	(83) 68	(84) 77	234
G. W. Lindsay	117, Government Road, Croydon	(85) 76	(86) 75	(87) 33	184
L. A. G. Pitt	24, John Street, Payneham	(88) 90	(89) 72	(90) 66	228
L. A. G. Pitt	24, John Street, Payneham	(91) 89	(92) 94	(93) 80	263
H. A. Rasmussen ...	Swan Terrace, Ethelton .	(94) 35	(95) 86	(96) 90	211
H. A. Rasmussen ...	Swan Terrace, Ethelton .	(97) 80	(98) 77	(99) 48	205
S. E. Reedman	51, Gilbert Street, Gilberton	(100) 59	(101) 109	(102) 45	213
Bruce Rowe	"St. Kevern," Two Wells	(103) 71	(104) 64	(105) 114	249
Bruce Rowe	"St. Kevern," Two Wells	(106) 75	(107) 90	(108) 64	239
H. J. Stacey	Uraidla	(109) 59	(110) 67	(111) 83	209
H. J. Stacey	Uraidla	(112) 91	(113) 90	(114) 29	210
Thomas & Elson ...	53, Clifton Street, Hawthorn	(115) 22	(116) 22	(117) 82	126
Thomas & Elson ...	53, Clifton Street, Hawthorn	(118) 69	(119) 71	(120) 68	208
H. L. Twartz	Gawler	(121) 63	(122) 92	(123) 85	240
H. L. Twartz	Gawler	(124) 70	(125) 55	(126) 82	207
F. F. Welford	1, Ludgate Circus, Colonel Light Gardens	(127) 75	(128) 88	(129) 59	222
F. F. Welford	1, Ludgate Circus, Colonel Light Gardens	(130) 98	(131) 99	(132) 16	213

EGG-LAYING COMPETITION—SECTION 1—WHITE LEGHOENS—*continued.*

Competitor.	Address.	Score to Month ending October 31st, 1933.			
		Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Totals
A. P. Uriwin	Box 80, Balaklava	(133) 69	(134) 95	(135) 91	255
A. G. Dawes	230, Portrush Road, Glenunga Gardens	(136) 118	(137) 94	(138) 78	290
Total—Section 1		—	—	—	9,743

SECTION 2—ANY OTHER LIGHT BREEDS.

V. F. Gameau	Findon Road, Woodville (Minorcas)	(139) 85	(140) 48	(141) 31	164
M. O. and C. A. Roberts	Torrens Road, Kilkenny (Minorcas)	(142) 33	(143) 64	(144) 44	141
Total—Section 2		—	—	—	305

SECTION 3—BLACK ORPINGTONS.

Arthur Cook ..	187, Goodwood Road, Colonel Light Gardens	(145) 107	(146) 114	(147) 54	275
B. Cooke	Kanmantoo	(148) 34	(149) 10	(150) 49	93
L. H. Crawford	Military Road, Grange ..	(151) 62	(152) 67	(153) 89	218
L. H. Crawford	Military Road, Grange ..	(154) 106	(155) 102	(156) 113	321
Les. Darcy	Mypolonga	(157) 110	(158) 93	(159) 85	288
Les. Darcy	Mypolonga	(160) 53	(161) 93	(162) 53	199
J. H. Dowling	Glossop	(163) 47	(164) 44	(165) 19	110
H. Fidge	313, Cross Rds., Clarence Pk.	(166) 81	(167) 54	(168) 62	197
H. H. Hefford	McHenry Street, Murray Bridge	(169) 62	(170) 16	(171) 113	191
F. J. Hudson	54, Willcox Av., Prospect	(172) 61	(173) 105	(174) 22	188
A. G. Dawes	230, Portrush Road, Glenunga Gardens	(175) 34	(176) 126	(177) 77	237
C. H. Lines, jun.	Box 75, Gladstone	(178) 92	(179) 32	(180) 58	182
C. H. Lines, jun.	Box 75, Gladstone	(181) 88	(182) 45	(183) 88	221
H. J. Mills	Edward St., Edwardstown	(184) 95	(185) 102	(186) 100	297
H. J. Mills	Edward St., Edwardstown	(187) 117	(188) 92	(189) 90	299
J. Rawe	Honeyton St., Seaton Pk.	(190) 98	(191) 44	(192) *	142
S. E. Reedman	51, Gilbert St., Gilberton.	(193) 68	(194) 59	(195) 109	236
S. E. Reedman	51, Gilbert St., Gilberton.	(196) 18	(197) 103	(198) 95	216
H. L. Twartz	Gawler	(199) 40	(200) 97	(201) 79	216
A. G. Dawes	230, Portrush Road, Glenunga Gardens	(202) 123	(203) 100	(204) *	223
N. F. Richardson ...	60, Beaufort St., Wood- ville Park, Kilkenny	(205) 124	(206) 104	(207) 107	335
W. H. L. Wittenberg	3, Rushton St., Goodwood	(208) 92	(209) 23	(210) 35	150
W. H. L. Wittenberg	3, Rushton St., Goodwood	(211) 57	(212) 88	(213) 98	243
W. Woodley	Tailem Bend	(214) 23	(215) *	(216) 68	91
W. Woodley	Tailem Bend	(217) 81	(218) 59	(219) 58	198
Total—Section 3		—	—	—	5,366

SECTION 4—ANY OTHER HEAVY BREED.

H. Fidge	313, Cross Roads, Clarence Park (Rhode Is. Reds)	(220) 42	(221) 54	(222) 44	140
V. F. Gameau	Findon Road, Woodville (Rhode Island Reds)	(223) 85	(224) 48	(225) 71	204
V. F. Gameau	Findon Road, Woodville (Rhode Island Reds)	(226) 57	(227) 67	(228) 89	213
H. J. Mills	Edward St., Edwardstown (Rhode Island Reds)	(229) 109	(230) 108	(231) 62	279
W. R. Williams	28, Avenue Rd., Frewville (Rhode Island Reds)	(232) 71	(233) 73	(234) 46	190
W. R. Williams	28, Avenue Rd., Frewville (Rhode Island Reds)	(235) 73	(236) 35	(237) 97	205
Bruce Rowe	"St. Kevern," Two Wells (Barnevelders)	(238) 84	(239) 54	(240) 39	177
Bruce Rowe	"St. Kevern," Two Wells (Welsumers)	(241) 28	(242) 68	(243) 1	97
Total—Section 4		—	—	—	1,505

*Dead.

NOTE.—Only first grade eggs are shown above.

RED COMB EGG ASSOCIATION.

LEADING SCORES TO WEEK ENDING NOVEMBER 3RD, 1933.—FIRST
GRADE EGGS ONLY.

WHITE LEGHORNS.		
<i>Singles—</i>	Eggs Laid.	Bird Nos.
A. G. Dawes	118	136
H. H. Hefford	118	67
B. Rowe	114	105
<i>Trios—</i>		
W. C. Slape	292	55-57
A. G. Dawes	290	136 138
B. Cooke	270	19-21
<i>Teams—</i>		
L. A. G. Pitt	491	88 93
B. Rowe	488	103 108
G. C. Gavin	458	58 63

MINORAS.		
<i>Singles—</i>		
V. F. Gameau	85	139
M. O. and C. A. Roberts	64	143

BLACK ORPINGTON		
<i>Singles—</i>		
A. G. Dawes	126	176
N. F. Richardson	124	205
A. G. Dawes	123	202
<i>Trios—</i>		
N. F. Richardson	335	205 207
L. H. Crawford	321	154 156
H. J. Mills	299	187 189
<i>Teams—</i>		
H. J. Mills	596	184 189
L. H. Crawford	539	151 156
A. G. Dawes	502	175-177

and 202-204

ANY OTHER HEAVY BREEDS.		
<i>Rhode Island Reds.</i>		
<i>Singles—</i>		
H. J. Mills	109	229
H. J. Mills	108	230
W. R. Williams	97	237
<i>Trios—</i>		
H. J. Mills	279	229-231
V. F. Gameau	213	226-228
W. R. Williams	205	235-237
<i>Teams—</i>		
V. F. Gameau	417	223-228
W. R. Williams	395	232-237

EXPERIMENTAL FEEDING TESTS CONDUCTED AT PARAFIELD
POULTRY STATION.

[By C. F. ANDERSON, Poultry Expert.]

A series of feeding tests are being conducted at Parafield Poultry Station with a view to ascertaining if suitable foods which are obtainable on the majority of our farms can be satisfactorily fed to poultry. The tests are each of 50 White Leghorn pullets, and commenced on April 1st, 1933.

The feeding is as follows:—

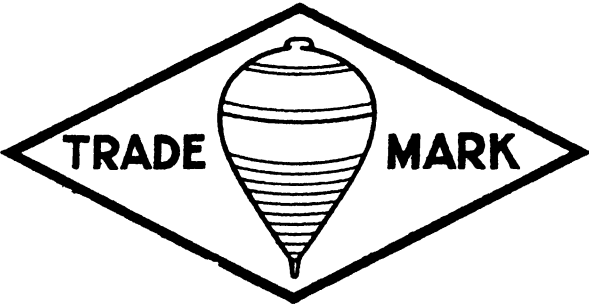
- No. 1 Test.—Morning—Wet mash composed of 1 part crushed barley, 2 parts wholemeal (by weight), $\frac{1}{2}$ lb. meat meal, 40 per cent. chaffed greenfeed.
Midday—1oz. wheat per bird. Night—1oz. wheat per bird.
- No. 2 Test.—Dry mash composed of same proportions as No. 1 Test.
Midday—Greenfeed. Evening—Wheat.
- No. 3 Test.—Morning—Wet mash composed of 1 part bran, 2 parts pollard (by weight), $\frac{1}{2}$ lb. meat meal, 40 per cent. chaffed greenfeed.
Midday—1oz. wheat per bird. Night—1oz. wheat per bird.
- No. 4 Test.—Morning—Wet mash composed of 1 part bran, 2 parts wholemeal (by weight), $\frac{1}{2}$ lb. meat meal, 40 per cent. chaffed greenfeed.
Midday—1oz. wheat per bird. Night—1oz. wheat per bird.
- No. 5 Test.—Morning—2ozs. wheat per bird. Evening—2ozs. wheat per bird. Greenfeed in season.

The following are the numbers of eggs laid by each pen from April 1st, 1933, to October 31st, 1933.

Definite conclusions, however, cannot be given at this juncture with regard to the various methods of feeding. It is necessary for the tests to complete the 12 months before any satisfactory opinions can be formed.

No. of Test.	No. Eggs Laid		Total Eggs Laid
	April 1st to September 30th.	No. Eggs Laid Month October.	April 1st to October 31st.
No. 1	3,391	888	4,279
No. 2	2,968	928	3,896
No. 3	2,730	839	3,569
No. 4	3,223	956	4,179
No. 5	1,356	527	1,883

TOP BRAND
SUPER



NOT COMPULSORY, BUT NECESSARY TO
USE ON ALL CROPS AND PASTURES.

MANUFACTURERS—

The Adelaide Chemical & Fertilizer Co., Ltd.

PAPERS READ AT CONFERENCES.

THE MILLING QUALITIES OF WHEAT.

[Contributed by MR. G. L. CHINNER (Loxton) at the Murray Lands East Branches, Taplan, October 17th, 1933.]

Various reports have appeared in the press of the efforts of the Minister of Agriculture, the Hon. A. P. Blesing, M.L.C., to discover the most suitable wheats for various districts in this State. It has been pointed out how essential it is to produce varieties of wheats that will return to the farmer a good yield and at the same time embody a strong quality so that Australian, and South Australian wheat in particular, may regain its former prestige, and thus command top price in the world's markets.

The liberty is taken of freely quoting Mr. Wenholtz, Director of Plant Breeding, New South Wales Agricultural Department, whose achievements entitle him to be quoted as an authority on wheat in general. Many farmers will recollect the time when most of the old Purple Straw varieties of white color and soft character were supplanted by some of Farrer's and Marshall's crossbreeds, *e.g.*, Federation, Yandilla King, Marshall's No. 1, Dart's Imperial, and Steinwedel. These, whilst being in general cultivation, offered no special claim to favor from the miller's point of view. Of all the new varieties, Federation proved a great disappointment, as its flour did not come up to expectations regarding quality.

Strong and Weak Flours.

The baking quality of wheat flour is ascertained by the number of loaves that can be produced from a given quantity of flour, such loaves to be of fine texture, good color, and pleasing to the taste. It is known that the most important factor in the determination of quality or strength is the gluten, in which the nitrogenous portion of the wheat is contained. However, it is not the quantity of gluten, but the *quality* which constitutes the determining factor in the baking quality. Flour that contains a large quantity of gluten of good quality possesses the capacity to absorb a large quantity of water, yields dough of toughness and elasticity, which will stand severe handling in the troughs and holds the gas generated during fermentation period. Baking with such flour produces a good loaf of bread.

Weak flours generally contain a low percentage of gluten of more or less poor quality, which reacts on the fermentation process, resulting in soft, sluggish doughs. The gluten may be regarded as comprising the walls of a cell, which are being subjected to pressure from within by the expansion of gas evolved by the yeast organism in the dough. A low quality gluten in the flour means that the cell walls, being thin and unable to withstand the pressure, burst. Such dough generally drives a baker to distraction, for the result is a very poor loaf.

Good quality gluten is generally obtained from hard wheat varieties—medium and poor quality from soft grain. It must not be assumed, however, that all hard wheats produce the best loaf of bread. The term "quality in wheat" means the quality of flour milled from such wheat. Therefore, grain quality depends on the gluten quality. This characteristic seems to be inherent in any wheat variety not modified to any extent by environment. On the other hand, the quantity of nitrogen, that is, gluten in a wheat variety, is influenced by hereditary environment.

Of the old wheats, such as Purple Straw and similar varieties—which in their day proved great bread producers—one has no hesitation in asserting that bakers produced a superior loaf of bread from those wheats than they are able to do from present-day grain. The commercial art of baking has been developing on lines very different from former times, being beset with difficulties that did not then arise. In many

[Papers Read at Conferences.]

cases the flour, first of all, lacks quality, the deficiency in which is being made up by electric chemical bleaching and the employment of various yeast foods or yeasts. The advent of machinery in the bakehouse contributes further towards the demand for stronger flours. The severe punishing the doughs are subjected to in power mixers—in combination with dividers and moulders—puts a severe strain on the fermentation process. Unless the gluten in the flour possesses sufficient quality to stand this punishing by machinery, this way of dough making defeats itself. By this fact the anomaly becomes evident of two flours of the same identity producing dissimilar results. The housewife and the small baker who do not use machinery, but hand-mix the dough and mould it, are able to watch the fermentation. Not being tied to time to take the dough whether ripe or not, the small baker may produce a pleasing loaf, whilst the machine-made loaf runs a bad second. The flour is blamed for this failure, whereas the blame should primarily be attached to the wheat. Occasionally some housewives, who are baking their own bread, often find their tempers tried by the sluggishness of fermentation and the resulting poor loaf, but in nine cases out of ten the cause of failure can be attributed to the wheat. Even bad milling may not spoil good wheat. The biggest miller in New South Wales once observed that good wheat milled on a pair of freestones and dressed through a ladder would produce good flour, but it is not possible to make good flour from poor quality wheat, even with the best machinery. No matter how the flour is treated, if the inherent quality of the gluten is faulty, then the result—bread—will be faulty also. In connection with this important question, the following incident of recent occurrence is related. A country miller friend asked me to see him regarding flour trouble, and reviewing the situation on the spot I soon came to the conclusion that the wheat—Baldmin—was responsible for the flour trouble. My friend could not believe this and had the flour analysed in the city, the test showing only a 5 per cent. gluten content from 67lbs. per bushel wheat. This seems hardly credible, nevertheless this fact alone accounted for the poor baking results. I am not exaggerating when I state that a loaf of bread from Baldmin wheat is a total failure.

Australian flour should contain approximately 10 per cent. gluten of fair quality, and this percentage has always been recognised in the world's markets.

For some years past all the energies of most agricultural colleges, as well as private breeders, have been spent in obtaining "bushels per acre." Quantity became the most important factor, and it has thus happened that there are more than 200 varieties of wheat grown in South Australia to-day. Gradually, but more insistently, as years went on, bakers began to complain about the loss of "kick in the flour. Millers generally were more or less puzzled, most of all country millers whose supplies were drawn mostly from round about the district in which the mill was situated. That many of these newer heavy-yielding varieties of wheat proved the cause of the trouble became evident.

Baking Quality and the Producer.

What has the question of baking quality in wheat to do with the primary producer? The farmers' foremost consideration must necessarily be to obtain the largest number of bushels. No one is desirous of altering this, but since Australia is an exporting country in wheat as well as flour, it remains of supreme importance that she meets competition by keeping up the "quality." Australian flour is now considered weak, and therefore not on a price level with strong flours, notably Canadian and United States spring crop. The English baker uses Australian flour primarily for its color, dryness, and sweet flavor.

The Chinese and Japanese distributors have both lately complained of the quality of Australian wheats and flours. The Eastern importers for years being used to the outstanding qualities of Canadian products severely criticise the New South Wales

[Papers Read at Conferences.]

wheat shipped and containing as much as 8 per cent. rubbish. They also complain of the flour, much to the surprise of the authorities. In China, where the native population is not using flour in the shape of bread, but makes dough balls and fries them in oil or fat, the flour that will return the largest quantity of dough from a bag of flour will command the best price in this market.

Some 40 odd years ago the late W. Farrer devoted his time to the improvement of Australian wheat, having in view the outstanding qualities of the red, hard Canadian varieties for the manufacture of strong flour. He succeeded in raising new varieties of the desired character—Comeback, Bobs, Jonathan, Florence, &c., Farrer, without doubt, succeeded in one respect better than he anticipated. He made a great wheat for the miller, but unfortunately a poor wheat from the farmers' point of view. His hard wheats "did not yield," and for this reason quickly disappeared, with the exception of Florence. Strangely enough, Florence, a cross between a Fife wheat and Nepaul skinless barley, survived, supplying the miller with a strong wheat which he required to mix with and build up the weak wheats he was compelled to take in the absence of any better.

All of the newer varieties can be termed only medium and poor flour wheats, the results of years of unchecked breeding by agricultural experimental stations and private breeders.

The private breeders' aims are to obtain wheat free from disease which will yield the most bushels. He had no means of comparing definite results until the progeny of his work became evident in the baked loaf of bread. The agricultural stations, however, possessed the means of ascertaining the probable quality much earlier, by submitting grain to a nitrogen test, and were in a position to reject anything not coming up to standard, but bushels always predominating.

Gluten Content of Wheat.

The following is the latest process discovered by a German chemist, Pelshenke, for ascertaining the gluten content of any wheat variety, even in its earliest stages of evolution:—

A small doughball of finely ground wholemeal mixed with 5 per cent. of its weight of compressed yeast is allowed to ferment in a beaker of water kept at an even temperature, and the time taken for the doughball to burst is regarded as a measure of the combined quantity and quality of the gluten. The quality of the gluten is determined by dividing this figure by the protein content of the wheat. It is stated that these tests of various wheats in different countries have given similar results to those returned from baking tests. It is also extremely useful in testing some high gluten flours where the difference in baking quality is not distinctively apparent in a straight baking test, but only becomes apparent in a blend test. It must not be assumed that the strongest flour, used alone, will produce the best loaf of bread.

Doctor Callaghan, of Roseworthy College, has adopted this process in his cross-breeding experiments. He will also be able to weed out such wheats as he finds unsuitable to meet the demand for quality. Since it takes 10 to 15 years to produce a new wheat variety, South Australia will have to draw on New South Wales, where Mr. Wenholz has succeeded in establishing varieties of outstanding character. In three years he expects to have 1,000,000 acres under crop in New South Wales.

South Australian millers are not asking farmers to depart from their bushel policy. To the contrary; until such time as they can be supplied with better wheats such as those now being bred in New South Wales the miller would appreciate a small supply of Florence. It is realised that Florence does not meet with special favor, but it represents that one variety in South Australian wheats that does supply the kind of flour millers and bakers are looking for. Doctor Callaghan is anxious to improve Florence by overcoming the bad habit of "shaking out." Millers are also considering the advisability of paying a small premium for good milling wheats, such as Florence and other similar varieties.

[Papers Read at Conferences.]

Again referring to the poor baking qualities of Baldmin grown in the middle north, it is not to be understood that this wheat represents the only variety of such character. By no means. Gallipoli, for instance, bears a very bad character amongst Victorian millers. Since baking tests have not been carried out by the South Australian Agricultural Department, and country millers do not possess the necessary instruments for doing so, there is much guesswork attached to the baking qualities of wheats which are drawn from small areas only. The larger town mills working in definite mixtures, where individual varieties of wheat have to be tabulated, do not disclose the results of baking tests made in their laboratories. Suffice it to state, according to results ex the New South Wales Agricultural Department, Gluyas, Federation, Currawa, Sultan, Caliph, Nabawa, and similar newer wheats are being tabulated as medium to poor, and therefore poor bread producers.

However, certain factors have to be considered that influence the baking quality, even in medium and poor wheats. Climatic conditions constitute one of these factors. Wheat grown in districts where moist and cool conditions prevail, is soft in texture and poor in gluten in comparison with similar varieties produced in hotter and drier regions. This explains the reason why mallee grown crops are superior quality flour producers compared with crops grown in districts with a higher rainfall. Since it is possible to-day to determine the baking quality of any wheat variety without having recourse to baking the flour, the millers are requesting the Agricultural Department to subject, first of all, the Show wheats to this test. The Department is sparing no effort to tabulate the individual characteristics of most of the exhibits, but as yet, the most important factor, both from the millers' and bakers' viewpoint is absent, namely, baking quality. Doctor Callaghan recognises this and is taking all possible steps to remedy the matter.

South Australian flour meets with severe competition overseas, and the local trade is burdened with high taxation costs. The industry is not spoonfed, but has to stand on its own feet. There is no export premium or bonus of any kind on export flour. Therefore, the State depends on farmers to foster this industry, and incidentally benefit themselves by growing good quality wheat.

A big improvement in the wheat industry will be noticed when the State produces good yielding wheats of high quality.

PINNAROO LINE BRANCHES, PARILLA, SEPTEMBER 26th, 1933.

FODDER CONSERVATION.

[By C. W. NEINDORF, Parilla.]

The writer of this paper makes no apology for bringing forward this hardy annual. We can rest assured that history will repeat itself, and that whilst this season now gives every indication of giving us a bountiful harvest of both grain and fodder crops, the year will assuredly come when there will be a shortage of farm-grown livestock and foodstuffs. So soon as good seasons come we are too prone to forget the lessons that we should have learned during times of scarcity.

One of the main essentials of livestock husbandry is the careful management of the animals, and not the least important of these is that, while the holding should be stocked to its fullest carrying capacity, care must be exercised to guard against overstocking. If the former point is to be observed, then during certain months of the year the farmer must be prepared to resort to hand feeding if maximum results are to be obtained from the flock.

Fodders can be conserved in the form of ensilage, grass, chaff, straw, and hay, but it is desired to draw particular attention to the conservation of oats and oaten hay. The oat crop is a valuable item in rotation of crops in the mallee. It increases the

[Papers Read at Conferences.]

fertility of the soil for the ensuing crop of wheat, and tends to reduce the ravages of takeall by starving out this disease. The cheapest method of handling oats is to drill in the seed on the wheat stubble with a disc before rain, if possible, either in February or March. Such early sowing is certainly something of a gamble, but if the crop does not make sufficient growth, on account of weeds, to give a cut of hay, it will pay handsomely as a feed paddock.

The better plan, however, is to work up a grass paddock in February or March, and seed it as early as possible—certainly not later than the middle of May. In the event of a wet season being experienced, an extra working would be advisable.

It is not necessary to have good fallow to produce a good hay crop, excepting possibly if the oats are sown on new land, where the fallowing would get rid of stumps, and so enable the binder to do a more satisfactory job. In all cases seed the crop at the rate of 1bush. of oats to 50lbs. to 70lbs. of super per acre.

Of the many varieties of oats grown in the mallee, I favor the following:—Algerian and Scotch Grey. From observations of the Fulghum oat, I consider it will ultimately replace Algerian. This oat ripens quite a fortnight earlier than the other varieties, and is an important factor in enabling the hay harvest to be got out of the way before the reaping of wheat is commenced. Guyra makes a prolific growth, and I am trying this variety for the first time this year. Palestine appears to be the best oat for grain.

A fair average for chaff grown on the farm is £2 10s. a ton, yet it is not uncommon for farmers to have to pay up to £10 for chaff.

All over the State men on the land are reverting to the use of the horse for farm power, and this is another reason why the ample provision of feed supplies should be made in seasons of plenty.

Too many farmers make the mistake of cutting the oat crop for hay when it is too far advanced towards the ripening stage. It can be cut with absolute safety much greener than is the general practice.

After having gone to the trouble of growing the crop, cutting, stooking, and carting it, some provision should be made to guard it against attacks by mice. To do this effectively, the writer suggests that the site of the stack should be enclosed with galvanised iron about 3ft. high. Take care, however, not to leave anything resting against the iron up which the mice can travel, and so enter the stack.

Finally, the stack should be covered with a thick layer of straw, and netting placed every 3ft. or 4ft. apart to keep it in place. For a stack that is held in reserve an extra layer of straw next year is advisable. If the stacking is done in dry weather, salt water can be sprinkled on every layer. If the weather is wet, crushed salt can be used.

POINTS ON KEEPING POULTRY FOR PROFIT.

[By S. R. G. CHENEY, Parilla.]

Leading authorities are all of the same mind, that, through years of testing, the best methods give best results. We need something better than "barn door" fowls to make the difference between profit and loss. For a growing industry that is six times the size of six years ago it goes to say that we have, and must still improve the strain. We need better breeding stock for the purpose.

The size and number of eggs are the main factors. To get these results, all eggs used for hatching must be 2ozs. or over (either for incubator use or for hen), fresh and clean, and of good shape—fresh, for sturdy chickens; clean, to help in checking vermin; and good shape, to be sure of no cripples.

The eggs should be laid by second-year hens, so that all young stock are given the best start possible—the older the hen the stronger the chick. The male bird used for mating should not be less than 10 months old. There are several ways of mating, but

[Papers Read at Conferences.]

the above methods are the ones used by nearly all leading breeders. Be sure the cockerel is from a good laying strain, good size, healthy and vigorous. He controls in progeny, size of egg, and body. One that has been dubbed or combed off is by far the best.

Care of chickens is a big factor in successful breeding. They must be kept on the move and kept growing, have plenty of green feed, grit, warmth at night, and fresh air.

When they are four months old all cockerels should be separated from pullets, locked up, fed, and fattened for market. Pollard soup is mostly used. The pullets are fed on mash, bran and pollard, and green feed in the mornings, wheat at night, thrown in a litter so that scratching and exercise are used in obtaining same.

I would recommend White Leghorns first, if closed up and fed on the intensive system; next, Black Orpingtons. These birds are splendid layers if the right sorts are obtained.

Gather the eggs twice a day, and give the birds plenty of clean, fresh water, kept in the shade. See that the birds are not sleeping in a draught.

Breed Black Orpingtons in August, and White Leghorns in September. They will then be laying when eggs are at the top price.

Fowl-houses should be inspected regularly. Keep down all vermin, using waste oil or kerosene. This is healthy for the birds, and a check on disease. Bluestone in water is a good tonic. Charcoal and shell grit are also needed. Brush all roosts with oil or kerosene every two weeks.

WHEAT OR MEAT?

[By R. C. JACOB, Geranium.]

It has generally been recognised and frequently emphasised that wheat was the ultimate objective of the farmer and that all other operations were more or less sidelines leading up to the production of the maximum crop of wheat at the end of the rotation; but since the disastrous drop in world wheat prices, largely due to the heavy surplus accumulated in America by the artificial manipulation of the market, has been slower in recovering, so that the wheatgrower puts his crop in with the almost certain knowledge that he will lose money on the project.

Undoubtedly, it is the development and maintenance of sidelines that has kept the majority of farmers in this district on their farms and off the dole. Unless something unforeseen occurs in one of the great wheat-producing countries to reduce that huge surplus, such as seasonal influences ruining existing crops or that big carry-over is destroyed by fire or some other means, there is little likelihood of a change in the position for the better, as we are still getting a premium through exchange. It is a question, therefore, of how long the State or the farmer on whom the State depends can carry on.

However, under the terms of the Ottawa Agreement, we have a golden opportunity of improving our position through meat—chiefly lamb, mutton, pork, and poultry. The position was made very clear by Colonel Copley at Congress. He stated that Britain was fulfilling her part of the Agreement, and the obligation was therefore on Australia to do her part. Up to June 30th last, 1,713,000 carcasses of mutton and lamb had been sent to England this year, leaving 2,586,500 still to be sent if available. The quota for 1933 is 4,300,000 carcasses, which would be the greatest number ever shipped, but it was unlikely that that number would be reached. After June 30th, 1934, there would be no quota as far as Australia was concerned. She could ship all she could produce. England consumed mutton and lamb as follows:—

	Tons.
Home grown	324,468
New Zealand	195,793
South America	94,112
Australia	57,802

[Papers Read at Conferences.]

and under the agreement there would be a progressive restriction upon foreign imports varying from 10 per cent. for the quarter ending March 31st, 1933, to 35 per cent. for the quarter ending June 30th, 1934.

The market is there, and if we do not seize the opportunity and make use of it we might not get such a chance again, but it will be of no avail if we do not study their requirements instead of expecting them to accept whatever we like to ship.

There is no question that the stock-carrying capacity of our districts as a whole can be increased on the larger farm, chiefly with sheep, and on the smaller with pigs and poultry, probably associated with dairy cows.

It appears to me that we would be wise to confine cropping wheat to the land most suited to it, and give it the best treatment possible, and sow the rest of our cultivated area to oats, peas, barley, or fodders for stock feed, and utilise all stubbles with grazing crops or even just top-dressing the pastures so as to increase the flock to the maximum and provide a reserve of hay, ensilage, or grain to tide over a lean time. It means departing from the system of farming that has been evolved and adopted from years of experience which under normal price conditions of wheat paid, but it offers greater possibilities of profit in the near future, and will certainly lead to increased yields, and so lower the cost of production in later years.

It is impossible to formulate any definite scheme. Each farmer will have to decide for himself what he can best do, as it is a matter largely of finance and local conditions.

It means definitely an increase in the quantity of super purchased, and in some cases possibly the purchase of sulphate of ammonia or other means of applying nitrogen. This is a difficulty we must overcome if we are to keep to our end of the Ottawa Agreement and get the most profit from our farms. Superphosphate is unquestionably the life-blood of our industry here.

Experiments and practice have proved conclusively over a period of years that 1 cwt. of 45 per cent. superphosphate per acre more than doubles the natural carrying capacity and increases the profit of our farms, but how many farms get it? At the Waite Research Institute this year even with a dry winter the increased bulk of fodder on barley on unfallowed land by the use of sulphate of ammonia and on pasture by the addition of Subterranean Clover is outstandingly self-evident.

It is well known and easily seen on many farms in this district how heavier or continuous application of super increases the growth of native clovers, so by increasing the super we increase available nitrogen by encouraging clovers, and it is certain that nitrogen plays a much bigger part in the success of all our crops than is generally realised.

It has definitely been proved that the amount of available phosphate and nitrogen in a soil greatly affects the drought-resistant qualities of the crops grown, also its rate of maturity; also that, by regulating the quantities of either, the composition of the pasture can be controlled within limits, and it is self-evident that the quality of the pasture is reflected in the quality of the stock grown on it, and the profits derived therefrom.

Having arranged for the feed, what are we to do about the stock to eat it? As wool is a much better figure, finance for stock should be simpler and not an unsurmountable difficulty; so, assuming finance is available, what should we aim at? All tests have shown that the cross-bred mother is the best for a fat lamb for the English market, using a Down-type sire, of which there is a fair selection. An even or any line of Crossbred ewe is difficult to get; the next best would be a Comeback, and if they are bred by Corriedale sires out of even-type Merino ewes they are more likely to be of even type than if bred by Merino rams from Crossbred ewes. Failing these, of course, the large framed, plain bodied Merino ewe is more easily secured, and will have to be in the majority for some years, but we must not forget that the English taste is against anything that savors or points to Merino, viz., the dark flesh and longish leg of mutton. They will pay more for the chunky, lighter colored flesh of the British breeds.

[Papers Read at Conferences.]

It is important to catch the early market, so lambs should be dropped about April, and every care taken that they get no check by feeding the ewes both before and after lambing if necessary, supplying a phosphate lick and having plenty of good water.

On smaller farms possibly cows and pigs offer as good if not better returns and, of course, one's natural inclinations count a lot in the successful management of either. A man must be fond of sheep to do any good with them, and love cows and pigs to put up with the continual drudgery they entail.

On the pig question we have had to change altogether our ideas of type, and there seems to be some uncertainty just what the type is, but certainly the over-fat, chunky, Berkshire type is done, and the longer, leaner, large Yorkshire pig, more suitable. This is a distinct advantage to us as large quantities of milk are not so essential, and they can be produced on open runs instead of stuffing them in sties. Pigs can be bred up quicker than most farm animals, so that it is easier to stock up with them. In the past the greatest trouble in the pig industry has been the lack of a definite export market, but this is our opportunity, and we should not lose it.

Another branch of the meat industry, beef, is important to Australia, but does not yet come within our scope. Although the English farmer does a lot in it, we cannot compete with the cheaper production of the cattle stations. Finally, eggs and poultry can be produced *cheaper on the farm than anywhere else*, and offers another avenue whereby we can utilise our grain and sell it as meat and return us a better profit.

BARLEY GROWING.

[By J. H. SPRATT, Lameroo.]

Preparation of Land.—We have found the best soil for malting or Cape barley is burnt wheaten stubble or grass land—stubble land for preference, as it generally gives a better sample. Worked over with a spring-tyne cultivator or skim ploughed, according to the conditions of land, in the autumn will allow any weed seeds or wheat to germinate. After the first rains have fallen work it once or twice with the cultivator or combine.

Seed and Pickling.—In selecting the best sample the first step to be taken, if possible, is to examine the crop from which seed is to be taken. It should be free from weed seeds and smut, also true to type, as the maltster does not like too much Cape barley in malting. Prior is the best malting variety. Formalin used at the rate of 1lb. to 40galls. of water is very effective in pickling. Divide the bag into two parts, shake, and immerse for two or three minutes; light grain can be skimmed off. Cape barley is more subject to smut than malting. Sow at the rate of 50lbs. to the acre with 80lbs. to 90lbs. of high-grade super.

Time of Sowing.—This will vary according to the break of the season, but experience has shown that May is the best month as May sowing gives the barley longer to mature. In 1930 we sowed one paddock during the latter end of April with malting barley, and reaped 34bush. to the acre of No. 1 sample. Really good crops can be grown with June seeding, providing the spring rains are good. The cool nights greatly assist barley during ripening, which is very helpful in a district situated a long distance from the coast.

Harvesting.—Barley should not be reaped before it is properly ripe or it will sweat in the bags. Great care should be exercised in harvesting malting barley, as good samples can be ruined for malting purposes by dressing the crop too close and skinning the grain. The ideal sample is that with about $\frac{1}{4}$ in. of tail left, but it is far better to leave it longer than that than to skin it. Adjustments should be made to the harvesting machine as the day warms up. The riddles should be set to avoid repeating as this is where a lot of damage results.

[Papers Read at Conferences.]

Marketing.—Submit a good average sample as soon as reaping has commenced to all the barley merchants. The price quoted on sample in the harvest period is usually the best. Malting barley should be put in new cornsacks as the buyers will not otherwise accept it for export.

Yield and Rainfall.—The following are the yields we have obtained over the past seven years:—

Variety.	Yield (Bush.).	Rainfall (1st May to end October). Inches.
1926—Malting.....	18	No. 1 sample off grass land 10-14
Cape	22	
1927—Sown for feed.		
1928—Malting.....	21	No. 1 grass land 7-57
1929—Malting.....	20	Stubble land and late fallow 6-28
1930—Malting.....	33	No. 1 grass land and stubble 9-96
Cape	35	
1931—Malting.....	20	No. 1 stubble 11-24
Cape	24	
1932—Malting.....	25	No. 1 stubble 10-26
Cape	34	

Effect on Soil.—It has been said that growing barley, especially Cape, ruins the soil and so impoverishes it that nothing else will grow. But I have carefully watched the land where barley has been sown, and there is no deterioration. Some of our best wheat crops have been grown where we have had barley.

Feed.—The paddocks where barley has been sown make excellent feed for all stock. Any heads that may be snapped off by the wind, or grain lost in harvesting, will be readily sought after by sheep which, with plenty of water, will soon put on condition. The grain that gets buried will germinate with the first rains, and makes rapid growth. It is ideal feed for ewes and fat lamb raising.

HYRE'S PENINSULA (LOWER), AT CUMMINS, OCTOBER 4th, 1933.

FENCING.

[By W. E. BRYANT, Cummins.]

Erecting new fences and replacing or repairing old lines of fencing are problems that have to be faced by all landholders every year. When erecting new lines of fences, once the line is pegged place the posts along the line before the holes are sunk, then one can sink the holes to suit the posts; the same rule also applies to renewing old lines of fences.

A very good method to follow is to put up each post as the work proceeds, with enough earth around it to keep it steady. Do this for one strain, then go back and ram them tight. If this is done it is possible to correct any fault if the posts are a little out of line in the bottom. In putting posts in line always use the line ahead in preference to the back line.

A class of fence used very extensively many years ago in the Terowie district was a wooden post every 40ft., a flat iron post every 40ft. placed half-way between each wooden post, and two corrugated droppers between each wooden post—strainers every 133½yds., 146½yds., or 160yds. as desired or angles in the line permitted, giving four 10ft. spans between each wooden post.

The wire spacing from the ground upwards was 6in., 6in., 6in., 6in., 8in., and 10in., a total height of 42in., the top wire being barbed. I have erected miles of this class of fence for 6d. per post, strainers included, without anything for droppers or iron posts. In replacing old lines of fence cut all wires and knots except the top wire, and split off broken posts. The old wires can then be removed fairly easily either by hand or with a horse and cart, taking out or taking off the top wire last.

[Papers Read at Conferences.]

In boring use a 9/16ths inch or $\frac{1}{2}$ in. bit; they clean better than $\frac{1}{2}$ in. bits, particularly if the posts are green or only partly dried. The holes for plain wire fences should be bored direct along the line, also even with the surface of the ground, because one or two holes bored out of line in either direction greatly increase the labor of pulling in the wires. Experience soon teaches the value of attention in this matter, particularly if working single-handed. If handling new wire I use a spinning jenny made from 3 in. x 2 in. hardwood—two pieces a little longer than the largest coil of wire, cut half through at the centre and crossed, leaving the surface level. Nail them together, and bore a hole through the centre; place on a block of wood 4 in. or 5 in. high with a hole through it, and drive an iron pin through both into the ground. Bore eight holes, two in each arm, so that they will be inside of each coil, and use four wooden pegs to keep the coil in position, and the wire is easily run in the line of fence.

For vermin-proof fences it is customary first to erect the line of fence, then plough out the trench, which requires very little straightening afterwards. In running out the netting use a horse and dray, the netting being placed on a bar on the side rail at the back of the dray, keeping the belly in the netting towards the fence. For straining, a stick with four $\frac{1}{2}$ in. hooks in it and a rope to pull around the post can be used.

In filling in the trench after the netting was tied on I always use a shovel, then the netting can be stretched where the ground is a little lower than usual. The earth is sometimes ploughed back into the trench, and while this is certainly much quicker and easier it does not make such a neat job when completed.

A point well worth remembering is to put the netting on the lower side of the fence, this greatly reduces the risk of floodwaters taking the fence with it. In using 36 in. or 42 in. netting with a barb wire above it two plain wires are enough if the netting is well buried, say, 3 in. to 4 in., because stock will not bother a netting fence like a plain wire fence.

In erecting cyclone fence I use all iron corkscrew posts, 5 ft. long, placed 15 ft. apart, with wooden sleepers for line-strainers every 7 $\frac{1}{2}$ chains, straining the barbed wire first and using lift shifting stays. Two of the cyclone special strainers were used—one a strain ahead of the other. By using two strainers the fence does not go slack. The cyclone fence was tied in three places to each post—top, bottom, and middle.

The cyclone Kinglock 26 in. fence is excellent for sheep, but for big stock it may not prove so serviceable. For subdivision the fence is placed 7 in. from the ground, with a barbed wire 10 in. above the cyclone—total height of fence, 3 ft. 7 in.

MOUSEPROOF HAYSTACKS.

[By F. J. JERICOHO, Cummins.]

The mouse-proofing of haystacks is a valuable safeguard against damage, and can be done without much trouble and expense. The stage can be made with ordinary wooden fence posts 6 ft. long cut in halves and put in the ground about 18 in.; the other 18 ins. will be quite high enough for the purpose—placing the posts about 6 ft. each way. Railway rails on the posts for rafters will give the best results, or round rafters of wood are quite satisfactory (5 in. diameter). Before putting the rafters on the posts place kerosene tins cut in halves on the posts. On the rafters ordinary mallee rails 8 ft. long and 1 ft. apart will serve the purpose.

For a stage 44 ft. x 15 ft. seven posts each 6 ft. long in each of three rows, six railway rails, and about 80 to 90 mallee rails 8 ft. long and 2 in. to 3 in. through will be required. There are no mice in my stack, which contains three seasons' hay, neither has there been any waste from the stage. No grass will grow within 3 ft. of the stage, and neither will any loose straw or hay which falls near the stage remain there, because the slightest breeze will shift it, which is a good fire protection.

[*Papers Read at Conferences.*]

THE ADVANTAGES OF FALLOWING WITH A FOOT PLOUGH AS COMPARED WITH OTHER METHODS.

[By E. A. PFEIFFER, Cummins.]

Fallowing is an indispensable item on practically every farm, and of recent years quite a number of different implements of various constructions and designs have been used. Although these have all given varying degrees of success, the undisputed fact remains that a good foot plough equipped with P-type shares is by far the best implement for the purpose.

The P-foot is preferred to the plate type of share on account of the tendency of the plate type to skip in the heavier classes of soils, especially if the ground worked still contains a fair percentage of stumps. Moreover, it has been proved in a number of instances that as even a depth of ploughing with plate shares cannot be obtained as with the P-type of share. One has only to compare ploughs fitted with these two types of shares and take note of the difference in set between the two to obtain some idea of this.

These, however, are not the only disadvantages of the foot plough fitted with plate shares. It must be realised that while the plate share usually has two bolts by which it is fixed the P-type is simply fastened by a pin which can be removed in less than half the time which it takes to remove the other. (Especially is this the case if the bolts have become rusted.

On the whole it can be said that the plate does not do such good work in practically any class of soil, for it is frequently seen that the swath cut by the plate share is not completely turned over. The plate share is an obsolete invention, for it was extensively used before the advent of the wrought steel or P-foot share because hand-forged steel shares were too expensive.

Fallowing has by no means been confined to foot ploughs nor ploughs in general, for quite a large area in recent years has been fallowed with the double-V cultivator, but without the desired success. While this method is much quicker than the plough farmers and agricultural scientists have realised that unless the ground worked is completely turned over fallowing is not a success. This is especially true if the ground is covered with a growth of weeds, for then the foot plough serves the double purpose of destroying weed growth and later on as the weeds decompose they revert into manure.

This in turn helps to fertilise the soil, and so makes the following crop more productive. Personal experience has proved this to be a fact, for the cultivator only stirs up the soil but does not turn it over, which is absolutely essential. It may also be argued that fallowing with a disc plough has definite advantages over the foot plough under certain circumstances, but such arguments are rather far-fetched, and do not carry much weight; for whereas some may hold that they could not have got a foot plough through certain classes of new land, &c., it would have been of definite advantage to them had they cleared their land sufficiently to allow the passage of a foot plough. Certain it is that had they done so they would not only have rooted up the land much better and made subsequent workings easier, but crop results would also have increased to quite an appreciable extent. This is a proved personal experience.

Furthermore, the use of the foot plough instead of the disc on new land is by far the more economical proposition; for whereas breakages on disc ploughs, especially on new land, are both frequent and expensive; breakages on foot ploughs, provided they are handled with a reasonable amount of care, are rare.

Opposition may also have it that certain soils—particularly those of a sandy nature—can be worked excellently with a disc plough, but it is also just as certain that these classes of soils are excellent for wearing out disc bearings, &c., and as the foot plough makes at least as good a job even in these soils the disc rather has a disadvantage than an advantage over the foot plough even in this respect.

[Papers Read at Conferences.]

When the purchase price of the various types of fallowing implements is taken into consideration it will be clearly seen that there is practically no difference and this, coupled with the advantages of the foot plough, leaves no reason why such an implement should not be purchased in preference to others.

METHODS I HAVE FOUND SUITABLE FOR GROWING GRAIN ON LOWER EYRE'S PENINSULA.

[By R. R. WILSON, Yeelanna.]

Wheat.—Referring principally to the Yeelanna district for wheatgrowing, I find that there are two methods of growing heavy crops. One is by adopting good fallowing methods, the other by cropping grassland. As my experience goes to show, grassland crops have proved by far the most profitable.

Fallowing.—The paddocks selected for fallow should be burnt clean if possible during February and March; breaking up with either the cultivator or plough should commence in July. The best results have been obtained with the draught cultivator, using a 6in. share. I harrow as soon as possible afterwards. The next working should soon follow with the cultivator across the previous working with an 8in. share. The following workings are just dependent on weather during September and October, or whether the farmer has sufficient sheep to keep weeds under control. The last working, however, before harvest is most important. I do not believe in closing the soil by means of harrowing or packing, but to leave it open to the sun during harvesting operations. During March and April if rain falls cultivate with light harrows attached to the cultipacker to consolidate the under layers of the soil and bring the seedbed as near as possible to the surface.

After the first winter or late autumn rain falls, harrow with points sharp and weighted down. I prefer sowing at the opening of June with combine and light harrows attached, and if it is anticipated weeds will make another appearance harrow again on the eighth or ninth day after sowing.

Grassland.—Burn old grass if at all possible. Plough well after first autumn rain falls and as quickly as possible, because the land dries out in a few days; immediately harrow and then cultipack. Harrow again after rain, and again cultipack if the soil is loose, and sow same as on fallow.

My reason for making the land so solid is because loose soil of over 2in. deep between the surface and the seedbed is disastrous to the wheat plant, and unless heavy rain falls after sowing on loose soil to consolidate it take-all will probably develop or the crop will not yield to expectations. The wheat plant must force its roots into firm soil to ensure healthy growth. A firm, even seedbed also encourages a better germination, which lays the foundation for a heavy crop. If the land is clean enough from scrub and shoots never use a disc implement. Disc implements are necessary on new country and save a lot of hard labor, but the sooner the land can be worked without them the better will be the results, because it is impossible to establish a level seedbed by a revolving disc. There are several golden rules in regard to growing wheat:—

1. Adopt a rotation of crops; a good one is wheat—peas (grazed with sheep instead of harvesting), then follow with wheat again, or fallow—wheat—oats—fallow—wheat—pasture.

2. Select good, clean, graded seed, and consider the quality. I prefer mostly the early varieties to enable seeding to be later.

3. Apply a liberal dressing of superphosphate.

4. Work the land well and at the correct time.

Barley.—The best quality barley will always be produced on wheat stubble land. After burning off the stubble give a light working to work in the ash, which also buries any weed seeds to germinate as soon as rain falls. Plough or cultivate as soon

[Papers Read at Conferences.]

as the rain falls, harrow again, and commence sowing at the latter end of June or early July. Pickle strong—1½ eggcups of formalin to a 4gal. bucket of water—this is sufficient to pickle three bags of barley; 1bush. per acre of good seed is sufficient, and 50lbs. or 60lbs. of superphosphate.

SHEEP HUSBANDRY.

[By M. T. GARDNER, Koppio.]

There is no doubt with many stockowners—and probably the fact has been strongly impressed upon sheepowners most particularly—that never before in their experience as flockowners have they been so hard pressed for sufficient feed for the adequate nourishment and profitable keeping of sheep during the winter months. Present indications prove although there is not cause for very great pessimism the question of paddock feed for the spring and summer has not yet been solved. With the recent abundant rains there is every hope that feed will grow, but there is the prospect, too, of stock having been kept so short of feed that it will be eaten up without any great reserve being left over for summer and autumn feed. It is in this respect that very careful management is required for profitable handling of sheep.

Last year, from early April until the end of the year, there was a superabundance of feed in the fields, and too much dried off, which I doubt has ever before been surpassed in poor quality.

In these years of contrast—the plenty and lean of paddock feed—it is a very hard matter to judge and maintain the correct stock-carrying capacity of our holdings, and we all know of instances where after the last year's excess of feed, landholders thought that more sheep could be carried this year, and in consequence losses have occurred.

The necessity for having a reserve of dry feed in the form of hay or oats has been brought home to many this year, and having had the experience of seeing sheep with insufficient feed, we should have learned the lesson to store dry feed against times of shortage of winter feed in the fields. A few tons extra of hay at the time of haymaking is not missed out of the crop, neither is the extra work to cut, cart, and stack same, but the value of it is appreciated in such a time as the winter we have just passed.

Good hay chaffed is the most economical way to feed sheep with self-feeders. A 10ft. feeder will accommodate 50 sheep, because not all of them feed at once, but a few can do so at a time, and there is plenty of time for sheep to feed if it is available for them. A 10ft. feeder is a handy length to shift about, and does not want such stout timber as longer feeders. Material for such should not cost more than £2 10s., and with care should last a long time, and even in years when there is dry feed in the paddocks the feeding of ewes prior to lambing is worthy of consideration. The feeders are very useful once made for feeding sheep if they have to be shut out of paddocks on account of stinkwort. Good water is also necessary.

To provide greenfeed for ewes and lambs oats drilled in with the combine very soon after the ground has become softened on burnt stubble is an excellent method, and after the sheep have had several months feed a good crop of oats can be reaped.

To get the oats in before the ground gets too hard after the first rains everything must be ready to get to work—oats cleaned and machine fixed up with good tubes.

After providing the feed for sheep there is a lot more to be done to ensure the best results from sheep, although it is not much use doing the rest if the sheep are undernourished. To save as much work and trouble as possible should be one's aim in life, not to dodge work, and if good fences with good gates are erected and maintained in good order, the trouble in looking after sheep is greatly reduced and rotational grazing can be carried out, which is the success of pasture management.

To have paddocks of rather smaller than larger dimensions is the best idea, and with heavy stocking for short periods the stock-carrying capacity increases.

A set of strong and sheep-proof yards is a great help and a necessity to successfully manage a flock of sheep, and a convenient woolshed is a boon when close to the yards. Failing this, sheep have to be taken away to be shorn, which is the next best thing.

[Papers Read at Conferences.]

I read recently of 2,000 wethers averaging 19lbs. of wool. This fact should set us all thinking. If so much country will grow so much wool there is no need to overstock, and the aim should be to have all the sheep well fed, and all working growing wool, and no "duds." If it costs no more to keep good sheep than poor ones, cull out the poor ones and keep only the best. It is said that medium strong wool with a lot of character is the most profitable type of wool to grow, but care must be taken to keep the character in it.

A lot of time and money are lost to the farmers each year through the blowfly pest. This can be overcome in most localities in South Australia by crutching. Do the lot—ewes, wethers, and lambs—twice a year is sufficient in most cases and, if not, do it three times and save the wool and save the sheep.

In many cases the raising of fat lambs for export is a very profitable sideline, and these can be bred from culled ewes from the wool flock, but care must be taken that all such lambs are sold or butchered. It is well to mark all culled for wool with a permanent earmark so that such sheep are easily recognised and not mated for wool production.

We have seen a lot of adverse press reports lately about classing of farmers' wool, and I do not intend to say much about this subject more than it is up to all who grow wool to try to grow it as true to type as possible, and then try and sort it out and put it together in bales in its correct classes.

Buyers are not so much concerned about the type of wool they buy as much as whether it is mixed types. We are told that every type of wool has a "type" value, and that each type is valued separately. Therefore, we see that with mixed types packed together we get mixed values, and the buyers in such cases to protect themselves give under-values. Let us try to market this valuable product to make the most money for ourselves and for our State.

THE CARE OF MACHINERY.

[By C. A. NEWBON and W. P. BARTLEY, Wudinna.]

Farmers generally are seeking a way to reduce the cost of production in connection with wheatgrowing. This Branch of the Bureau has asked members of the Advisory Board of Agriculture to give us advice as to how we can reduce the cost of production. The answer is always the same, "Grow more wheat to the acre."

I maintain that every farmer throughout the whole world is trying to grow more wheat per acre, and the more wheat they grow the more they will reduce the price of this product. My paper is entitled "The Care of Machinery," and I will endeavor to show in a small way how by the care of machinery you can reduce the cost of production "just a little." First of all a farmer should overhaul his machinery before starting out on a new season's work.

The stripper and harvester are machines that will last for many years if they are well looked after. A farmer will send his motor car to a garage to be overhauled, but his harvester, which is more important, he will overhaul himself. But there are times when he does not overhaul it until something breaks. Then very often a farmer is held up at harvest time with a broken bearing; he is sure to lose one day's reaping or perhaps a full week waiting for parts to come by mail or train.

A harvester's main bearing is that bearing which is placed between the pinion and the flywheel; this bearing is mostly a roller bearing. Before starting harvest it should receive attention. If the rollers are worn and there is sufficient room to allow another roller to be placed in the bearing one roller should be put in. If too much space is allowed between the rollers the chances are that one roller will jump out of place, become jammed with other rollers, and break the bearing. The bearing will break a casting, and if the machine is not stopped in time more damage may be done.

[Papers Read at Conferences.]

The cost of one small roller will be nothing compared with the cost of a bearing and a casting and the loss of time in good reaping weather. All other bearings should be watched for signs of wear, and all chains and belts tightened a little to take up slack.

The wear on the main axle and the main wheel are very often the cause of the crown and the pinion becoming very much worn. With regard to the main axle and the main ground wheel of the harvester and the stripper they are very much the same, and should be dealt with in the same way. The machine should be jacked up, the wheels taken off, and the main axle taken out. The worn parts of the main axle should be built up to fit the wheels. This work should be done at a motor garage where there is a man with a torch. I understand that they are best built up with bronze. The cost of a main axle is about £5, the price for building up is about £1 per end. I have seen the crown and pinion of a stripper chewed up through cutting into one another. The price of a new crown is over £2, but it would be useless to buy a new crown unless you have the axle and wheels trued up.

Another advantage of the oxy-welding plant is the important work of repairing castings. No casting is too large or too small to be repaired with the oxy-welding plant. The price of doing these jobs is usually based on the price of the new casting. A few shillings may be saved on the price of a new casting, the sales tax, and the freight. The freight in some cases is a third of the cost and sometimes more.

Some farmers are in favor of doing their own repairs; that may be all right if the farmer has some knowledge of blacksmithing, but when it comes to building up the main axle of a harvester or a stripper it is a job for a tradesman and not for a farmer. With the oxywelding plant there are repairs that can be done better and cheaper than with the blacksmith's forge, and it is useless for a farmer to tackle a job that is too big for him. He must remember that his own time is worth something to him, and also that the tradesman has to live, and it is not quite fair to give him only the jobs that the farmer cannot do himself. Every little bit that you can do in this way is a little bit off the cost of production.

Harvesting and Care of Machinery.—The first consideration should be given to the machines to see that they are in order to avoid delay when crops are ready to harvest. Farm machinery being expensive, the farmer should take every care of it. Before starting work in the paddocks each machine should be overhauled, and worn or broken parts should be repaired. Spindles, for instance, can be filled with bronze and re-laid at a much less cost than buying new ones, and will wear just as well. I favor the stripper and power winnower for harvesting; by this method the crop can be harvested in much less time, with less risks of delays by breakages. At the same time you are in a position to save all cocky chaff, which is of great value in drought years.

If the crop is down badly it can be taken off with a stripper with good results with perhaps a little more labor, but probably less expense per bag. Personally, I think that we have more crops on which it would not pay to use the header or harvester at the present price of wheat and oats, than otherwise. The heaps should be made longways and not too wide; by making the heaps this way the floors do not cut up as badly as round heaps, and there is less risk of being damaged by wet. Narrow heaps are much better for the power winnower. To get the best results while cleaning the grain it is necessary to leave the machine standing as level as possible, and the sieves should be in good order. The sieves should not be too close, and the top one should have plenty of slope; I should say from 4in. to 5in. on a power winnower. The tailboard should be as low as possible for cleaning wheat. For cleaning oats only one sieve should be used—a large-lipped sieve. A piece of tin about 8in. wide should be nailed underneath the front of the sieve in order to reduce the wind as the oats fall to the sieve; if the full amount of wind is blowing right through the sieve, a lot of grain will go over the tail of the machine. For oats the tailboard should be fairly high on a power winnower; this is the reverse to cleaning wheat. For cleaning wheat the machine should travel faster than for cleaning oats. After harvesting is completed all machinery should be placed in a shed.

[Papers Read at Conferences.]

**NON-IRRIGATED FRUIT-GROWING DISTRICTS, NURIOOTPA,
NOVEMBER 7th.**

FRUIT DRYING.

[By A. J. CHAPMAN, Light's Pass.]

It is not my intention in this paper to deal with fruit drying in detail, but rather to offer some observations regarding the quality of non-irrigated dried fruits, and to suggest how the standard of quality can be improved.

The quality of the fruit produced has a seasonal variation over which growers have no control, but a considerable improvement can be affected by the exercise of more attention to detail in drying practices.

Too few growers visualise their fruit further than the packing shed door. If we were to critically examine our product from the consumer's aspect and ask "Is this fruit as clean, true to type, and as appetising in appearance as we can make it?" I feel sure that much of the faulty fruit would not be offered for sale to become a drug on the market and adversely affect the industry.

The outlet for the bulk of our surplus dried fruit is Great Britain, and whilst on that market we enjoy the advantages of preferential duties and exchange premiums. To effect sales, the quality must compare favorably with the world's best. Modern grading machinery and packing shed practices can do much towards turning out an attractive and saleable product, but the real responsibility of quality rests with the producer.

CURRENTS.

There is roughly about 2,000 tons of this fruit produced in the non-irrigated areas of South Australia, representing about one-eighth of the Commonwealth production, so that any improvement in drying practice which will tend to raise the grade will have an appreciable effect on the Australian pack.

The chief criticisms levelled at our currants are excessive moisture content and lack of bloom and body. Although there has been a marked improvement in regard to the former, much of the fruit delivered still contains too much moisture for safe transport through the tropics. London buyers detest currants which are at all sticky; they demand a fruit answering the description of "dry and free-running."

In regard to lack of bloom and body, this fault can be minimised if the fruit is ripe at the time of picking with a Beaume of at least 13.5°. Shade drying, whether on racks or trays, will always produce fruit of better bloom and body than sun drying. Shortage of trays or rack space is false economy.

The one practice which is outstandingly responsible for the lowering of the grade is that of "rubbing off" before the currents are quite dry; the breaking up of the bunches and "buck" riddling whilst the fruit is still soft causes some berries to burst. The sound fruit becomes sticky, and small particles of dirt and stems adhere to it, giving the fruit a grubby appearance, which is even more apparent after grading. This precludes otherwise top-grade fruit being classed as such.

"Sweating" is another essential practice for which wooden containers either of the sweat box type or petrol cases can be used. The practice of sweating currants in large heaps is not conducive to high quality. There being no ventilation under this method, excess moisture and heat cannot readily escape, the result being fruit inclined to stickiness.

TREE FRUITS.

With the exception of prunes and plums, tree fruits are dried in halves or sliced, and for this reason added care and attention on the drying ground are necessary if dried fruit of a high quality is to be produced.

[Papers Read at Conferences.]

The presence of dust and grit on the cut surfaces is a common fault, and whilst a sudden dust storm is sometimes responsible, it is more frequently caused through the drying trays being spread on the ground. In this way, they collect dirt on the under surface, and on being stacked the loose dirt is shaken on to the fruit on the tray beneath.

The provision of wire racks on which to rest the trays is the best method of overcoming this difficulty; failing these, lengths of round scrub timber 4 in. to 6 in. in diameter placed on the ground will answer the purpose quite well.

In taking the fruit off the trays a certain amount of handling is unavoidable, and it is at this opportune time that blemished and otherwise faulty fruit—which does not conform to the general sample—can be eliminated most economically. A point worth remembering is to avoid unnecessary handling, but when it is necessary to do so, do something to improve the sample.

APRICOTS.

To produce dried apricots of good color and texture such as is required for export, apricots should be picked ripe, but sufficiently firm to retain their shape on being dried. Cutting should take place at the earliest possible moment after picking, preferably within 12 hours.

Sulphuring is one of the most important operations. The cut surface should not be allowed to become dry before being placed in the sulphur chamber. The provision of several small chambers of boxes is better than one large one. The somewhat common practice of cutting all day and sulphuring all night is wrong.

The time of sulphuring depends on the condition of the fruit and weather, about six hours is usually sufficient. A quick burn of sulphur with adequate ventilation in the chamber will fix the color quickly without unduly impregnating the fruit with sulphur. It may be of interest to note that the time occupied in drying has a very decided bearing on the sulphur content of the dried article. Following the showery and cool weather experienced last year, fruit analysed in London only showed 700 parts of sulphur dioxide per million as against the 2,000 parts allowed, so that under bad drying conditions longer sulphuring is indicated.

Apricots should not be removed from the trays whilst warm or until sufficiently dry, the wrinkled appearance of fruit which has been handled in this state is not at all attractive when packed.

PEACHES.

Much the same treatment is required for peaches as for apricots, except that a longer time must usually elapse between picking and cutting. The color of the peaches produced in these areas does not as a rule compare favorably with the river production. In the case of the Elberta—which is the principal drying variety—the trouble is usually the result of the fruit being picked before it is sufficiently ripe, thus necessitating a longer period in cases prior to cutting. The fruit is then inclined to wilt, and does not ripen to a bright color. Dry growing conditions are also responsible for dark-colored fruit.

PEARS.

Of the dried fruits produced pears provide the greatest variation in color and quality, and with a few exceptions this fruit is not a credit to the industry. The class of fruit we should aim at producing is that of a light straw color, free from pink or brown edges. This type can only be produced by careful treatment from the time of picking until the drying is complete.

The fruit should be mature before being picked, and should be stored for preference in a cellar or other cool place. The judicious use of damp bags in hot weather to retard evaporation will help. The fruit, in fact, should receive the same care as though it were intended for canning.

Cutting should take place when the pear is just past the canning stage or, in other words, lemon yellow; if allowed to become over-ripe the color of the dried article will suffer.

[Papers Read at Conferences.]

The fruit should be placed in the sulphur chamber as soon as possible after cutting and before any discoloration takes place—the time of sulphuring may be anything from 12 to 18 hours, until the fruit is soft to the touch right through.

In drying, the trays should be spread in the sun (if not too hot) for two or three days, then stacked and shade dried. An occasional day in the sun after being stacked for several days will hasten the drying without impairing the color.

PRUNES.

The quality of this fruit is generally good. South Australian prunes were this year exported to New Zealand, Canada, and London. In each market they were well received, and prices realised indicate that the quality compared very favorably with Californian and South African fruit.

There is a tendency on the part of some growers to over-dip and under-dry. The variation in the skin texture of the different varieties of prunes makes it almost impossible to lay down any hard and fast formula for the strength of dips. It is only by trying a small quantity of fruit to be dipped each day that the quantity of caustic soda can be gauged.

It is not necessary to crack the fruit to the extent often practised, the removal of the bloom is all that is required, and although the drying period is prolonged the fruit will be heavier and of better quality.

ORGANISED MARKETING.

[By D. FARMER, Angaston.]

Much to-day is heard of the term "orderly marketing." The expression first came into use during the years when the American Farm Bureau Federation was being organised, 1919-1921. The term is not a simple mathematical formula for solving primary producers' marketing problems, but implies in a general way price stabilisation through control of the flow of the product to market. In the liberal sense it may be defined as the marketing of the commodity at the right time and place, in the right quality and quantity. At the same time price is the final great regulator. The law of supply and demand never abdicates its throne. When saturation point is reached in consumer demand a lower price will register that fact. The difficulties that confront every primary producer are admittedly great, but no grower can blind himself to the fact that only by collective, consistent, and effective organisation can he obtain the best results for his labor. Better methods of production, better grading of goods, more direct and economical marketing, better machinery of finance and credit, better publicity, oversight of distributive charges, study of competitors' methods, study of markets, we can all assist towards a solution, and this can only be effectively accomplished by organisation of producers.

Organisation is apparent in every phase of life to-day. It has been well said that the obvious handicaps under which the primary producer labors is that whilst other branches of industry have reached by organisation relatively high stages of organisation, and are therefore able to gain advantage over the farmer, he suffers by reason of no fully organised effort. Now, why is the farmer or grower so prone to reject organised methods of marketing? Because in farmers and growers there is a definite spirit of individualism. The tendency of farming is to foster a spirit of self-reliance. The man who controls the use of a tract of land, who decides the nature and kind of all the processes of cultivation, must depend on his own judgment. He may, and oftentimes does, consult with his fellow growers, but instinctively he acquires a habit of independent action and of general self-sufficiency. In short, the bias of the growers' mind is individualistic. For these reasons the idea of combining with others in business transactions, and in some degree surrendering his independence is not congenial, and co-operation or organised effort with others can only be advocated as a business proposition on the ground that it will secure by collective effort definite trading economic advantages.

[Papers Read at Conferences.]

Farm or orchard management has two distinct branches (1) technical, (2) economics; in other words, practical farming and business organisation. Agriculture is primarily a business. It has sometimes been described as an art, and sometimes as a science, but though its pursuit involves technical skill it does not differ in that respect from any other industry. Whether the grower wins from the soil only the means of sustenance for himself and his family, or an excess of products for exchange or sale, his object is to make an income in kind or cash, which is the object of all who engage in business. With so many units in production, with such diversity of character and thought, the trouble arises in making growers appreciate the fact that they are virtually shareholders in a business with others, and that unless they combine or organise they become definite competitors. Especially is this so in the case of the small grower whose stake in the particular commodity is small.

Free competition leads inevitably to instability, because stability is impossible without planning, and planning is impossible with such a large number of unknown factors as free competition involves. To plan a marketing programme demands rare skill, but where competition is free it is impossible, for your plans are dependent upon a knowledge of the supply and demand of markets, both of which are beyond the control of the grower.

The victim of this chaotic condition is the grower, and it is in his interest to-day that freedom of competition should be so far curtailed as to make possible a sound marketing programme. What the grower needs to-day is not more competition in his particular commodity, but more co-operation or co-ordinated effort in order to stabilise marketing and keep him in employment.

MARKETING BOARDS.

Any intelligent grower will admit that the thing most desirable is stability in marketing; some assurance that the sale of that which he produces will at least secure to him costs of production. It has been indicated that free competition leads inevitably to instability, and that this freedom of competition should be curtailed or controlled to make possible a sound marketing programme. Such control means restriction of trade, either by the producer or by the State. Control by the State carried to its logical conclusion is communism, but control vested in the hands of the producer can co-ordinate marketing activities, and permit of a sane policy of distribution. It is significant that all over the world steps are now being taken to appoint Marketing Boards for various products. Vast changes have been witnessed in the past 10 years or so in the science of agricultural marketing. Agricultural economics are receiving to-day more attention than ever, and much as one may deplore the passing of individualism, even the most conservative types of producers are recognising the new order of things, and are prepared to accept new ideas on marketing. Within the past month or so by an overwhelming majority the farmers of England have declared themselves in favor of the Government Milk Marketing Scheme, under which the sale and collection of milk is controlled by a Board. This Milk Marketing Board will control the national milk supply and its sale. The scheme involves an annual value of between £50,000,000 to £60,000,000 and the livelihood of more than 250,000 producers. In Spain citrus exporters must be registered in the official register kept for the purpose at the Commercial Section of the Ministry of National Economy. In October, 1930, the Bulgarian Government set up a special Board for the purchase of bread-stuffs, &c. The administration of this Board included accounting, control and inspection, and in a very short period of its activity the Board succeeded in not only checking the continual fall in the prices of exported cereals, but was even able to raise the price above world's parity. In Greece there is a Greek Currant Control Office; the trade in Argentine fruit has of recent years been re-organised by dealers and growers; whilst a Bill was introduced into the Imperial Parliament called the "Agricultural Marketing Bill, 1930," which has as its main purpose the enabling of schemes to be made for regulating the marketing of agricultural products by producers. Other illustrations could be cited, but these indicate the trend of thought towards organised

[Papers Read at Conferences.]

marketing methods in other countries, and the advisability therefore of Australian producers recognising such, so that they may be able, by organisation, to face organised competition by other primary producing exporting countries.

When the Bruce-Page Government came into power one of its major planks of policy was organised marketing. Various Boards were created, legislative control was introduced, and this was followed by a great outcry against Government interference in business. It is significant that to-day, after a lapse of about 10 years since such measures were first introduced, producers of wheat, butter, oranges, milk, and other products are seeking a way out of their difficulties by advocating some system of legislation for their respective industries. Now, why the necessity to bring the Government into it at all? For the reason that voluntary organisation amongst producers has not proved sufficiently effective to ensure the full efficiency desirable in national marketing schemes, owing to the fact that the measure of stability which such voluntary organisations have achieved has been seriously affected by the action of growers in not supporting measures primarily designed for their benefit, or of selfishly taking advantage of voluntary organised schemes for their own particular benefit.

Where, however, an industry has been given certain legislative powers to assist it to control its own affairs, any subsequent organised marketing scheme launched must recognise certain basic economic laws. There are three interested parties in primary production: (1) the original producer; (2) the middle man; and (3) the consumer. Of these three the consumer is the most important. The grower is apt to assume that not only is there a constant demand for his foodstuffs, but also a necessitous demand. Both these assumptions are false. The consumer turns to various substitutes and the demand for food is very elastic. In addition, there is a definite saturation point in consumer-demand, and when that stage is reached a lower price will register the fact. One of the most difficult problems in agricultural marketing is that of a correct sale and price policy. In marketing farm produce, the elements of bargaining and price-strategy enter, and the ideal should be to keep the consumer consuming, and the producer producing, avoiding shortage and undue carry-over. Further, the producer cannot ensure success by copying merchandising methods of successful manufacturing concerns—his problems of marketing are totally different. The manufacturer can control quantity—the producer cannot; he can control quality—the producer is subject to climatic conditions; he has a greater field of expansion—the producer's field is definitely defined.

A good deal is heard to-day regarding the evils of price-fixing by producers. Intensive grower-organisation is a pre-requisite to successful price-control, but there is no reason why the domestic or home consumption price should not be pushed to that point at which the return to the grower will bring his position into favorable comparison with that of others. Growers' interests are better served by stable prices than by violent fluctuations, and if it is possible to obtain to some measure of economic equality with other branches of industry in the domestic market, that need not preclude later adjustments to meet changing conditions. The accusation is also made that where control is brought into primary production, it is contrary to true economics. If by this is meant control as applied to the law of production, then I am inclined to agree, but if it is meant control as applied to the law of trade, then that is a different proposition. All trade laws are man-made, and if the proposal to control is economically unsound, then so are many laws of trade which permit holding by an industry of supply and releasing to demand at will.

Production calls for individual effort, but from that stage onward organised effort must commence to obtain best collective results. Once out of the grower's hands his product passes into the hands of others who will all charge him for their services. The road from farm to consumer may be long, crooked, and full of toll-gates, but

[Papers Read at Conferences.]

organised effort can ensure that no tolls are taken except for actual service rendered. The use of co-operative association by growers has increased considerably in recent years, but that in itself should not affect intensive organisation amongst growers themselves.

Control legislation, orderly marketing, organised marketing, may all be somewhat of a new science, but it behoves every grower to keep his mind open and receptive to the new ideas, and to adapt himself to the torrent of change that is taking place in primary production methods the world over. The old-fashioned, casual ways of marketing have now become dangerous. There is a new knowledge abroad in the world. Gradually, growers are learning to have a greater measure of control in their affairs than their fathers ever dreamed of. Admittedly organised marketing means the passing of individualism, and its innovation has met bitter opposition, both from growers and interested parties, but it has come to stay. No amount of study of the past fits us to pass judgment upon what may or may not be done in the future. Changing conditions are sure to justify and necessitate further changes in the marketing of primary produce, and agricultural statesmen might well confer and formulate and announce production policies having regard not only to interstate and national programmes, but also with regard to international competition.

PICKING AND HANDLING FRESH FRUIT.

[By L. PLUSH, Light's Pass.]

In pre-war days Australia consumed most of her fruit production with the exception of apples, but since that time the output has increased to such an extent that we are exporting at least 50 per cent. of our fruit, either fresh, as with pears and apples, or canned, in the case of pears, peaches and apricots. Competition with other countries is becoming keener, and we are finding it increasingly difficult to make sales overseas at profitable prices.

It behoves us to take more care in handling, packing and grading, and to make the fruit attractive. In quality our product is equal to that of any country, but how often have careless grading, handling and packing spoilt our good name and good fruit?

The paper is divided into two main subjects:—The care and handling of fruit for canning, and the picking, grading, and packing of fresh fruit for export.

In dealing with fruit for canning, there are four main points to watch—Size, cleanness of the crop from disease, correct stage of maturity, care and grading after picking.

GOOD EVEN SAMPLE NEEDED.

It is essential to have a good even sample for canning, and, of course, not too small. In years such as this I advise every grower of apricots and peaches to thin his crop where necessary to allow the fruit to come to normal size. Small fruit is costly to harvest, of little or no use for canning, and distressing to the tree for next season.

Fruit clean from scab or other blemishes, such as limb rub, leaf mark, and codlin infestation, is essential. Misshapen fruit must be rejected, and put aside for drying or sold for jam.

Picking apricots for canning is a difficult job, especially when a garden is situated any distance from a factory, and it is almost impossible to pick the fruit without having to grade it for ripeness. It is a good plan to grade every bucket as it is emptied into the case, the riper or blemished fruit being put aside and used for drying or sold separately for jam.

Apricots should be picked when very firm and poured gently in cases, which should be slightly bumped and well-filled before dispatch to the cannery. As soon as the fruit is picked it should be put in the shade and kept cool. Never put it in a hot shed over night. It is much better in the garden.

There are three varieties of apricots good for canning—Moorpark, Tilton, and Trevatt. Of these three I prefer Trevatt.

[Papers Read at Conferences.]

PEACHES AND PEARS.

Peaches need much care, but are not the same problem as apricots. The fruit is firmer, and generally the weather is cooler at picking time. Clingstones are now chiefly used for canning, although some freestones are still canned for local markets. However, in a few years no freestones will be canned. The fruit may be allowed to become well-matured before picking and several pickings should be made. Grading, out all blemished fruit helps, and sizing adds to the appearance. The same care in placing the fruit in cases, as with apricots is necessary. The finest canning varieties are Golden Queen, Phillips, Pelora, Levis, and Goodman's Choice.

Pears are a slightly different proposition from apricots and peaches. The fruit should not be picked too early, but allowed to ripen sufficiently, before picking begins. This should be all done with a ring 2½ inches in diameter, the fruit graded for codlin moth and mis-shape, and packed, not placed indiscriminately in the case, which should be lightly bumped, with the lid lightly and evenly pressing on the fruit. It is an advantage to put a crumpled piece of newspaper on top of the fruit before placing the lid on, to prevent bruising.

HANDLING.

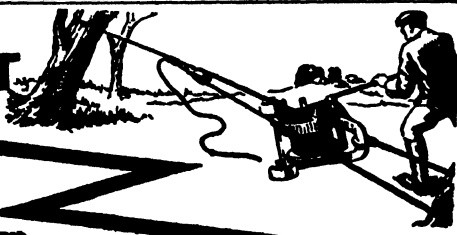
Much depends on the way all fruit is handled after picking as to whether it will arrive at its destination in good order. Empty cases should be kept in the shade prior to filling, and care must be taken not to allow sand or dirt to get into cases. A good plan is to have a number of battens on which to stand full cases, because sand will enter, when filled, even with the greatest care. On very hot days place wet bags on the full cases. Considerable damage can be done by rough handling of cases of fruit.

A large buyer of canning and jam fruits told me that he did not mind paying higher prices for fruit which arrived in good order, because there was little or no waste, which was the greatest trouble he had to contend with. One man may take care to grade his fruit, and handle it carefully, and 100 dozen tins, perhaps, are canned from a ton, whereas another grower's fruit will give only 80 dozen tins.

APPLES AND PEARS FOR EXPORT.

The second subject for consideration is picking, grading, and packing apples and pears for export, or local markets.

TEARING THEM OUT



Is the regular job of the Monkey Grubber; in fact it was born to the work.

TREES AND STUMPS, it matters not, they are torn out with roots intact in a single job quickly done. Run to the job like a bare trunk, and worked in the same manner as a stump to reveal. It develops the power of the man progressively applied, and always under perfect control.

In any position, so long as the operator has space for a footing, the machine is efficiently worked. An Automatic Gear allows a hand to be heaved or released at will. Besides the great power and portability there are embodied other labour saving features, such as special rope coupling, rear shifter, engine block, etc.

Applications in Australia, New Zealand, Great Britain, South Africa, the Americas, as well as Persia, India, China, Central Africa, F.M.A. the East and West Indies, record the merits and applied its help.

THE "MONKEY" GRUBBER

Is fashioned from material mined and made within the Empire, by Empire craftsmen, to assist with the fast and efficient development of Her Majesty's resources.

Patentees and Makers—Monkey Grubber, Monkey and Wallaby Jacks:
TREWHELLA BROS. PTY LTD. TRENTHAM, VIC. AUSTRALIA

ADELAIDE STOCKISTS—

Marwa, Scarfe & Co. Ltd.
Australasian Implement House Furnishing Co

Colton Palmer & Preston
South Australian Farmers Union.

[Papers Read at Conferences.]

Before starting to pick these fruits, make sure of their maturity. The best methods to arrive at a correct decision for apples are by the iodine test, color test, and by cutting open a number of apples and examining the seeds, which should be dark brown. The last test is the most reliable, although the color test is good. Color charts are available from the Department of Agriculture. The iodine test is very unreliable at times. When satisfied that the fruit is ripe enough, see that the pickers have short finger nails, and set them to pick with a 2½ in. ring, not smaller, for the first picking.

Pick the fruit and cart to the shed, postponing grading for at least a day. Should the fruit be graded at once, do not have it packed for at least a day, and two days are better. Bitter pit does not always show at once, nor do bruises. This is not always convenient, but it is better than having several hundred cases rejected at Port Adelaide. Apples and pears should be handled as carefully as eggs, because if slight bruises do not show at once, they do later, when unpacked. Grading is the most important part, and generally is not done thoroughly enough. It is the half-dozen apples in the case which should have been rejected which may make a difference of 1s. to 2s. a case when sold overseas. Those six apples are expensive to the grower. The buyer has to protect himself and to allow for a percentage of bad fruit in each case.

CARELESS SIZING.

One of the biggest mistakes packers make is careless sizing, and a good pack is almost impossible without good sizing. The four sizes used for apples are 2½ in., 2½ in., 2½ in., and 3 in., and they are mostly exported with the size stamped on the case. The retailer in England sells his fruit by units and dozens, not by weight, and he likes to know how many apples are in the case he is buying. For instance, he buys a case of 2½ in. apples; that case may have 150, 165, or 175 apples in it, and still they are 2½ in. apples. Therefore, the sooner the count system is adopted for export apples and pears the better.

Packing charts are a great help to a packer, and frequent reference should be made to them, especially at the beginning of the season.

The straight pack should be used in preference to the angled pack wherever possible. Pears are packed similarly to apples, but care must be taken not to rest a pear on the stem of a previous one.

A mechanical grader is of great help where fruit is packed on the property, but to get the best out of it care must be taken to have it adjusted correctly. The mechanical grader is a great advantage to the packer who does not have to worry about sizing his fruit. He has also the added advantage of being able to make two packs out of each size of fruit. In a 2½ in. size he can pack the larger apples 150 to the case, and the smaller 165's or 175's, and thus make an excellent pack of the correct height and tightness without any trouble.

USE OF LID PRESS.

The lid press is a great advantage for nailing down, but this can be abused, especially with cases that are packed a little too high. When the press is pushed down the apples of the top layer will frequently be cut on the edge of the case. This can also happen by nailing down in the ordinary way, but not to the same extent. The lid press is quite all right, but it needs care in handling. Cases nailed in the ordinary way should never be attempted without first placing them on battens to allow for the bulge at the bottom.

Wiring is a necessity, especially with the Canadian case. The wire should be put around as close to the cleat as possible, and the tie made on the side of the case, not on the top or bottom, as is sometimes done. In stacking the packed cases, always do so on their side, with the labels facing out.

The fruit should not be kept long after packing, especially in hot sheds, but dispatched to cool stores should there not be a boat available for some time.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

PINNAROO LINE BRANCHES.

The Conference of the Pinnaroo Line Branches was held at Parilla on September 26th, when Mr. H. G. Johnson presided, and Mr. A. J. Cooke (Chairman of the Advisory Board of Agriculture) delivered the opening address. Besides representatives of Branches, the Conference was attended by Messrs. H. B. Barlow (Chief Dairy Instructor), R. C. Scott (Supervisor of Experimental Work), C. F. Anderson (Poultry Expert), R. L. Griffiths (Agricultural Instructor), and H. C. Pritchard (General Secretary). Miss E. Campbell (Inspector of Domestic Arts, Education Department) also attended to give a special address to the members of Women's Branches in the district.

The following papers were read by members of Branches:—"Advantages and Best Methods of Conserving Fodder" (Mr. C. W. Neindorf, Parilla); "Wheat or Meat" (Mr. R. C. Jacob, Geranium); "Poultry Breeding" (Mr. R. Cheney, Parilla); and "Barley Growing" (Mr. H. G. Spratt, Lameroo).

The following resolutions were carried:—(1) That the next Conference be held at Pinnaroo, under the auspices of the Parilla Well Branch. (2) That the present sixpence condemnation levy on pigs be lifted, and twopence in the £ be levied in lieu of same, the money to be collected by the Stud Pig Breeders' Association through stock agents, and paid only on condemned pigs. (3) That this Conference deplores the decision of the Government to remove the facilities which delegates to Congress have enjoyed for so many years in attending Congress, and desires to request that for the benefit of the State in general, and the Agricultural Bureau in particular, such decision be rescinded.

Many questions were submitted to the Conference, and answered by officers of the Department and members of Branches present.

Mr. Cooke presented the trophies to the winners of the 1932-33 District Chandos Wheat Crop Competitions. In making the presentations, he referred to the donation of £100 by the South Australian Farmers' Co-operative Union, Limited, which would be distributed to the various districts throughout the State to assist their competitions this year. Mr. A. J. A. Koch, of Lameroo, who won the trophy for the three-year aggregate, was largely instrumental in obtaining assistance through this channel.

The winners of the competitions were:—First, J. H. & C. H. Spratt, Lameroo (93 points); second, H. E. Angel, Pinnaroo (90½); third, Traeger Bros., Parilla (90); and fourth, C. & L. Fischer, Pinnaroo (89½). Junior Class.—First, Cecil Johnston, Parilla (86½); second, Murray Hutchens, Parilla (83). Highest aggregate in district over three years, 1930, 1931, and 1932.—A. J. A. Koch, Lameroo, with 260 points out of a total of 300. In the Junior Class the highest aggregate was won by Murray Hutchens, Parilla, with 248 points.

In the evening the Conference was addressed by Mr. H. B. Barlow (Chief Dairy Instructor) on "The Pig Industry."

EYRE'S PENINSULA BRANCHES.

Two Conferences were held on Eyre's Peninsula in October, viz., the Southern Districts, at Cummins, on October 4th, and the Central Districts, at Minnipa, on October 6th. Mr. A. J. Cooke (Chairman Advisory Board of Agriculture) delivered the opening address at both Conferences, which were also attended by Messrs. W. J. Spafford (Deputy Director of Agriculture), H. B. Barlow (Chief Dairy Instructor), C. F. Anderson (Poultry Expert), R. H. F. Macindoe (Stock and Brands Department), and H. C. Pritchard (General Secretary Agricultural Bureau), for the purpose of addressing the meetings and assisting in discussions. Messrs. H. D. M. Adams and W. H. Brownrigg (Agricultural Instructors) also attended at Cummins and Minnipa respectively.

THE CUMMINS CONFERENCE.

Mr. G. W. Proctor presided over the Cummins Conference, and papers were submitted by Mr. H. E. Bryant (Cummins), "Fencing"; Mr. M. T. Gardner (Koppio), "Sheep Husbandry"; Mr. E. A. Pfeiffer (Cummins), "The Advantages of Following with a Foot Plough, as Compared with Other Methods"; Mr. R. B. Wilson (Yeelanna), "Methods I Have Found Suitable for Growing Grain on the Lower End of Eyre's Peninsula"; and Mr. F. J. Jericho (Cummins), "Mouse-Proof Haystacks."

"The following resolutions were carried:—(1) That the next Conference be held at Yeelanna. (2) That the Advisory Board of Agriculture again ask superphosphate manufacturers for a reduction of 5 per cent. for cash on super for 1934 delivery. (3) That this Conference requests that farmers be entitled to receive discounts obtained by the State Bank on purchases made on their behalf. (4) That the State Bank Farm Relief Department be asked to endeavor to import cornsacks direct for the coming harvest, to reduce costs to producers working under Farm Relief. (5) That if the Port Lincoln Freezers are sold to a private company that a guarantee be provided that the works shall continue to operate as a freezing works to cater for the farmers on Eyre's Peninsula. (6) That it be a recommendation from this Conference that an inquiry should be held re the price of power kerosene, with a view to obtaining a corresponding reduction in the price, seeing that a big reduction in petrol was made following investigations of the Petrol Commission. (7) That in view of our inability to obtain good roads through the district council, there be a reduction of motor registration on Eyre's Peninsula owing to the bad state of roads. (8) That special Government grants be allotted for making roads in the Cummins-Yeelanna district owing to their shocking state and the great disabilities primary producers have to work under through this cause. (9) That there be a further reduction in rail freights. (10) That the Government be asked to reconsider the decision which removes from delegates to future Congresses the railway concessions, and that such concessions be restored, so that Branches may have an opportunity of sending representatives under the same conditions as in the past.

THE MINNIPA CONFERENCE.

This Conference was presided over by Mr. G. Williams, and a paper was read by Mr. C. A. Newbon (Wudinna), "The Care of Machinery." During the day special addresses were delivered by Messrs. H. B. Barlow on "Marketing the Correct Type of Pig"; C. F. Anderson on "The Poultry Industry"; and R. H. F. Macindoe, "Ailments of Stock." Resolutions were carried as follows:—(1) That the next Conference be held at Kyancutta. (2) That the Government be approached asking that dead-end mains of the Tod River water supply be extended in order to allow farmers to carry more stock, and thus increase the productivity of their farms. (3) That the Railways Commissioner extend the freight concession on one case of fruit to three to five cases, so that Eyre's Peninsula settlers will have an opportunity of buying at rates in comparison with other places in South Australia. This concession will fall in line with the Adelaide Steamship Company's minimum. (4) That a further concession in freight on super be made for the month of February. (5) That this Conference protest against the double exchange on cheques, and urge upon the Advisory Board to make further representations to the associated banks to remove this additional charge. (6) That this Conference urges the Government to immediately resume control of the Minnipa Experimental Farm, with the object of supplying the Eyre's Peninsula farmers with good, clean seed wheat, true to type, and the trying out of new varieties, with a view to ascertaining their suitability to our local conditions. (7) That delegates and Branches have derived great benefits from Congress, and this Conference considers that rail fares should be renewed.

In the evening Mr. Spafford addressed the Conference on "Side-lines on Farms on Eyre's Peninsula."

CONFERENCE OF MURRAY LANDS (EAST) BRANCHES.

Branches of the Agricultural Bureau, situated in the Murray Lands East Districts of the State, held their Annual Conference at Taplan on October 17th, 1933. The attendance was disappointing, delegates being present only from the Loxton, Taplan and Taplan Women's Branches.

Messrs. W. J. Spafford (Deputy Director of Agriculture), C. F. Anderson (Government Poultry Expert), R. L. Griffiths and P. H. Suter (District Instructors), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary Agricultural Bureau) attended on behalf of the Department of Agriculture. Mr. W. J. Hammond (President of the Taplan Branch) occupied the chair, and the opening address was delivered by Mr. Spafford.

Mr. G. Ginner (Loxton) contributed a paper, "Milling Qualities of Wheats," and the following addresses were delivered:—"Side Lines for Mallee Farms," Mr. W. J. Spafford; "Management of the Farm Dairy Cow," Mr. P. H. Suter; and "Diseases of Wheat Crops in the Murray Lands," Mr. R. L. Griffiths.

It was decided that the Advisory Board should decide the place of next Conference, and if possible that the Conference be held during the same week as the Karoonda fixture.

The following resolutions were adopted:—

"That this Conference protests against the action of the Government in deciding not to grant railway fares to delegates to attend the Annual Congress." "That the Taplan Branch express its appreciation of the action of the *Advertiser* in sending a representative to report the proceedings of the Conference."

On behalf of the Advisory Board of Agriculture, Mr. W. J. Spafford presented to Mr. P. R. Hodge, Secretary of the Taplan Branch, a certificate conferring on him life membership of the Agricultural Bureau.

At the evening session, Mr. C. F. Anderson delivered an address, illustrated with lantern slides, "Progress of the Poultry Industry."

CONFERENCE OF NON-IRRIGATED FRUIT-GROWING DISTRICTS.

The Annual Conference of Branches of the Agricultural Bureau in the non-irrigated fruit-growing districts of the State was held at Nuriootpa on November 7th, 1933.

A representative gathering of delegates attended from the Lyndoch, Williamstown, Light's Pass, Greenock, Penwortham, Stanley Flat, Blackwood, Angaston, Watervale, and Balhannah Branches.

Mr. W. Ahrens (Chairman of the Light's Pass Branch) presided and the opening address was delivered by Mr. H. N. Wicks.

Messrs. H. N. Wicks (Member Advisory Board of Agriculture), W. J. Spafford (Deputy Director of Agriculture), G. Quinn (Chief Horticultural Instructor), R. Fowler (Manager Blackwood Orchard), J. B. Harris (District Horticultural Instructor), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary Agricultural Bureau) attended on behalf of the Department of Agriculture.

The following papers were read and discussed:—"Care and Packing of Fresh Fruit," Mr. L. Plush (Light's Pass); "Fruit Drying," Mr. A. J. Chapman (Light's Pass); "Organized Marketing," Mr. D. Farmer.

Mr. J. B. Harris (District Fruit Instructor) addressed the Conference on "Frost Prevention by Orchard Heating."

Mr. K. Robinson (Angaston) reported on the activities of the Frost Combating Committee, and Officers of the Department replied to numerous questions. The evening session was occupied with an address, "With the Trade Ship to the East," by Mr. J. B. Murdoch, of the Advisory Board.

The following resolutions were carried:—"That the 1934 Conference be held at Balhannah;" "That this Conference urges the Federal Government through the State Government to take immediate action in bringing about the control of tree dried fruits;" "That subjects which are of interest to fruit-growers should be given preference over other subjects at all Conferences of fruit-growing Branches."

ADVISORY BOARD OF AGRICULTURE.

The Advisory Board of Agriculture paid a visit to Roseworthy College on October 24th, when there were present Messrs. A. J. Cooke (Chairman), A. M. Dawkins, Dr. A. E. V. Richardson, S. Shepherd, P. J. Baily, F. Coleman, and H. C. Pritchard (Secretary). Apologies were received from Messrs. R. H. Martin, J. W. Sandford, J. B. Murdoch, G. Jeffrey, A. L. McEwin, and Professor Perkins.

Under the guidance of the Principal (Dr. Callaghan), members inspected the Farm, and the experimental work conducted at the College was outlined to them. Speaking on behalf of the members present, the Chairman assured the Principal that they were very pleased with the condition of the farm crops, the fallows, and livestock, and were surprised at the amount of work achieved by Dr. Callaghan since his arrival at Roseworthy.

At a meeting held during the day the following business was transacted:—

Life Members.—The following members of Branches were admitted to Life Membership of the Agricultural Bureau:—M. Reynolds (Narridy) and E. A. Hasting (O'Loughlin).

New Branch.—The formation of a Women's Branch at Balhannah was approved, with the following as foundation members:—Mesdames H. S. Middleton, N. N. Wicks, E. Cox, R. James, F. Norseworthy, F. Leane, B. Spoehr, L. Beckwith, J. Grashy, and Misses D. Spoehr, J. Kelsey, T. Peacock, N. Pitt, D. Camp, and V. Grashy.

South-Eastern Conference.—It was decided to hold the next South-Eastern Conference at Tantanoola.

New Members.—The following names were added to the rolls of existing Branches:—Adelaide—A. Fairbank, H. Fairbank; Appila—E. B. Wurst, E. Shillabeer; Auburn Women's—Mrs. Kench; Barmera—F. Phillips, E. R. Scott; Beetaloo Valley—R. A. Pearce, J. Bugg; Buchanan—J. W. Cuthbertson; Chilpuddie Rock—H. Page; Clarendon—A. Loud; Coonawarra—J. Hinton, jun., P. C. Stafford; Coonawarra Women's—Mrs. W. Pounsett, Mrs. H. Redman, Miss F. Jackson, Miss D. Stafford; Cummins—D. Blacker, H. B. Blacker, F. C. G. Greig; Eurelia—E. A. Wickens, M. Wickens; Jervois—J. Connell, R. Gugtulman, G. Hately, J. Gregory; Kanni—W. Gregory, H. A. Pobke; Ki Ki—A. R. Stevens, C. Stevens, F. Brennan; Kybybolite Women's—Miss D. C. Johnson, Mrs. P. A. Lawrie, Mrs. R. H. Shepherd, Mrs. H. D. McFarlane, Miss E. Glynn, Miss K. Heffernan, Miss M. Moore; Lone Pine—G. Naismith, B. Barrett; Longwood—A. L. Betteridge; Macclesfield—Captain H. G. Hodgson; Maltee—A. L. B. Baasham; McLaren Flat—B. Rake; Millicent—C. G. C. Skeer, R. F. Clifford; Farrell's Flat—G. E. Twelftree; Frayville—E. Hein, L. Hein, H. A. Helbig, E. Bretag; Gawler River—E. W. L. Dawkins; Gladstone Women's—Mrs. Durrant, Mrs. J. A. Flavel; Hanson—Sergt. G. McDonald; Hope Forest—S. H. Reed; Murray Bridge—C. S. R. Whitbread, G. Riches; Nelshaby—S. Thomas, T. Davies; Nelshaby Women's—Mrs. L. Lane, Miss L. Lane, Miss D. Jose, Mrs. Pearce; Owen—J. Davies; Palalie—R. Mullins, W. Sheedy, R. M. Hamilton, R. Sheedy, H. Bates, N. Rashleigh, W. Miller, jun.; Parilla—L. G. Wright, S. R. G. Cheney; Parilla Women's—Mrs. S. R. G. Cheney; Moorlands—J. Peitsch; Mount Barker—Major Irwin, J. L. Turnbull, W. Slade, N. Alcock; Mundalla—H. Hillier, K. Hillier, G. Hillier, I. Dinning, R. Packer, H. Donnell; Mundalla Women's—Miss M. Knowling, Miss C. Hinge; Bendelsham Women's—Mrs. C. Buhlman, Miss D. Buhlman, Mrs. W. McArthur, Miss M. McArthur; Saddleworth—E. Saint, W. Vogt, B. Ashton, L. Dungey; Scott's Bottom—A. J. Martin; Shoal Bay—W. W. Cook; Stanley Flat—W. Moore, R. Lang-

ridge; Strathalbyn—V. C. Ellery, E. A. Stacey, A. P. Saunders; Sutherlands—J. Sander, B. Doecke; Taragoro—E. Benson; Paruna—N. L. Haines; Paskeville—C. K. Stephenson; Penola Women's—Miss M. Reschke, Mrs. R. Balnaves, Mrs. J. W. Anderson, Mrs. A. W. Pearson, Mrs. J. Hall, jun., Mrs. C. Neilson, Miss I. Neilson; Penwortham—H. J. Hudson, N. Hudson; Pinbong—A. E. Cheaney, L. Kammermann, H. Scholz, D. Scholz; Pygery Women's—Miss M. Kammermann; Ramco—A. E. Seary; Redhill—R. Crouch; Rendelsham—C. Osmond, J. O'Toole; Tatiara—M. Dodd; Tintinara—D. L. Jones, L. F. Galley; Warcowie—L. Lipert, R. Felten, C. Wheaton, L. D. Sweet, L. J. Carpenter; Warrambo—C. Sampson; Wasleys Women's—Miss G. Smith; Wepowic—H. W. Noske, J. M. Jasper; Wudinna—J. Browne, E. Browne; Yeelanna—R. Watkins; Petina—F. Daniels—Taplan Women's—Mrs. B. Eime, Mrs. P. Condon; Nunkeri—R. Grills; Coonawarra—R. J. Skinner.

Other items were taken in Committee.

EXAMINED DURING THE MONTH OF SEPTEMBER, 1933. IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC.,

IMPORTS.

Interstate.

Apples (bushels)	328	Swedes (bags)	72
Bananas (bushels)	10,163½	Bulbs (packages)	39
Citrus—		Plants (packages)	135
Grape Fruit (bushels)	4	Seeds (packages)	40
Oranges (bushels)	21	Trees, Fruit (packages)	10
Passion Fruit (bushels)	355	Wine casks (No.)	2,820
Paw Paws (bushels)	22		
Pineapples (bushels)	1,497	<i>Fumigated—</i>	
Nuts—		Trees, fruit (packages)	6
Peanuts (bags)	197	Wine casks (No.)	1
Peanut kernels (bags)	10		
Beans (bushels)	38	<i>Rejected—</i>	
Carrots (bags)	165	Pineapples (bushels)	6
Cucumbers (bushels)	24	Second-hand cases (No.)	2
Potatoes (bags)	851		

Overseas.

(State Law.)

Wine casks (No.)	280
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Federal Quarantine Act.

	Packages.	Lbs.		Packages.	Lbs.
Seeds, &c.	1,280	261,605	Tea chests	4,976	—
Canes	65	—			Sup. ft.
Cocoanut chests	579	—	Timber	231,879	4,874,842

EXPORTS.

Federal Commerce Act.

		Packages.			Packages.
England	Citrus—Oranges	22	Singapore	Citrus—Oranges	14
Colombo	Citrus—Oranges	66		Vegetables	90
	Vegetables	5	Strait Settlements ..	Apples	7
Netherlands, East	Citrus—Oranges	10		Citrus—Lemons	2
Indies	Vegetables	12		Oranges	2
Singapore	Apples	5		Vegetables	21
	Citrus—Lemons	6	New Zealand	Citrus—Oranges	16,310

DAIRY AND FARM PRODUCE MARKETS.

MESSRS. A. W. SANDFORD & CO., LIMITED, reported on November 1st, 1933:—

BUTTER.—Production is now cutting back considerably owing to the incoming of hot weather at the end of October which wilted off the feed in many districts, and supplies have therefore cut off more quickly than was anticipated. Unfortunately the London market, just as production was at peak, became somewhat demoralised, and owing to the Commonwealth Control Board having fixed minimum prices above what London merchants were prepared to operate at, heavy quantities went forward from this State on consignment. These shipments, unfortunately, will arrive at drooping markets, so that considerable losses seem likely to be incurred. On account of this an adjustment of butter fat values became necessary, but it is to be hoped that some interest will be shown in Australian butter with the easing in prices through the greater consumption which usually follows when the commodity is selling at more moderate rates. The local prices remain unaltered. Choiceest creamery fresh butter in bulk, 1s. 0½d. Prints and delivery extra. (These prices are subject to the stabilization levies.) Store and collectors', 4½d. to 5d. per lb. at store door, less usual selling charges.

EGGS.—The usual seasonal decrease in supplies is now in evidence, brought about by the drying off of the feed in most areas. Unfortunately also the proportion of eggs which would pass the Commonwealth graders are lower just now because of the warm weather, so that the quantities packed for export will from this out decline. Values are unchanged. Ordinary country eggs, hen or duck, 4½d. per dozen; selected, export quality eggs, 1½ozs. and over, 8½d. to 9d. per dozen.

CHEESE.—The outlook for the production of cheese is not nearly so bright as compared with a month ago, for the hot weather materially affected the supplies, so that the quantities to be exported will not be nearly so great as last season. Prices for cheese have maintained, and local and Western Australian trade kept well up to the average. New makes, medium and large, 7½d. to 7¾d.; loaf, 7½d. to 8½d.; semi-matured and matured, 9½d. to 10d. per lb.

BACON.—As usual during the hot period of the year, the consumption of bacon falls and there has been since the opening of the month less sales for certain cuts of bacon than was previously the case. On the other hand, however, hams are selling more freely, and also bacon factory smallgoods. In anticipation of larger sales with the nearer approach of Christmas, curers have been kept working at high pressure, and as the quality of the established brands of bacon has been well maintained, the outlook is satisfactory. Best local sides, 9¾d. to 9½d.; best factory cured middles, 10½d. to 11d.; large, 9d.; rolls, 8d. to 8½d. Hams, 11½d. to 1s. 0½d. per lb.; cooked, 1s. 2d. to 1s. 2½d. Lard, prints, 7s. per dozen.

LARD.—Supplies have been a little more plentiful, so that some interstate trade was possible during the last few weeks.

ALMONDS.—Quantities marketed during the last few weeks have only been limited and these met with ready sale, as some of the larger storekeepers purchased supplies for their Christmas trade, and still need further lots. It is therefore anticipated that strong demand will continue, although there is no firming in rates. Kernels were also taken up readily at quotations. Softshells and Brandis, 8½d. to 9½d.; hardshells, 5d. to 5½d. per lb.; kernels, 1s. 11d. to 1s. 1½d. per lb.

HONEY.—For the prime clear extracted consignments of new season's, good demand was experienced last month, but the quantities marketed have not been great. Lower grades of dark and inferior sorts were very difficult to quit. Prime clear extracted in liquid condition, 3d. to 3½d. per lb.; lower grades, 1½d. to 2½d. per lb.

BEEWAX continues to meet with ready sale where the quality is right; 1s. 0½d. to 1s. 2d. per lb. according to sample.

LIVE POULTRY.—The catalogues submitted recently have not been sufficient for the requirements of the trade, especially as some poulterers already have commenced putting supplies away in refrigerators for their Christmas requirements. Consignors would be well advised not to delay the forwarding of their surplus stock until too close up to Christmas, when the markets become somewhat over-supplied, but to forward any birds they have ready straight away. Crates loaned on application. Prime roosters, 3s. 3d. to 4s. 6d.; nice conditioned cockerels, 2s. 8d. to 3s. 2d.; fair conditioned cockerels, 2s. 5d. to 2s. 8d.; chickens lower. Heavy weight hens, 2s. 3d. to 3s. 3d.; medium hens, 1s. 10d. to 2s. 2d.; light hens, 1s. 5d. to 1s. 9d.; couple of pens of weedy sorts lower. Geese, 3s. 6d. to 4s. 6d.; goslings lower. Prime young Muscovy drakes, 5s. to 6s.; young Muscovy ducks, 2s. 10d. to 3s. 8d.; ordinary ducks, 1s. 9d. to 2s. 6d.; ducklings lower. Turkeys, good to prime condition, 10d. to 1s. 1d. per lb. live weight; do., fair condition, 7d. to 9d. per lb. live weight; do., poor and crooked breasted, lower. Pigeons, 4½d. to 5d. each.

POTATOES.—Old, 4s. 6d. per cwt.

ONIONS.—Old Brown, 4s. per cwt.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department show the rainfall at the subjoined stations for the month of October, 1933, also the average precipitation for October, and the average annual rainfall.

Station.	For Oct. 1933.	Av'ge for Oct.	Av'ge Annual Rain- fall.
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FAR NORTH AND UPPER NORTH.

Oodnadatta	—	0.43	4.70
Marree	—	0.46	5.89
Farina	—	0.49	6.47
Copley	—	0.47	7.94
Beltana	0.7	0.54	8.54
Blinman	0.9	0.77	11.95
Hookina	0.20	0.60	11.53
Hawker	0.23	0.80	12.30
Wilson	0.31	0.88	11.78
Gordon	0.22	0.78	10.63
Quorn	0.18	1.11	13.29
Port Augusta ..	0.11	0.85	9.42
Bruce	0.19	0.80	9.93
Hammond	0.21	0.95	11.31
Wilmington	0.12	1.47	17.43
Willowie	0.14	1.00	12.19
Melrose	0.25	2.01	22.85
Booloroo Centre ..	0.17	1.31	15.15
Port Germein ..	0.32	1.10	12.43
Wirrabara	0.11	1.66	19.21
Appila	0.28	1.31	14.57
Cradock	0.19	0.87	10.83
Carrieton	0.30	0.97	12.31
Johnburg	0.19	0.84	10.61
Eurelia	0.44	1.00	12.87
Orroroo	0.31	1.07	13.21
Naakara	0.31	0.73	11.16
Black Rock	0.26	1.00	12.41
Oodlawirra	0.22	0.59	11.56
Peterborough ..	0.30	1.09	13.21
Yongala	0.33	1.25	14.42

NORTH-EAST.

Yunta	0.33	0.69	8.50
Waukaringa	0.22	0.66	8.00
Mannahill	0.16	0.76	8.28
Cockburn	0.06	0.62	7.96
Broken Hill	0.04	0.78	9.63

LOWER NORTH.

Port Pirie	0.34	1.21	13.17
Port Broughton ..	0.18	1.20	13.93
Bute	0.42	1.35	15.36
Laura	0.19	1.69	17.91
Caltowie	0.21	1.53	16.69
Jamestown	0.20	1.60	17.71
Gladstone	0.12	1.54	16.29
Crystal Brook ..	0.32	1.47	15.78
Georgetown	0.16	1.67	18.35
Narridy	0.28	1.40	15.85
Redhill	0.31	1.46	16.55
Spalding	0.24	1.75	18.99
Gulnare	0.30	1.71	18.56
Yacka	0.21	1.34	15.33
Koolunga	0.21	1.39	15.40
Snowtown	0.47	1.38	15.64

LOWER NORTH.—continued.

Brinkworth	0.29	1.36	15.74
Blyth	0.71	1.47	16.77
Clare	0.86	2.12	24.53
Mintaro	0.78	2.10	23.42
Watervale	0.77	2.35	26.91
Auburn	0.95	2.15	23.98
Hoyleton	0.57	1.61	17.32
Balaklava	0.41	1.43	15.49
Pt. Wakefield ..	0.28	1.12	12.03
Terowie	0.22	1.16	13.35
Yarcowie	0.25	1.16	13.57
Hallett	0.19	1.47	16.40
Mount Bryan ..	0.20	1.34	16.65
Koorings	0.35	1.67	17.89
Farrell's Flat ...	0.42	1.67	18.65

WEST OF MURRAY RANGE.

Manoora	0.70	1.76	18.83
Saddleworth	0.62	1.74	19.55
Marrabel	0.76	1.80	19.84
Riverton	0.77	1.88	20.75
Tarlee	0.73	1.63	18.11
Stockport	0.52	1.58	16.88
Hamley Bridge ..	0.33	1.47	16.54
Kapunda	0.63	1.84	19.79
Freeling	0.42	1.66	17.85
Greenock	0.81	1.98	21.56
Truro	0.49	1.84	19.96
Stockwell	0.84	1.82	20.12
Nuriootpa	0.89	1.84	20.64
Angaston	0.98	1.99	22.43
Tanunda	1.03	1.95	22.02
Lyndoch	0.63	2.16	23.45
Williamstown ..	0.91	2.38	27.71

ADELAIDE PLAINS

Owen	0.55	1.35	14.33
Mallala	0.37	1.51	16.56
Roseworthy	0.91	1.66	17.34
Gawler	0.46	1.74	18.96
Two Wells	0.60	1.40	15.70
Virginia	0.60	1.47	17.12
Smithfield	0.47	1.54	17.50
Salisbury	0.43	1.58	18.54
Adelaide	0.64	1.73	21.10
Glen Osmond ..	0.80	2.14	25.96
Magill	0.62	1.98	25.50

MOUNT LOFTY RANGES.

Teatree Gully ..	0.57	2.17	27.30
Stirling West ..	1.66	3.76	46.91
Uraidla	1.35	3.37	43.91
Clarendon	1.49	2.63	32.82
Morphett Vale ..	1.07	1.83	22.64
Nearlunga	0.95	1.59	20.34
Willunga	1.21	2.14	26.01
Aldinga	1.16	1.53	20.21

RAINFALL—continued.

Station.	For Oct. 1933.	Av'ge for Oct.	Av'ge Annual Rain- fall.
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MOUNT LOFTY RANGES—contd.

Myponga	1.41	2.11	29.48
Normanville ...	0.39	1.58	20.69
Yankalilla	0.91	1.66	22.85
Mount Pleasant	0.89	2.40	27.18
Birdwood	1.04	2.50	29.15
Gumeracha	0.85	2.85	33.39
Millbrook Res. .	0.71	2.93	34.86
Tweedvale	1.07	2.98	35.89
Woodside	1.12	2.72	32.25
Ambleside	1.36	2.99	34.87
Nairne	1.21	2.44	28.09
Mount Barker ..	1.61	2.80	31.79
Echunga	1.59	2.84	33.15
Macolesfield	1.26	2.65	30.43
Meadows	1.23	3.07	36.12
Strathalbyn	0.73	1.73	19.34

MURRAY FLATS AND VALLEY.

Meningie	0.59	1.46	18.37
Milang	0.57	1.31	14.92
Langhorne's Ck.	0.64	1.35	14.76
Wellington	0.31	1.36	14.56
Tallem Bend ...	0.38	1.47	14.70
Murray Bridge .	0.25	1.29	13.59
Callington	0.48	1.35	15.20
Mannum	0.09	1.02	11.47
Palmer	0.29	1.48	15.43
Sedan	0.16	1.14	12.11
Swan Reach ...	0.27	0.98	10.60
Blanchetown ...	0.24	1.05	11.04
Eudunda	0.47	1.54	17.11
Sutherlands	0.05	1.00	10.82
Morgan	0.17	0.91	9.20
Walkerie	0.28	0.93	9.66
Overland Crnr...	0.20	0.95	10.41
Loxton	0.54	0.98	11.59
Renmark	0.48	1.05	10.49

WEST OF SPENCER'S GULF.

Eucla	0.38	0.70	9.98
Nullarbor	0.21	0.59	8.73
Fowler's Bay ...	0.60	0.85	11.82
Penong	0.67	0.84	12.12
Koonibba	0.85	1.00	11.82
Denial Bay	0.77	0.90	11.36
Ceduna	0.83	0.81	9.95
Smoky Bay	0.49	0.76	10.28
Wirrulla	0.57	1.03	10.08
Streaky Bay	0.48	0.98	14.82
Chandada	0.39	—	—
Minnipa	0.64	1.18	13.68
Kyancutta	0.38	—	—
Talia	0.56	0.99	14.63
Port Elliston ...	0.55	1.16	16.39
Yeelanna	0.87	1.30	15.72
Cummins	0.97	1.37	17.35
Port Lincoln....	0.75	1.37	19.34
Tumby	0.60	1.28	13.92
Ungarra	1.14	1.46	16.73
Carrow	0.60	1.27	13.08
Arno Bay	0.61	1.19	12.44

Station.	For Oct. 1933.	Av'ge for Oct.	Av'ge Annual Rain- fall.
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WEST OF SPENCER'S GULF—contd.

Rudall	0.48	1.00	12.19
Cleve	0.31	1.32	14.66
Cowell	0.16	1.13	11.10
Miltalie	0.59	1.32	13.54
Darke's Peak ..	0.47	1.31	14.92
Kimba	0.40	1.02	11.52

YORKE PENINSULA.

Walleroo	0.37	1.17	13.91
Kadina	0.41	1.31	15.61
Moonta	0.35	1.23	15.05
Paskeville	0.51	1.37	15.46
Maitland	0.62	1.62	19.90
Ardrossan	0.51	1.23	13.93
Port Victoria ...	0.56	1.27	15.40
Curramulka	0.58	1.62	17.87
Minlaton	0.72	1.48	17.80
Port Vincent ...	0.46	1.25	14.40
Brentwood	0.72	1.33	15.45
Stansbury	0.99	1.44	16.81
Warooka	0.84	1.36	17.51
Yorketown	0.70	1.33	16.94
Edithburgh	0.80	1.28	16.34

SOUTH AND SOUTH-EAST.

Cape Borda	1.21	1.55	24.83
Kingscote	1.24	1.36	19.11
Penneshaw	0.88	1.37	18.85
Victor Harbor ..	0.70	1.78	21.27
Port Elliot	0.82	1.62	19.91
Goolwa	0.60	1.44	17.81
Copeville	0.31	1.13	11.44
Meribah	0.64	0.86	11.10
Alawoona	0.50	0.82	10.02
Mindarie	0.37	1.22	11.91
Sandalwood	0.37	1.27	13.57
Karoonda	0.50	1.41	14.33
Pinnaroo	0.38	1.23	14.54
Parilla	0.35	1.23	13.90
Lameroo	0.30	1.49	16.08
Parrakie	0.46	1.39	14.49
Geranium	0.37	1.52	16.41
Peake	0.33	1.53	16.03
Cooke's Plains ..	0.16	1.45	15.36
Coomandook ...	0.54	1.62	17.11
Coonalpyn	0.49	1.61	17.42
Tintinara	0.62	1.64	18.60
Keith	0.49	1.47	17.87
Bordertown	0.86	1.75	19.22
Wolseley	1.15	1.78	18.41
Frances	0.89	1.97	19.99
Naracoorte	0.87	2.03	22.59
Penola	1.18	2.31	26.06
Lucindale	1.36	1.93	23.16
Kingston	0.99	1.73	24.33
Robe	1.19	1.70	24.64
Beachport	1.39	1.76	26.93
Millicent	1.42	2.20	29.76
Kalangadoo	1.83	2.83	32.03
Mount Gambier ..	1.56	2.46	30.53

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page.	Dates of Meetings.		Branch.	Report on Page.	Dates of Meetings.	
		Nov.	Dec.			Nov.	Dec.
Adelaide	*	—	—	Gladstone	*	—	1
Alawoona	*	—	—	Gladstone Women's	†	21	19
Allandale East	†	—	1	Glencoe	*	14	12
Alma	†	—	—	Goode	†	1	—
Appila-Yarrowie	483	3	1	Goode Women's	*	1	R
Ashbourne	*	1 & 29	—	Greenock	†	6	4
Auburn Women's	†	24	R	Green Patch	490	2 & 30	—
Balaklava	*	R	R	Gumeracha	*	6	4
Balhannah	*	—	—	Hanson	*	28	—
Balumbah	*	—	—	Hartley	*	1 & 29	27
Balumbah Women's	500	1	6	Hindmarsh Island	*	—	—
Beetaloo Valley	†	27	—	Hope Forest	†	6	4
Belalie Women's	†	14	12	Hoyleton	*	20	18
Berri	†	1	7	Inman Valley	*	16	21
Belvidere	*	—	—	Jamestown	*	15	20
Blackheath	†	2	7	Jervois	†	9	14
Black Rock	*	7	R	Kalangadoo Women's	*	11	9
Black Springs	†	—	—	Kalangadoo	*	11	9
Blackwood	*	13	11	Kalyan	*	15	20
Blyth	484	54	22	Kangarilla Women's	†	16	21
Booborowie	*	27	—	Kanni	*	—	—
Bouleroo Centre	*	—	1	Kapinnie	*	—	—
Boolgun	†	30	R	Kapunda	*	10	8
Boor's Plains	488	2	R	Karoonda	*	1	6
Bowhill	*	27	—	Keith	*	2 & 30	—
Brentwood	*	2	7	Kelly	†	—	2
Brinkley	*	1 & 29	—	Ki Ki	*	—	—
Brinkworth	*	27	—	Kilkerran	†	2 & 30	—
Brownlow	485	—	—	Kongorong	*	27	—
Buchanan	485	—	—	Koolunga	†	—	—
Buglo	*	14	12	Koonibba	*	27	—
Bute	*	16	21	Koppio	490	28	—
Butler	*	R	R	Kringin	*	6	4
Caliph	*	7	5	Kulkawirra	*	14	R
Caralue	*	1 & 29	—	Kyancutta	492	7	5
Carrow	*	1 & 29	—	Kybybolite	*	2 & 30	—
Charra	*	—	—	Kybybolite Women's	†	7	5
Cherry Gardens	†	25	30	Lameroo	*	—	2
Chilpuddie Rock	†	—	—	Langhorne's Creek	*	1 & 29	—
Clare Women's	†	—	—	Laura	*	4	2
Clarendon	*	27	R	Laura Bay	†	—	12
Cleve	*	4	2	Laura Bay Women's	*	14	12
Collie	*	1	6	Lenswood and Forest	*	—	—
Coomandook	*	24	29	Range	*	—	—
Coonawarra	*	2	7	Light's Pass	485	—	—
Coonawarra Women's	†	15	20	Lipson	*	—	2
Cummins	*	10	8	Lone Gum and	†	—	—
Cungena	*	2	7	Monash	†	1 & 29	—
Currency Creek	*	6	4	Lone Pine	486	27	—
Dudley	*	—	R	Lowbank	*	1 & 29	—
Elbow Hill	†	30	—	Loxton	*	10	8
Eudunda	†	26	4	Lyndoch	†	R	R
Eurelia	*	11	9	McLaren Flat	*	—	—
Eurelia Women's	*	1	6	McLaren Flat Wm's	500	2	7
Farrell's Flat	*	24	29	Macclesfield	†	16	21
Finnis	†	—	—	MacGillivray	*	28	—
Frances	*	—	—	Mallala	*	20	18
Frayville	†	—	—	Maltes	†	2 & 30	—
Gawler River	*	—	—	Mangalo	*	—	—
Georgetown	*	—	2	Mangalo Women's	*	—	—
Geranium	*	25	30	Marana	*	—	—

INDEX TO BUREAU REPORTS—continued.

Branch.	Report on Page.	Dates of Meetings.		Branch.	Report on Page.	Dates of Meetings.	
		Nov.	Dec.			Nov.	Dec.
Meadows	*	1 & 29	—	Rosedale	*	—	—
Milang	†	1	2	Roseworthy	†	—	—
Millicent	†	24	29	Rudall	*	28	—
Millicent Women's ..	*	—	—	Saddleworth	†	3	1
Miltalie	*	—	2	Saddleworth Women's ..	†	7	5
Monarto South	*	—	—	Scott's Bottom	†	—	2
Moorlands	*	29	—	Shoal Bay	†	28	—
Morchard	*	—	1	Smoky Bay	*	—	—
Morchard Women's ..	501	3	R	Snowtown	*	10	8
Mount Barker	*	20	18	South Killerran	489	28	—
Mount Bryan	*	—	—	Springton	*	1	6
Mount Compass	*	—	—	Stanley Flat	*	20	18
Mount Gambier	†	10	8	Stockport	†	—	—
Mount Hope	†	28	—	Strathalbyn	*	8	13
Mount Pleasant	*	10	8	Streaky Bay	*	24	22
Mudamuckla	*	11	9	Sutherlands	†	2	7
Mundalla	†	—	—	Tailem Bend	*	7	7
Mundalla Women's ..	†	2	7	Talia	*	24	29
Murray Bridge	497	—	—	Tantanoola	†	4	2
Murraytown	†	—	—	Tantanoola Women's ..	504	1	6
Mypolonga	*	8	R	Taplan	*	28	—
Myponga	*	16	21	Taplan Women's ..	†	—	—
Myrla	*	1 & 29	—	Taragoro	*	2	R
Nantawarra	†	2 & 30	—	Tarlee	†	—	—
Naracoorte	*	11	9	Truro	†	20	R
Narridy	*	—	—	Tulkinara	*	2	7
Nelshaby	*	—	—	Tweedvale	*	16	21
Nelshaby Women's ..	*	—	—	Ungarra	*	9	7
Netherton	*	1 & 29	9	Upper Wakefield ..	*	—	—
Nunjikompita	*	2 & 30	30	Uraidla and Summer-			
Nunkeri	†	1 & 29	R	town	*	6	4
O'Loughlin	*	13	11	Waddikee Rocks ..	*	—	2
Overland Corner	†	1 & 29	—	Waikerie	*	10	8
Owen	*	13	11	Wallala	†	8	13
Palabie	*	—	—	Wanbi	*	22	27
Parilla	*	21	19	Wandearah	*	28	—
Parilla Women's ..	*	15	20	Warcovie	†	28	—
Parilla Well	*	6	4	Warcovie Women's ..	†	—	—
Parilla Well Women's ..	*	28	26	Warrambo	†	1	R
Parrakie	498	—	—	Warrambo Women's ..	†	R	R
Parrakie Women's ..	†	28	R	Wasleys	*	9	14
Paruna	†	3	1	Wasleys Women's ..	*	2	7
Paskeville	†	28	—	Watervale	*	20	18
Pata	*	3	1	Wauralte	*	28	—
Penola	†	4	2	Weavers	†	13	11
Penola Women's ..	†	—	—	Wepowie	*	27	—
Penwortham	†	2 & 30	—	Wepowie Women's ..	*	7	R
Petersville	*	28	—	Williamstown Wm's ..	†	1	6
Petina	*	25	23	Willowie	*	27	25
Pinbong	†	—	—	Wilmington	†	14	R
Pinnaroo	*	—	—	Wirrilla	*	2	R
Pinnaroo Women's ..	502	3	1	Wirrilla Women's ..	*	2	7
Port Elliot	*	—	—	Wirrulla	*	15	20
Pygery	*	28	—	Wolseley	†	13	11
Pygery Women's ..	*	—	—	Wudinna	*	—	—
Quorn	*	—	—	Yadnarie	*	28	—
Ramoo	*	27	—	Yandiah	*	R	R
Redhill	†	—	—	Yaninee	*	—	—
Rendelsham	†	4	2	Yeelanna	*	1 & 29	—
Rendelsham Women's ..	502	—	—	Yurgo	*	—	—
Riverton	*	13	11	Yurgo Women's	*	—	—
Roberts & Verran ..	*	—	—				

* No reports received during the month of October. † Held over. R In recess. ‡ Formal.

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

[Branch Secretaries are reminded that the following are exempt from payment of the Annual Bureau subscription:—Life members, Branch Secretaries, members appointed before August 1st, 1930, and new members who reside in the same house as (a) a life member, (b) Secretary, or (c) another member who already subscribes.

The subscription for all other members is 2s. 6d., commencing from August 1st in each year, provided that—subject to the above exemptions—nominations forwarded during the months of January to June must be accompanied by a payment of 1s. 6d. each nomination for that period.]

MEN'S BRANCHES. SOUTH-EASTERN DISTRICT.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Mount Gambier.	11/8/33	11	" Pasture Experiments," D. Fraser	G. Gurry
Allandale East .	1/9/33	12	Question Box	J. Laslett
Millicent	August	—	Demonstration	L. Hutchesson
Allandale East .	29/9/33	13	Congress Report	J. Laslett
Mundalla	29/9/33	16	Congress Report	A. Ross
Mundalla	27/10/33	16	Address—J. Sullivan	A. Ross
Millicent	29/9/33	11	Congress Reports	L. Hutchesson
Penola	16/10/33	9	Congress Reports	F. Hinze
Wolseley	4/9/33	25	Address—E. S. Alcock ..	E. Sharrad
Wolseley	9/10/33	16	Congress Reports	E. Sharrad
Mt. Gambier ...	13/10/33	10	Congress Reports	G. Gurry
Tantanoola	7/10/33	9	Congress Reports	H. Kennedy

UPPER NORTH DISTRICT. (PETERBOROUGH AND NORTHWARD.)

APPILA (Average annual rainfall, 14.69in.).

August 8th.—Attendance, 11.

FARM CONVENIENCES.—Mr. C. Borgas read the following paper:—"Conveniences on the farm result in the saving of much time and labor. A gate made from pipe or iron, and fastened to a good stout post by means of hinges so that it swings without having to carry it, will prove very useful. A gate with a bolt latch should be swung so that a person has to lift it, say, $\frac{1}{2}$ in. or $\frac{3}{4}$ in., to hold the latch tight. A strong wind has a tendency to shake the gate, and in time the latch works its way out of the hole in the post and the gate swings open. Another good convenience is the motor ramp, which should be constructed of strong material, such as three main beams of 'I' iron, 8 in. x $\frac{1}{2}$ in. x $\frac{1}{2}$ in. The cross pieces from old railway or tram rails can be bought very reasonably, and will make an everlasting ramp. The ramp should be built on concrete walls, and made 6 in. to 1 ft. above the surface, with a pit 3 ft. deep. Every motorist should have a set of chains to use if the car becomes bogged. A serviceable set can be made from pieces of chain about 9 in. long and harness straps. The chains can be made from old harvester chains which have become useless. If the links are badly worn they should be closed down." Discussion:—A few members did not agree with the writer regarding the lifting of the gate to unlatch. For small children it would be inconvenient, and nearly every swing gate will sag down in time, and the latch will then be tight. A small hook around the latch handle is quite effective in keeping the latch in place. (Secretary, E. Wurst.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Wilmington ...	21/9/33	20	Life Membership Certificate to H. Duhring	C. Cole
Warcowie	3/10/33	22	"Shearing," T. Ryan ...	A. Crossman
Wilmington ...	10/10/33	16	Address—Dr. Stoney,	C. Cole

MIDDLE-NORTH DISTRICT.**(PETERBOROUGH TO FARRELL'S FLAT.)**

BLYTH (Average annual rainfall, 16.77in.).

July 28th.—Attendance, 19.

FALLOWING.—Mr. E. Eime read the following paper:—"As a general rule, provided it receives good after treatment, the best and most profitable fallow is that which is ploughed earliest in the season. The main advantage of early fallowing is that it enables the farmer to more thoroughly store up winter rains by exposing soil with a loose, broken surface, and secondly, under the influence of rain, it permits of the under-surface becoming consolidated to a suitable degree. In some soils it is not advisable to plough too early, because the land is beaten down by early winter rains, and tends to set harder than if it had not been ploughed at all. Such land should be left until later in winter. If one has both light and heavy land to work, break up the lighter land first, because if left until late it may not become consolidated sufficiently before seeding. In this district fallowing should start as soon after seeding as possible—June, July, and possibly August being the best months. Later fallow remains too open to make a suitable seed bed. In districts where late spring and early summer rains are frequent, fallowing may be continued until later in the year. Everything depends upon the quantity of rain the ploughed land is likely to receive before seeding. A great deal of difference of opinion exists on the depth to plough. The great bulk of South Australian fallowing is shallow, from 2in. to 4in., and has given satisfactory results. Shallow ploughing has the advantage of being economical in horsepower. Whenever compelled to fallow late, plough very shallow, in order to make consolidation easier. The plough used should possess well-shaped mouldboards, that will turn the ground over properly. The shares should be kept in good condition, and the furrows evenly spaced. Care should be taken to leave no strips between the furrows. When ploughing sandy soil that is likely to drift, a disc plough is very useful, because the straw can be turned under to prevent drifting. Many farmers use cultivators for breaking up the land. This may be all right where there are no weeds, and the ground is not too hard, but if the ground be very 'green,' it may not be any cheaper in the end, for it will probably need more working back if weeds are not turned under. The land should be harrowed to pull it to pieces, and if it is not properly broken up then a second harrowing is necessary. Sandy ground should not be harrowed. It causes a lot of drifting, and it sets down better if not disturbed too much. Cultivating should be left until the end of September or October, when such should be done to destroy weeds. The first cultivating should be about the same depth as ploughing, and the rest of the cultivating should gradually get shallower. The fallow should be worked after every heavy autumn rain, when weeds appear. Cross working is advisable, it gives a more even cultivation of the soil. The fallow should be cultivated again soon before seeding. It kills a number of weeds and makes a finer seed bed." (Secretary, R. Eime.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Beetaloo Valley	2/10/33	14	Address—E. L. Orchard..	B. Giddings
Murraytown ...	25/10/33	10	Congress Report	E. Pitman

LOWER-NORTH DISTRICT.**(ADELAIDE TO FARRELL'S FLAT.)****BROWNLOW.**

July 5th.—Attendance, 11.

TRAINING A DOG.—The following notes are from a lecture delivered by Mr. A. Semmler:—Do not start training a dog too young; it should be about six months old before it is used for horses and cattle, but a sheep dog can be educated earlier. If children are permitted to play with young dogs they do not work so well. I prefer a dog that barks to a silent heeler; they shift cattle and horses better. To get a good cattle dog cross a silent heeler with a dog that barks. A dog should be trained to work by signs of the hand, because often it is not possible to speak to a dog when it is far away, or on a windy day. Cattle dogs are very useful for rabbiting. When choosing a dog for hunting see that it has plenty of lung space. When a young dog catches its first rabbit or hare only give it the lungs to eat. (Secretary, F. Roocke.)

BUCHANAN.

July 7th.—Attendance, 11.

ROTATION CROPPING AND SIDELINES.—Mr. J. Armstrong read the following paper:—“During the past five years the whole of the farming industry has been practically revolutionised by the fall in the price of farm products. How much better off to-day would the farmer have been if he had organised his sidelines on a sound basis in prosperous times? The slump in both wheat and wool would never have hit him so hard. It is only by getting back to sidelines that we are likely to retrieve our position. Most of the farms in the district are about 400 acres in area, and the general practice is wheat-fallow alternately. It is possible that in this rotation the land will become wheat sick, and returns greatly reduced. My experience has led me to believe this: some method other than wheat-growing alone must be introduced. On my farm I have endeavored to spell land to grass as much as possible to try and keep the land in good heart for wheat, but the farm is hardly large enough for the purpose, and by introducing a system of rotation of oats on stubble land better results could be obtained in the carrying of more dairy cows without curtailing the sheep flock. This system should give a much bigger percentage of hay, besides a larger supply of grain for the lean months, and also place the land in good condition for wheat again. Being within 70 miles of the Abattoirs, the road service excellent, and also a good train service, the district is extremely well provided with transport. Dairying carried on in conjunction with pig raising would be a big advantage to the small farmer in this district, instead of wheat alone. Pigs can be raised far cheaper by running in a paddock to graze at will in preference to shut up in the sty. Much discussion is going on over which breed is most suitable for export, and until one class of boar is supplied to the breeder at a reasonable figure nothing in the way of a uniform carcass will be obtained for export. Where the area of farms is larger, sheep can be kept with much better advantage, but the growing of more oats will increase the carrying capacity and provide for lean times.” (Secretary, L. Bell.)

LIGHT'S PASS.

July 31st.—Present: 28 members.

GRAFTING VINES.—Mr. W. Ahrens read the following paper:—“When contemplating grafting, first make sure that you are converting to a variety which will always command a ready sale. Procure your scions of the favored variety, this should be done as soon as possible after pruning. The cuttings should not be too thick, and cut into convenient lengths, say 2ft., tied into small bundles, wrapped in a bag, and buried in a moist but well-drained place—deep sand for preference—until required. Time of grafting is governed chiefly by the season and soil conditions, nothing will upset the graft so easily as excessive moisture. Should the season be dry, and the soil well-drained, the latter half of September would be a good time to graft. However, in soils that are at all inclined to become waterlogged, wait until about the middle of October, by this time the heavy rains have generally ceased. The land should be well cultivated prior to grafting, so that plenty of loose soil will be available for packing around the graft. At one time the popular idea was to graft just beneath the surface, and not allow the graft to make any roots of its own. I favor grafting at least 6ins. beneath the surface, and permit the graft to retain its own roots, which makes very strong growth the first season, and after a few years the graft becomes practically independent of the old stock, and any danger which may exist from lack of affinity between stock and scion is therefore reduced to a minimum. Another advantage of deep grafting is that in some cases, although the graft comes away fairly well—the union is not perfect, and in such cases the graft will thrive much better if allowed to retain

its own roots. Here again it must be remembered that the danger from excessive moisture is far greater with deep than shallow grafting. The tools required are a spade, saw, knife, grafting tool, mallet, and billican. Enough scions for half a day's grafting may be cut ready before starting, and carried in the 'billy' which must be about half filled with water. The soil is removed from around the vine to the desired depth, the vine sawn off, and grafted. As soon as the operation is completed, a few handfuls of soil should be packed tightly around the graft, it can then be left for half a day if necessary before filling in the hole. When filling in, the soil should be thrown against the sides of the hole, away from the graft first, and it will be found that one shovelful around the graft will complete the job without much danger of dislodging the scion. Next drive in a stake alongside each graft—if a trellis is already erected, a thin bamboo will do—but the top must be tied to the wire. When the young shoot has reached a point about half way between the ground and the wire, the tip should be pinched out, it will then throw out two laterals of even strength, and a nicely balanced vine will result. It will be necessary to go through the plot occasionally to remove any suckers that may be coming through from the old stock. Any time spent in training the young vine during the first season's growth will not be wasted, a good foundation will make for easier pruning in future years. *Affinity of Stock and Scion*—Much remains to be done in this direction, and our knowledge to date is very limited. Shiraz does not do so well on any foreign stock as on its own roots, whereas the currant seems to thrive on any stock. Never graft onto Sercial, for this variety has a very poor root system, if it must be replaced, it is better to grub and replant. It is a debatable point whether it is advisable to graft very old vines of any variety, for anyone who can possibly afford it, grubbing and replanting are more satisfactory. Mr. Ahrens illustrated his remarks with black-board illustrations. (Secretary, C. Verran.)

FIELD DAY AT LONE PINE.

In an effort to stimulate interest in Agricultural Bureau activities, the Lone Pine Branch held its first Field Day on Monday, October 30th.

Thirty members and a fair number of visitors, including Messrs. W. J. Spafford (Deputy-Director of Agriculture) and F. C. Richards (Assistant Secretary of the Agricultural Bureau) made a tour of the Lone Pine (Tanunda) district. The party met at Mr. F. Fromm's property, and found him busy dipping sheep. This dip performs a community service, and adjacent landholders are charged a nominal fee for putting their sheep through. This year he expects that 1,500 sheep will be dipped. Many of the visitors were surprised when Mr. Spafford informed them that the dipping of all sheep in the Tanunda district was compulsory.

When Mr. Fromm took over his present property four years ago the fences were in a shocking condition. These have all been made sheep-proof, and a 10,000-gallon cement tank has been erected on top of rising ground, from which water is reticulated to each of the 11 paddocks into which the holding is divided. The property consists of 200 acres, 25 acres being devoted to vines, and 50 acres this year have been sown with wheat and oats, which are to be cut for hay for hand-feeding to sheep.

TOP-DRESSING COMMENDED.

Mr. Fromm is a strong advocate of the value of top dressing, and has applied superphosphate to 15 acres, at the rate of 2cwts. to the acre. His flock numbers 200, and consists of Dorset Horn and English Leicester crossbred ewes and Merino ewes. He is building up his flock on sound lines, and is using as sires six Dorset Horn rams from Mr. W. J. Dawkins's "Newbold" stud. He also purchased three stud ewes from the same breeder. The flock is run with the main object of providing fat lambs for the local trade, the butchers purchasing from the stock on the farm. This season his lambs averaged 15s. 6d. per head.

To provide a green picking for his top sheep, Mr. Fromm has set aside five acres, which will be sown with lucerne and Sudan grass, and irrigated.

FROST DAMAGE.

The next property visited was that of the President (Mr. Ben. Fromm). Here those members of the party who had not previously seen what frost can do to a vineyard had brought home to them what the visitation of the previous week had done to some portions of the Barossa district. Mr. Fromm has 20 acres under vines, and almost every vine has been cut back to the canes. The foliage appears just as though it had been scorched with fire, and the whole vineyard was black. Mr. Fromm said, "I will be lucky if I pick a bunch of grapes this year."

Mr. Fromm's chief sideline is poultry. He has 500 White Leghorns, and is marketing three cases of eggs each week. From these he averages only about a dozen rejects, proving that he realises the importance of quality and size of egg. The birds are housed in good sheds, but the general opinion of those who inspected them was that not

sufficient provision had been made for light to enter the houses, and that the birds would benefit by the addition of minerals to the feeding ration. A home-made 300-capacity brooder (battery) created much interest.

On Mr. C. F. Beckmann's farm portion of a paddock of 80 acres was sown with oats and Le Hugenot wheat for hay, and was expected to cut two and a half tons to the acre. A small area was under barley, and Correll's, Waratah, and Sepoy wheats were sown over the balance of the paddock, the better portion of the wheat giving indications of a good yield. The whole of the paddock was fed off during the early stages of the growth of the crops, and carried 220 sheep for eight weeks, the lambs, when three months old, realising 16s. 6d. per head.

WINE CELLARS INSPECTED.

The Wonganella cellars and vineyards of Messrs. F. W. Fromm & Sons were next inspected. Here the greater portion of the vines appeared to have escaped the frost, but those planted in the lower situations of the vineyard had been caught. The cellars have a capacity of 60,000 gallons, the greater bulk of which is stored in underground cement tanks, and the plant is capable of handling each year 300 tons of grapes. By far the greater part of the wine is sold for home consumption. The party was very interested in a well which had been sunk through 35 feet of solid rock, and provides an excellent supply of first-class water.

Two of the best crops of wheat inspected during the day were King's White and Nabawa, on the property of Mr. E. R. Hentschke. These were estimated to yield 30 bushels to the acre. Mr. Hentschke has an enviable reputation as a wheatgrower, and has a ready sale for his grain as seed wheat.

The party was entertained at afternoon tea at the Wonganella Cellars.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Snowtown	11/8/33	20	"Wheat Varieties," R. C. Scott	A. Hocking
Wasleys	17/8/33	29	Address—H. G. Hawkins, M.L.C.	C. Currie
Wasleys	8/9/33	24	Address—M. W. Aird	C. Currie
Koonunga	—/11/32	20	"Farm Management," H. Mibus	G. Cartwright
Koonunga	—/12/32	18	"Care of Machinery," E. Kleinig	G. Cartwright
Koonunga	10/1/33	20	"Poultry," H. Leigh	G. Cartwright
Koonunga	—/2/33	20	"British Wine Sales," R. Heintze	G. Cartwright
Koonunga	—/3/33	19	Discussion	G. Cartwright
Koonunga	7/4/33	14	"Obligations of Bureau Members," R. Heintze	G. Cartwright
Koonunga	—/5/33	8	Discussion	G. Cartwright
Koonunga	3/7/33	26	Annual Meeting	G. Cartwright
Koonunga	31/7/33	19	"Herd Testing," H. Mibus	G. Cartwright
Koonunga	—/8/33	27	Address—B. Boehm	G. Cartwright
Koonunga	2/10/33	17	Congress Reports	G. Cartwright
Tarlee	26/9/33	13	Congress Report	N. Clarke
Penwortham ...	7/9/33	30	Pruning Competition Prizes	A. Jenner
Penwortham ...	27/9/33	14	Address—C. Goddard ...	A. Jenner
Nantawarra ...	28/9/33	18	Congress Report	S. Herbert
Stockport	—	—	Cinema Lecture	L. Klaffer
Alma	28/9/33	12	Address—W. C. Johnston	E. Drescher
Roseworthy ...	4/9/33	22	Address—A. C. Russell ..	S. Bowden
Roseworthy ...	2/10/33	26	Address—W. Bennett, B. V. Sc.	S. Bowden
Black Springs ..	3/10/33	11	Congress Reports	K. Dunn
Lyndoch	3/10/33	11	Congress Reports	J. Hammatt
Koolunga	9/10/33	14	Address—J. O. Hatter ..	I. Jones
Redhill	3/10/33	7	Congress Reports	S. Pengilly
Stockport	23/10/33	23	Address—C. Baker	L. Klaffer
Stockport	26/10/33	—	Visit to Roseworthy College	L. Klaffer
Rosedale	2/10/33	20	Address—F. E. Waddy ..	S. Sincok

YORKE PENINSULA DISTRICT.

BOORS PLAINS (Average annual rainfall, 15.61in.).

July 6th.—Attendance, 25.

CARE OF BREEDING STOCK.—Paper presented by Mr. T. Rodda:—"During this period of low prices and depression it is necessary to take great care of breeding stock. The horse is recognised as the most important animal in our immediate district. *Mating Season.*—The year with this stock commences from the 1st of August, which is the general month for the commencement of the breeding season. If keeping a sire, see that he is in the pink of condition—not overfat but in good, hard condition. If seeking a sire for mares, see that the horse has breeding and quality with plenty of life and a good temper. A good plan is to watch a neighbor's teams and young stock; this will prove a guide to a suitable horse. Mares at this time of the year should be in good condition—one that is overfat is not usually a good breeder. If a mare has been worked down during seeding and is showing a worn-out appearance, it is wise to let her rest until later in the spring. After service, leave the mare 21 days before bringing her to the horse again. The usual time of bringing a wet mare to the horse is on the ninth day; always try to catch a wet mare during her first heat period after foaling. *In Foal Period.*—Great care should be taken during this period. The mare should not be over-worked, but must have plenty of exercise; ordinary farm work is one of the best forms of exercise, and is most beneficial. Lump rock salt for lick is a good tonic. If constipation arises, violently acting medicines must be avoided; it must be corrected by an easy laxative such as oil or some other equally soothing agent. In the later stages a mare should not be frightened nor teased by other horses so that they kick out suddenly, or abortion is likely to occur. *Natural Foaling.*—As the time of foaling approaches, the swelling of the udder indicates the coming event, in some cases the swelling extends to the abdomen and even into the hind limbs. Discharges appear of a whitish character from the teats. It is wise when a mare reaches this stage to watch her at intervals, night and day. For convenience she should be kept in a small paddock close to the house. When the mare becomes uneasy and has an anxious expression, she should be watched closely. The water-bag appears and breaks, followed by the front feet of the foal with its nose between the knees; with a little more labor the foal is born, the navel string becomes broken, and in a few minutes the membranes are expelled. A little later the mare generally cleans the foal by licking it all over. The whole act may not take 10 minutes, so that the foaling is often not seen. *Treatment after Foaling.*—It is a good plan to give the mare a warm bran mash and leave her alone, visiting her occasionally to see how she is getting on. If there is any difficulty in getting the foal to suck, a good clean out with warm soapy water is advisable. Perhaps one of the greatest troubles that a horse breeder finds is retention of after-birth. It is said that three times as many mares die from this than all other complications of foaling. Not a particle of after-birth must be allowed to remain in the mare after a few hours of foaling, as it speedily decomposes, setting up inflammation and causing septic poisoning. There are different methods of removing it—by gently twisting it around like a piece of rope and gradually pulling until it comes away, or by affixing a weight; when the latter method is used be sure that it has come away clean. If after-birth is retained for any length of time always give the mare a few injections of warm water to which has been added a few grains of Condly's crystals. *Cattle.* *Mating Season.*—Keep the bull in good healthy condition and away from the cows during the mating season. If a cow is hard to stint she should be given a good laxative two or three days before the heat period is expected. *In Calf Period.*—Cows during this period should be well fed and cared for. There is a big drain on the system, as usually the cow is milking. It is unwise to make the cows run or to use a rough dog. The quieter they are handled the better the result at all times. Keep salt and super in the cowyard, and if necessary, give it with the feed two or three times a week. *Natural Calving.*—If cows are showing signs of constipation prior to calving, administer a laxative. The correct position of the calf for natural calving is the same as with a foal. Care should be taken to see that no after-birth remains; also, give a laxative. *Sheep.* *Mating.*—The main point is to so arrange the mating that lambs are dropped at a time of the year when feed is plentiful. As soon as a young lamb requires more than its mother's milk it must have good, succulent pastures. Therefore, the lambing time selected must be such that there is prospect of four or five months of good grazing ahead. Lambs from Merino ewes do not do well when dropped in cold weather; I prefer them dropped towards the end of autumn or early winter. At this time the weather is milder and the lambs become strong before the cold, bleak conditions. The average gestation period is 150 days, and therefore it will be necessary to mate about five months before the time desired for the first lambs to be dropped. The rams should be strong and healthy. If either too fat or too low in condition the result is not likely to prove satisfactory. When mating for fat lambs, the number of rams should not be limited, and if possible, more than one should be turned in with the ewes, as

they then work better than if alone. In ordinary circumstances not more than 50 ewes should be mated to 1 ram. Shearing and dipping check the desire to mate, and therefore these operations should be carried out at least a fortnight before joining with the ewes. The rams may be allowed to remain with the ewes from 8 to 10 weeks. The ewe should not be too old; never use broken-mouthed ewes if possible to get others. Ewes should go to the ram in good store condition and be maintained in this state during the whole of the gestation period. *Lambing.*—If feed gets short in autumn, the flock must be hand-fed. As lambing approaches, a good sheltered paddock should be reserved for the lambing flock. The lamb is a source of revenue, and close attention must be given to the flock; during lambing it should be visited once a day. On the completion of lambing a good plan is to remove all dry ewes. Tailing and castrating should be done when the lambs are from 2 to 3 weeks old. At this age they suffer less shock and recover more quickly than when older. Remember that cleanliness is essential in this operation." (Secretary, S. Chynoweth.)

SOUTH KILKERRAN.

August 1st.—Attendance, 11.

FARM MACHINERY.—Mr. L. Jacka read the following paper:—"There are five essential points in the care of farm machinery, namely, adjustment and repairs, lubrication, careful handling, protection from weather, and a coat of paint occasionally. One of the best ways of reducing machinery costs is by systematic and efficient repairs. Another most important point in repairing farm machinery is to do it regularly before the machines are put away. The value of keeping a machine in order ready to start at any time cannot be over-estimated. Before starting any machine—especially a combine or a binder—see that every part is well adjusted. All nuts should be tightened, especially on a new machine that has been in use for two or three days. All worn parts should be replaced before putting a machine away, and when replacing a bolt see that it fits the hole correctly, never put in a bolt that only partly fills the bolt hole. Repair the machines before putting them away, when the condition of the machine is quite fresh in the operator's mind. The combine should be well cleaned out, and the super stars given a coat of blacklead. This keeps them from rusting and becoming stuck; the wheat side should be given a wash out with kerosene to prevent the cups from sticking. The rubber hose should not be put in the box and left until next season. A much better plan is to thread them on a wire and hang them in a dry shed so that they will hang straight down. Stored in this way, they never become kinked or bent. Before starting any machine it is essential to oil all working parts with kerosene and oil, and see that all parts work freely. Proper attention to lubrication and a few extra shillings spent on oil will prove a good investment. Lower costs and better work will come from machines given proper attention with oil and grease. Poor oil and grease, or not enough of either, will result in unnecessary expense in repairing parts. The life of the machine is often shortened by rough handling. When a machine is finished with it should be put away in a dry shed. Left out in the weather, it is damaged by heat and rain, and this very often takes more off its appearance than the actual work. A lot of machinery is used only six or eight weeks in the year, and in some cases is left out in the open twice as long. The wearing parts become stiff and rusted, and the woodwork very dry. A machine treated in this way very soon has a second-hand appearance. It is possible to get long service out of a machine only when it has proper attention. Implements such as harrows, ploughs, and cultivators, can be left in the open, but should be given a coat of paint every three or four years. Paint adds years of life to the wooden parts of the machinery." (Secretary, R. Hastings.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Kilkerran	8/8/33	10	"Reducing Costs of Production," E. Heinrich	G. Heinrich
Paskeville	3/10/33	10	Congress Report	J. Prouse
Weavers	2/10/33	6	"Wheat Marketing," L. Arthur	H. Cornish
Boor's Plains ..	5/10/33	—	Field Day and Congress Reports	S. Chynoweth
Sth. Kilkerran..	17/10/33	8	Address—H. B. Barlow	R. Hastings

WESTERN DISTRICT.

GREEN PATCH (Average annual rainfall, 26.56in.).

July 6th.—Attendance, 9.

RELATIVE VALUE OF BIRD LIFE AND TREES TO SUCCESSFUL AGRICULTURE.—Mr. L. Derrington read the following paper:—“When considering the successful pursuit of agriculture generally, one is often likely to forget the economic value of these two phases of natural life to farming, either cereal or orchard. Both birds and trees should be taken into serious consideration. Either from a sporting aspect or purely defensive view, it does not always seem wise to destroy our natural bird life, or denude the country of all big timber in our efforts to open up and farm the country. The destruction of most vegetation, crops, and orchards would eventuate, except for the ceaseless attacks of the birds of many varieties, on the almost limitless army of insects, grubs, &c., which prey on all plant life, generally to our loss. For instance, the potato beetle is capable of reproducing 60 million offspring in a single season. The common plant louse produces living young; having a short life cycle, they have 13 generations in a single season, each female producing, on the average, 50 young. These are examples of how insect life multiplies, and would devastate the whole country if there were not bird life to help keep this enemy within bounds. Viewed through powerful glasses, scientists have proved that certain birds consume enormous numbers of insects annually which are injurious to crops and vegetation generally. For example, the scarlet tanager has been observed, by very careful watching, to consume 630 caterpillars in 18 minutes, and 3,500 plant lice in 40 minutes. Great tits have been known to visit apple trees 47 times picking off caterpillars. By such unobtrusive means are our efforts to produce grain and fruit, &c., helped to success of varying degree. The common sparrow, often harmful because of the amount of grain it takes or damage to fruit, still does a lot of good when feeding its young on caterpillars and grubs, and so one might continue in the same strain in regard to the majority of our native birds. So it would seem that, although certain varieties appear to be a pest in certain respects, they probably do more good than harm in helping the agriculturist to attain his ends. It is stated on good authority that flights of owls generally follow a plague of field mice, these rodents being their particular diet. Opinions will vary, probably, as to the good or bad qualities of many of our feathered tribe. The common crow—although a pest of the first degree in many respects, chiefly with regard to lambs—still does a considerable amount of good as a scavenger and grub eater. Our Australian cockatoo, a rare pest at seeding time and harvest, particularly in the northern areas, does good in consuming the seeds of noxious weeds. In regard to tree life in relation to agriculture, big timber carrying a wealth of foliage is a great asset to successful agriculture. The roots of the big timber reach down to great depths after moisture, bringing this up through their roots, trunk, and on up to the foliage, from which the tree gives forth great quantities of this moisture via the air, benefiting surrounding country. The fallen leaves through the centuries make some of the richest soil. The opening up of and reclaiming of large tracts of land in many parts means the destruction of tremendous quantities of big growing timber, and although this practice is necessary to a certain degree, it seems that the denuding of the country is rather overdone in many instances. Deforested regions visited by torrential rains and floods tend to become desert, and in places drift to a considerable extent. The less tree life, the less moisture retained in the soil. The harm of ruthless destruction of forests in all parts of the world has long been felt, and the problem has been studied in many continents. Steps have been taken to remedy the loss caused by the above practice, either by reserving certain forest areas or by replanting large acreages with varieties of young trees, and help fill some of the gap that industry has created. Often some of our rough and rather poor soils have been turned to profitable account by planting in such manner. Germany was among the first to realise the economic value of following the above principle. In our own continent better farming results would be obtained if more and possibly wider timber breaks were left on a block when clearing preparatory to commencement of a farm. This naturally applies more to the drier and sandy localities of Australia's farming areas.” (Secretary, C. Whillas, Port Lincoln.)

KOPPIO (Average annual rainfall, 22.40in.).

June 27th.—Attendance, 18.

SHEEP AND WOOL.—Mr. C. Goddard (Assistant Wool Instructor of the School of Mines), in an address on this subject, said sheep must be of good type before a good type of wool could be grown. In many cases the quality of sheep on farms was not good enough, and the pooriness of type of wool made the keeping of such sheep unprofitable. The Merino was the best wool type for Eyre Peninsula. There was vast differences in types, and the most profitable type was the important fact to consider. The individual types of wool were fine, medium, and strong. Strong wool would yield 2lbs. more than medium, and 4lbs. more than fine per fleece. He was an advocate for

medium strong wool, but it must show quality. This type of wool filled more bales, and in turn enriched the grower to a greater extent. The narrow-chested, wrinkled, fine Merino could be discarded, and the stronger and more robust type grown. The strong type of wool grew on strong-constituted sheep, as was demonstrated by the sheep grown on outside pastoral country. In some localities the medium, fine-wooled sheep died in times of drought and the strong wools lived. The sheep's constitution was a big factor in economical sheep husbandry. The medium and fine types did well on good grassland, but the cutting capacity was 2lbs. less than the big framed, strong type, and this extra wool at 1d. per pound less meant from 1s. to 2s. per sheep. The strong wool ewe produced an earlier maturing lamb, which grew to greater carcass weight of 6lbs. to 10lbs., hence the aggregate advantages over the medium and fine go to the strong wool. The finer types were more prone to attack from blowfly than the medium strong type. In breeding medium strong-wooled sheep owners must pay special attention to selection of suitable rams to prevent the wool from becoming daggy around the breech and to maintain a high standard of quality in the wool. Sheep must have plenty of feed to produce wool profitably—300 sheep well fed were better than 500 indifferently fed. Feed counted for 90 per cent. of sheep management. All flockowners should have

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C. F. ANDERSON, Poultry Expert.

a reserve of feed and, if necessary, handfeed over lean periods. Starvation—even for a short time—showed in wool, and weakness in the fibres known as tender wool was the result, therefore feeding over lean periods paid with better grown and better nourished fleeces. *Marketing and Valuing Wool.*—Different buyers from different countries valued the wool with limits, and formed an idea of value on “tops”—wool sorted, scoured, carded, and combed. Valuation was an intricate and expert job. Often farmers stated that wool was worth so much per pound and would not sell for less than the estimated value, but how does the farmer know the value of wool? Mr. Goddard recommended the selling of wool as soon as it was sent to market. Every quality of wool had a type value. All wool should be graded, and graded with systematic practice. The reputation for good wool built up by Australian woolgrowers was now waning. For instance, an estate 30 years ago grew 1,800 bales of wool of one quality; now the same estate cut up into farms probably grey 2,000 bales of farmers’ lots of wool from different types of sheep and marketed in a mixed state. Experts stated that by this mixture of types of wool in the bales farmers were losing £1 per bale by not classing their clips. New South Wales had 260,000 bales of unclassified wool, and South Australia 50,000, or 25 per cent. of the wool output. Growers might be content to lose £1 per bale, but the national outlook had to be considered. Buyers had passed a resolution that every bale of farmers’ wool must be shown on the show floor, hence the cost of selling would be doubled, and growers would have to pay for the trouble. Farmers’ wool was often sold to dealers for less than its value, because it was not properly graded and marketed. The following were some of the main advantages of classing wool:—To make maximum profits out of the clip; to class in such a way as to suit customers; and to meet the requirements of buyers. Why classing of wool was necessary:—Sheep did not produce wool even enough in type or quality and utility for all purposes; fleeces differed in parts, and value in parts differed. That difference was the basis of wool classing. When the fleece was picked from the shearing floor a rolling table was necessary 10ft. x 5ft. and 3ft. 6in. high so constructed that small particles of wool would fall through and that could be walked around when skirting and taking off inferior edges. Types of wool were valued differently. Over skirting degraded certain values. When the value for pieces was nearly as much as fleece wool it showed over skirting. In classing small clips the same keen attention should be given as with big clips. Different out-type fleeces, such as extra short, extra heavy, extra strong, and yellow fleeces should be left out of bales with uniform type of wool, and put in with part bales of bellies, locks, lambs, &c., and separated with a small division of hessian and marked outside the bale as well. In this way freight and charges could be saved. Any such mixed bale was drafted to the bag pool, sorted and classed, and each type was accorded its type value. A reference list of each bale should be sent to the broker when wool was forwarded, and a letter sent giving full particulars of each and every bale; then each bale could be treated accordingly, and the highest value obtained for it. Wool being a valuable commodity it was worthy of good packing, and the neatness and attractiveness of the get-up of the clip was in favor of the grower. Mr. Goddard, in reply to a question, stated that the most practical way to start to strengthen up the quality of the wool was to secure good quality strong wool rams of 58’s-60’s count from a well established breeder, and keep on getting the same type of rams from the same breeder. (Secretary, M. Gardner.)

KYANCUTTA.

July 4th.—Attendance, 112.

FALLOWING.—The following papers were read on this subject by Messrs. T. Holman, E. Kelly, and G. Schwerdt:—(Mr. Holman): “Now that farms in this district are getting into working order—scrub clearing being almost a thing of the past—more attention can be paid to fallowing. The chief difficulty in laying down any one method is the number of different types of soil found on the average farm in this district. Even in a 150-acre paddock several types of soil will be found, and to get the best results each class of land needs a different working. This cannot be done when the land is so patchy, and all that can be advised is to work on a general scale. The depth of ploughing in light soil being adjusted with the plough lever. Careful treatment of sandy soil is required to prevent drift, but I do not advise leaving sand rises unworked or they may blow out in deep holes and leave them unworkable, but by ploughing the stumps and roots are removed, and then, if they do drift, this will allow them to drift evenly. If sandhills are left in a natural state they become a harbor for vermin and catch all the drift from surrounding land, which tends to make them impassable. I favor the mouldboard plough for fallowing because it leaves the land rougher and helps to hold drift. Fallowing helps to spread the work more evenly over the year, and stumps can be picked and burned or carted off, thus saving time when seeding. Fallowing should start as soon as possible after seeding and before the weeds get too big, then it will not be necessary to work the fallow so much. No mallee farmer should

be without sheep; besides being a very good sideline and providing cheap meat, they assist materially in keeping weeds in check and consolidating the seedbed, and in this district they do the last-mentioned job better than any implement. When fallowing is finished and stumps picked, the fallow should be cross-harrowed and left until late spring rains before working again, sheep being used to keep weeds down." (Mr. Kelly): "Fallowing is now essential in this district. We have old land that is getting grassy and setting firmer, this land needs working. Fallowing consists of three main points—preparation of seedbed, moisture conservation, and weed killing. By preparing the seedbed at fallowing time, the land is in the right condition for the combine at seeding. By conserving moisture, Nature is assisted and soil bacteria encouraged. By killing weeds the fallow is practically free from weeds, so that seeding may be started shortly after the first seeding rains have fallen. Fallowing should be started as soon as possible after seeding. The earlier it is done the better, thus allowing most of the winter rains to fall on the ploughed ground. Ploughing done after the middle of September is of little benefit as fallow. Deep ploughing is not necessary in this district, but it should be deep enough to ensure that all the land is cut, and if possible turned right over, thus making the following working easier. Towards the end of ploughing—if a dry spell sets in—it pays to run over the broken up land with the harrows, crossing where possible. This will check the weeds that have been cut with the plough but have rooted again; and it will also roll the loose stump out on top and make a cleaner job of stump picking. After harrowing, either the combine or cultivator should be used. These implements turn the fine soil on to the firm seedbed and leave the rougher soil and rubbish on top. This checks evaporation and lessens the tendency to drift. Sheep should then be able to control what weeds appear. Next to rain sheep are the best soil consolidators. If summer rains fall, a working with the combine will be beneficial; it conserves the moisture, and when the land is worked damp it reduces the likelihood of drift." (Mr. Schwerdt): "Fallow should be done as early as possible after a good rain has fallen so that as many stumps as possible will be pulled out of the ground. The land should be worked to a depth of about 2in. While fallowing, have the sheep on the paddock to keep the grass short. No fallow should be allowed to become overgrown with rubbish during spring. Cultivators or harrows should be kept at work, or in most cases sheep will do the work required. Fallow should be left rough on account of drift." (Secretary, J. Dyke.)

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SIDELINES IN EYRE'S PENINSULA.

[Paper read by Mr. H. Cowley at the August meeting of the Green Patch Branch.]

The relations between lines of main production and side lines has altered considerably during the last few years upon wheat farms throughout the greater part of Eyre Peninsula. Several lines formerly of minor importance have become established as essential or main lines in the business of farming.

In the "Sidelines Competition" conducted by the proprietors of *The Chronicle*, which aroused so much interest on Eyre Peninsula last year, the principal wool-growing breed of sheep—the Merino—was excluded from classification as a sideline. So also were draught horses, although the farmer who keeps a number of brood mares and an entire with a view to raising a few colts and fillies for sale in addition to those required for filling up the gaps in his farm team as they occur, should be entitled to class such activity as a sideline.

Other lines, which on most farms are becoming of too great importance to be reckoned as other than essential or main lines are dairying and poultry keeping. For the purpose of this paper I shall class every activity other than the growing of wheat, and any method of turning wheat to account otherwise than by direct sale, as a sideline.

Our chief concern as we set out to occupy land more suited to the growing of wheat than for any other purpose, is to be wheatfarmers growing the best crops that we are able to produce from our land. After this we are obliged to find what other activities can be successfully carried out in conjunction with wheatgrowing.

Firstly, under conditions such as we have known for several years past, the growing of wheat alone is not a payable proposition.

Secondly, the growing of other crops in rotation and the keeping of some class of livestock are essential factors in maintaining and increasing the wheatgrowing capacity of the land.

Thirdly, whatever the value of wheat may be waste is uneconomic, and in connection with the growing of wheat we must necessarily produce other grain of low market value as well as promoting by soil cultivation the growth of various weeds and grasses which would be of no value unless turned into usefulness through livestock. It is the recognition of and correct balancing of such facts that largely determine the success of farming in a profitable way.

The aim should be to grow the best possible crop and find for it the best available market. The discovery of better ways of dealing with what we have and can produce by the exercise of brain and brawn will also retain for us our title to independence and self-reliance, and to those nobler qualities of manhood which go to make our life and calling really worth while.

The scope for dealing with more wheat by consumption on the farm and offering less of it for direct sale seems at present to be limited by the difficulty of finding profitable markets for secondary products. Consequently our sidelines consist largely of other than wheat-consuming stock.

SHEEP AND WOOL.

Next to wheatgrowing, and in many cases almost equal to it, comes sheep raising, and we have to decide, each one for himself, in what proportion the flock shall stand to cropping. Whether we shall grow less wheat and keep more land open for sheep and, if we do, how far can we go in the direction of leaving greater areas uncultivated without reducing the sheep-carrying capacity per acre? These are questions that have been with us for a number of years, and our answer from time to time has been to a great extent guided by the relative prices of wheat and wool. Then again we have to decide whether we shall aim at keeping sheep for the production of wool and, if so, for what class of wool, or whether for the fat lamb or mutton market, or for a combination of several or all purposes. Consequent upon our choice we must again choose the breed or cross breed suitable for our purpose, and for our country and its conditions. Nor does our scope for choice end here, for the fine art of choosing is in the selection of the individual within the breed bearing the characteristics which make for success in raising a profitable flock. I incline to the belief that in a country suited to the production of high-class wool we shall never be able to afford to sacrifice our opportunities as suppliers of the world's finest wool for a somewhat doubtful position among the meat suppliers for distant lands. When markets are favorable we may, to a limited extent, profitably cross-breed with approved mutton-producing sires upon a portion of our Merino ewe flocks, and possibly to a more limited extent even introduce pure mutton breeds, but we must continue to breed and maintain the wool-producing qualities of our Australian Merino.

ROTATION OF CROPS.

We may regard the growing of oats or barley in rotation with wheat as a sideline, and at this point may connect the growing of oats with the keeping of sheep, for by hand-feeding with this grain when pasture feed is scarce we may carry through a flock of greater numbers than it would otherwise be safe to attempt to keep, and particularly we may assure sustenance for the ewes at lambing time. We may grow oats after wheat only as far as is necessary to keep the land free from "take-all," or we may grow as much oats as possible as a second crop in rotation or even as a third to be able to carry more sheep than the pasture can be expected to feed, and supplement this with oat feeding in self feeders for a long period of the year. We may even consider the growing of oats on a portion of the fallow in lieu of wheat, which is a practice on some farms where large flocks are kept.

Rye, peas, and melons may also be grown as sideline crops for stock feeding purposes as well as various pasture grasses and clovers (where soil and climate are suitable).

DAIRYING.

Of recent years—with low prices ruling for wheat and wool—we have been awakened to the importance of dairying on the farm, and the condition of overseas markets for wool and frozen lambs on the one hand and butter on the other will greatly affect the proportions between sheep-raising and dairying in the near future. Other factors have to be considered, particularly the ability of the farmer and his family to cope with the extra work associated with dairying. So far as feed supply is concerned, it is largely a question as to whether any particular pasture or garnered crop can be best utilised by sheep or cows for what will feed one will generally be found suitable for the other except in cases of sparsely pastured country or areas distant from the homestead which can be turned to most profitable account by sheep.

It is pleasing to observe that with the recent revival of dairying on farms there has come also a more general recognition of the importance of good breeding in dairy cattle, resulting in a marked and fairly rapid improvement in the class of animals kept. We must remember that we are as yet only at the beginning of the process of improving the producing capacity of the farmer's dairy cow, and still have much to learn and plenty of room for the extension of efforts in this direction. As with sheep, so also with cattle, the art of good breeding lies in the selection of the individual. To stop

[illegible]

● FULL MOON.

at the selection of a favored breed and expect the breed to do the rest without further selection can only end in a low producing herd in comparison with what can be accomplished by breeding only from the best and checking results by actual test records.

Improvement must be the constant aim, whatever breed we may favor. The breed itself may be chosen according to circumstances, such as whether we require quantity of milk merely, or as is more generally the case whether quantity of cream is the main consideration, or whether being out of touch with facilities for the convenient disposal of cream, hopes of profit may depend upon the production of dairy butter, the secondary productions from skim milk, and the raising of male cattle for beef.

POULTRY.

Poultry is a line that is destined within the next year or two to become altogether unprofitable from a marketing point of view in the outback areas where eggs cannot be delivered quickly to an export depot at least twice a week on account of the constantly receding value of second-grade eggs. This should not prevent the outback farmer from utilising a few birds bred and fed in such a way as to provide his household with a regular supply of eggs and table poultry, thus turning the consumption of by-products to profitable use.

In contrast to the state of affairs existing outback we have the growing importance of poultry keeping on the farm in the more conveniently situated districts, and we may even consider the advisability of feeding a quantity of wheat to flocks of laying hens as an alternative to direct marketing of the grain. Certainly we have to look overseas for a market for eggs produced in quantity, and consequently home market values are governed by overseas market prices, and just as certainly our market and to some extent our price will be improved by the regularity of supplies and the quality of the product. Hens that lay regularly and lay an exportable egg are our hope in this direction. Wise selection in breeding, coupled with proper feeding—not necessarily more expensive feeding—and cleanliness and promptitude in handling and marketing eggs are among the essentials in the elevation of poultry keeping to the position of a profitable and important sideline. Neglected fowls may easily become merely unprofitable consumers of unmarketable by-products and general farmyard scavengers.

PIGS.

A few pigs on the farm are useful to eat what is not suitable as food for other animals and poultry, and in turn to provide a portion of the meat supply for the household. The raising of pigs for market as a source of profit is a line of activity dependent upon a number of circumstances, the chief of which are:—The state of the market for pig products, and the quantity of available by-products from other lines of farm production which cannot be turned to more profitable account by feeding to other stock. One fact of importance is that pigs can be bred and reared fairly quickly—provided one has some foundation stock—when necessity arises, and can quickly be quitted, though almost invariably at a loss when a quick clear-out is unavoidable. Considering pigs as being secondary to other sidelines we may govern our activities in dealing with them by our answers to a number of questions including:—Can we feed wheat to pigs more profitably than by selling direct or by feeding to poultry? Can barley or peas be grown as a secondary crop and fed to pigs more profitably than to poultry or sheep or than by being sold direct as grain? Can oats or any pasture be turned to profitable account by pigs if not required for cows or sheep? Can skim milk, if produced in quantity be more profitably consumed by pigs than by its use for raising calves or for making up a protein-rich food for poultry, taking the place of more expensive food, such as meat-meal? The answer to these questions must largely be dependent upon the kinds of other stock kept on the farm and the relative numbers of each, having first taken into consideration the market demand for pig products. The foregoing form the principal sidelines from which we may hope to materially increase the income from farming activities by producing in fairly large number or quantity, as the case may be.

Numerous minor lines may be included in the list of activities which—while probably not producing an appreciable quantity of saleable produce—may help to provide an inexpensive living for the farmer's household or to lessen the expense of working, and of the upkeep of the working plant and farm buildings and other improvements. To deal with such as these in this paper would make it rather lengthy for present discussion, and would probably distract due consideration from some of the points already raised in connection with the major sidelines, though we cannot in actual practice afford to dispense with any activity with which we are capable of dealing, however relatively small and unimportant, if it can be applied to make farming operations more effective and—what is not to be overlooked—more interesting to ourselves and families—particularly the families.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Wallala.....	9/8/33	7	Question Box	C. Zippel
Kelly	2/9/33	29	Question Box	F. Illman
Kyancutta	5/9/33	14	Discussion	E. Kelly
Warramboos ...	19/9/33	10	Winter School Report ...	F. Chilman
Warramboos ...	10/10/33	7	Congress Reports	F. Chilman
Goode	5/9/33	17	"Agricultural Instruction," R. Gerkie	B. Linke
Koppio	27/9/33	9	Congress Report	M. Gardner
Pinbong	7/10/33	9	Congress Report	C. Scholz
Elbow Hill	3/10/33	8	Congress Report	J. Wildman
Kelly	30/9/33	28	Congress Report	F. Illman
Kyancutta	3/10/33	14	Congress Report	E. Kelly
Goode	4/10/33	11	Congress Report	B. Linke
Laura Bay	10/10/33	13	Congress Report	W. Edson
Wallala.....	11/10/33	8	Congress Report	C. Zippel

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

MURRAY BRIDGE (Average annual rainfall, 13.59in.).

July 26th.—Attendance, 12.

HOW TO OBTAIN MAXIMUM PRODUCTIVITY FROM A SWAMP HOLDING.—In the course of an address on this subject, Mr. P. Bailey said the factors governing efficiency in the use of the rich fertile soils of the reclaimed areas could be summed up under the headings of irrigation, drainage, herds, fodders, sidelines. Maximum productivity could only be obtained from cows, although some consideration had been given to the

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growing of potatoes, onions, or maize as the principal money products. The lay-out of a block had a large effect as to how economically the block could be managed. Irrigation lay-out was very important, and paddocks must be so placed that the stock had easy access. Where pasture was grown the paddocks must be suitable to allow for a certain period of rotation, both in grazing and irrigation. Owing to the many different shapes and gradings one could not define any definite lay-out. However, one could realise how much easier the work could be carried out if a block was well laid out for accessibility. Efficient irrigation and drainage governed the success of production, although at the same time something efficient to turn the production into a saleable article was also necessary. On and off with the water as quickly as possible was a motto which should always be practised when irrigating. Channels must be clear, with good access to the drainage channel, which in turn should be large enough to get the water to the pump quickly. A most important point was efficient pumping to maintain a 27-inch water table. There were many varieties of fodders suitable for irrigation conditions. A perennial fodder saved the expense of seasonal cultivation, which left a space of non-production every time it was re-sown, while the perennial type would last quite a long period without re-sowing. Of the perennial fodders two species existed under local conditions. Lucerne was used mainly as a crop to mow for hand feeding. The perennial pasture was most satisfactory to graze. The care and management of the above types were worth consideration, as the continuance and height of production solely depended on efficient management. Lucerne, if cared for would give good results for 14 years or more. The rotation system of cutting and watering this fodder must be observed with much care. In the summer months a rotation of six weeks could be maintained for cutting, and as the weather cooled off and shorter days set in the period of rotation must be lengthened. The care in irrigation of lucerne was very important, and a good stand could be ruined in a few hours. Lucerne planted on the heavier types of swamp soil, which were generally the hardest to drain—other factors being equal—should be watered about every 6 weeks, and on the lighter soils, near to drainage, every 3 weeks would give more production. The maintenance of the stand would be greatly increased if items such as watering, cutting, avoidance of any unnecessary traffic, especially in frosty weather, were always kept in mind. The permanent pasture needed just as much—or, perhaps more—attention than lucerne. Pastures had some very peculiar habits, and must be studied from the day they were established. Presuming a perennial certified pasture of the correct type for swamp conditions:—To obtain the most efficient results, it should be fenced into small areas, so that it could be grazed on a definite rotation, and watered with ease, with convenient access to each block. The rotation of the pasture paddocks was very important, and must be watched from day to day, as it had an important effect on the composition and growth of the swath. It was not wise to graze very heavily—just enough not to damage the crown of the plants. Three to four days in a paddock was plenty. For cows, a 24 days' rotation, varied a little in the winter months, seemed to work very well. During the heavy spring growth the pasture was inclined "to get away." This was the time for the mower to get to work, and ensilage could be made from the surplus, so that when winter set in the surplus could be fed to maintain a higher percentage of stock over the year. If this heavy flush of foliage was not conserved, most of it would be wasted, the plant injured, and the carrying capacity not fully utilised. The lecturer illustrated the seasonal growth of perennial pastures with graphs prepared at Wood's Point. The only animal suitable for turning the fodder into saleable product was the cow. Unless the cow had the qualities of a good producer the highest possible return from the block could not be obtained. The cow was the "factory," and she must be in good working order. Aim at improving her, and gradually build up a higher yield per acre per annum. Unfortunately producers were going through a period of very low prices, and it was hard to make the cow pay its way. With low prices, it was most necessary to increase the herd's production. Every extra gallon reduced costs per acre. The inclination for any sideline depended on the person, and his preferences. Poultry, pigs, potato and onion growing, if they could be managed, would all help to balance the budget. The type of machine used for working the land, harvesting the feed, or milking the cows greatly added to the efficiency of a well-worked block, and also lowered the cost of production to a large extent, if used in the correct way. A machine in bad order became very costly, and it was often that a little repair at the correct time would save much in the long run. (Secretary, F. Barr.)

PARRAKIE (Average annual rainfall, 14.49in.).

August 8th.—Attendance, 12.

QUESTION BOX.—The following questions were submitted for discussion:—What is the best method of getting water from a bore at the foot of a rise to the top, situated 100 yards distant? Answer—Mr. Beelitz advised the use of a stuffing box, by which

means the water could be forced to any position desired. Share plough v. disc? Members favored the share plough where it was possible to use it. Is deep fallowing of any benefit in this district? Opinions of members were divided. Mr. A. Beejitz favored deep fallowing on heavy land, and shallow working on sandy land. What is the cause of so many stock dying between seeding and harvesting? It was thought that horses were allowed to graze too long on the stubbles and became sanded, whilst insufficient minerals in feed for cattle caused them to chew bones, and so contract disease. What is the best way of getting rid of weevil in a wheat stack? Answer—Mr. F. Gravestocks advised the use of copper carbonate to dust the shed after the wheat had been removed. Mr. Irrgang had used formalin with good results. What is the best time for shearing in this district? Answer—Mr. Beelitz said that the time of shearing should be governed by the intentions of the farmer. For instance, if he wished to fatten wethers it would be wise to shear as early as possible. On the other hand, later shearing was usually favored with better wethers. Hoe *versus* disc drill? All members favored the hoe, but considered that for this district the combine had definitely displaced the former types of drill. The best methods to white metal bearings, plough boxes, &c.? Answer—Mr. Gravestocks said he had metallised some plough boxes about 4 years ago, and found it very satisfactory. He advised that the axle and wheel be removed from the plough and the outer end of the box sealed with plaster of paris. With this there was less chance of the metal spitting, as it would do if wet clay was used. Mr. Cabot said that it was best to wrap two thicknesses of brown paper around spindles when metallising straight bearings. (Secretary, A. Afford.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Nunkeri	27/9/33	10	Discussion	E. Peltz.
Paruna	3/10/33	20	Address—M. Shannon ...	F. Sumner
Overland Corner	2/10/33	15	Field Day. Address—R. L. Griffiths	H. Loffler
Overland Corner	27/9/33	16	Congress Report	H. Loffler
Marama	17/10/33	8	Congress Report	T. Hinkley
Borrika	18/10/33	18	Address—R. L. Griffiths .	J. Waters

SOUTH AND HILLS DISTRICT.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Jervois	28/9/33	21	Congress Report	T. Baily
Finniss	2/10/33	10	Address—A. Beviss	L. Dunn
Shoal Bay	3/10/33	10	Congress Reports	E. Bell
Milang	6/9/33	90	Annual Meeting. Address —F. C. Richards	L. Yelland
Macclesfield ...	19/10/33	15	"Mixed Farming," Peter-son	H. Ross
Hope Forest ...	2/10/33	—	Demonstration—R. Baker	E. Muldoon
Hope Forest ...	16/10/33	—	Field Day	E. Muldoon
Black Heath ...	13/10/33	5	Discussion	E. Paech
Scott's Bottom	30/9/33	8	"Pigkeeping," — Ring-vall	E. Atkinson
Scott's Bottom	28/10/33	7	"Incubation," — Mitchell	E. Atkinson
Cherry Gardens.	28/10/33	18	Working Bee	A. Stone

WOMEN'S BRANCHES.

BALUMBAH.

July 5th.—Attendance, 17.

ART NEEDLEWORK.—Miss O. Deer presented the following paper:—"Needlework has a distinct advantage over other crafts, for it does not require a special workroom and is a wonderful pastime. Fancywork is very expensive worked, but traced goods can be bought quite reasonably, and worked at a small cost, and so beautify the home. No excuse can be offered for not being able to work the different stitches; there are many useful books which can be bought at a low cost. The 'Melba' art needlework book is very useful; it contains a variety of stitches and crochet edges. The Semco books are also very good. The first thing to be remembered in working is that knots must not be tied. Take a few small stitches on the back to make the threads secure. To finish off, run a few stitches back into the other and be sure to cut the cotton close to the work. It is important to keep the back of the work as tidy as possible; threads should not be carried from one flower to another, because the threads may get caught and broken in the iron when pressing, leaving ends, thus making the work very unsightly. Shading is largely used in working flowers. The outer edge of a flower is darker than the centre, therefore three shades of cotton should be used to tone down the color. Stranded cottons are best for working; one or two threads can be used, according to the stitch used. Indian filling is much better worked with one strand. If two strands are used it has a coarse, heavy appearance, while satin and buttonhole stitch are better worked with two strands. A basket of sweet peas on a cloth or cushion is a very pretty design. Flowers worked in their natural colors look very natural. Sweet peas are very dainty worked in Indian filling; it makes them stand out. The simplest stitches in needlework are stem and back stitch, snail trail, satin, and lazy daisy. Lazy daisy is a stitch that does not wear well, and if bullion stitch is used in its place, will wear well and look nicer. Cineraria is a very simple stitch and has a pretty effect. Keep the stitches even. Baby roses are most suitable for baby's clothes; they are easily and quickly made. (Hon. Secretary, Miss V. Wohling.)

McLAREN FLAT.

August 3rd.—Attendance, 23.

IRISH CROCHET LACE.—The following paper was read by Miss F. Bell, who also exhibited some of her work:—"Of the various kinds of hand-made lace Irish crochet is most interesting. This lace did not originate in Ireland, but was introduced from France to help the cottagers during the famine of last century. Nowadays, though considered rather an old-world art, it has a fascination and unusualness which ordinary crochet work does not possess. There are two forms of this work—the fine baby Irish and that composed of heavy, padded motifs. The latter is more difficult, being worked over a card, the tightening or loosening of which shapes the sprig, and for this reason no definite directions can be given for working and joining the pieces, for it is seldom that two workers will make a sprig exactly alike. The best lace is always firmly and evenly worked, the stitches should be uniform and compact, and the padding cord should never show through the work; loose or ragged crochet makes very inferior lace, lacking in crispness and durability. First decide on the size and shape of the article to be worked, then mark the outline on a piece of calico. When padded motifs are worked and drawn into shape, cut the padding cord, leaving about a quarter of an inch, which must be securely sewn down at the back of the work. Tack each piece down firmly, wrong side up, on calico foundation in the position they occupy in the design. Then proceed to work the connecting bars or filling. The advantage of having the wrong side up is that the filling can often be carried across the back of sprigs and continued in another space without breaking the thread. Fastening off can be done more easily and securely. Sometimes joinings and fastenings are done with a sewing needle; this is quite allowable. When lace is complete, cut tacking threads at back of foundation to avoid risk of cutting lace. Baby Irish lace derives its name from the fineness and daintiness of the work. It is usually fairly simple, being composed of medallions made of a tiny motif surrounded by picot filling; these pieces may be round or square. The stitches used in Irish crochet are the same as for ordinary crochet. Regarding materials, any fine hard twisted cotton is suitable, and a heavy broder for padding. A fine smooth hook is necessary for good work. It is important to keep the work fresh and clean, and the final pressing should be done under a piece of damp new calico. While still steaming, iron lace itself until dry. This gives the lace a firmness not obtainable by any other method." (Secretary, Mrs. D. Elliot.)

MINNIPA.

Although there are only a few Women's Branches in the Central portion of Eyre's Peninsula, a Conference was held at Minnipa on October 6th, when there was a good attendance, including a number of ladies residing at Minnipa, where there is at present no Branch of the Bureau. After attending Mr. Anderson's address on "Poultry" a successful meeting took place in an adjoining hall, when Mrs. Ohlman, of Warramboo, read a paper on "Wool and Its Uses," and exhibited several articles made from wool.

MORCHARD (Average annual rainfall, 13.59in.).

July 7th.—Attendance, 11.

THE VEGETABLE GARDEN.—Mrs. W. Twigden read the following paper:—"In every garden there should be a vegetable patch. To make a vegetable garden successful it is most essential that there be unfailing vigilance in the new sowings of quick-maturing crops and subsequent care of the growing plants. A good working rule is to make successional sowings, when the preceding sowing is showing above ground. It is important to sow seeds of turnips early in February. They make a welcome vegetable on the table in late autumn. They are tender and quickly grown. Lack of success is frequently due to late sowing. Successional sowings may be made weekly until the end of March. Red beet is a useful vegetable for salads, but should be grown quickly and pulled when young. Where space can be spared an effort should be made to grow a few rows of silver beet; it is a good vegetable for the hot weather. Do not neglect to raise cabbage and cauliflower plants; they will be ready to plant out early. Put in a few carrot and parsnip seeds. Keep the hoe busy; weeds destroy the young plants."

VEGETABLES: THEIR VALUE AND USES.—Paper read by Mrs. Mills:—"The value of vegetables as an article of diet is well known. Vegetables contain many very valuable mineral salts and vitamins that are most necessary to good health. Cabbage, cauliflower, lettuce, celery, and spinach are very valuable for the mineral salts they contain. There is a time limit for cooking green vegetables, and when that is reached they should be taken up and drained. The tomato is rich in vitamins and can be eaten raw or cooked. Onions, potatoes, parsnips, carrots, turnips, and beetroot are best when cooked fresh and young. Potatoes are the most used vegetable, and are usually served with other vegetables. Care should be taken when boiling them not to use too much water. Water in which vegetables are boiled is very good for soups. The goodness of the potato is next to the skin and they are best boiled in their 'jackets.' Wherever possible, every household should have a vegetable plot." (Secretary, Mrs. Schulz.)

August 4th.—Attendance, 10.

PORK AND ITS USES FOR SMALLGOODS.—Miss B. Halliday contributed the following paper:—"The best months to kill a pig are May, June, July, and August. When a pig is being killed save the blood in a vessel into which has first been placed some salt otherwise it will go thick and curdle. Clean the runners in several changes of cold and hot water and then soak in salt and water all night. Finally run warm water through them before using. Where there is only one pair of hands to do the work, put away the main part of the pig first. Save any small pieces of meat, which can be used for sausages. The following is a recipe for Scotch haggis:—Mince liver, heart, and kidneys, then about 1½ cups of fat cracklings, 2 medium-sized onions, 2 slices of breadcrumbs, then add 1 handful each of flour and flaked oats or oatmeal, ½ to 1 packet mixed spice, according to size of mixture, a little thyme, salt and pepper to taste. Mix well together and fill into the big stomach. Put in a saucepan of boiling water and boil for about 1 hour. It is then ready to cut and fry when cold. Sausages—These are made from scraps of meat cut off hams, &c. Mince it all and add breadcrumbs, thyme, pepper, salt, and onion to taste, and fry for breakfast. If the sausages are to be kept leave out the bread and onion. Mix well and it is then ready to fill into the small runners. Black Pudding.—Cut cheeks off pig's head and cook head and heart and other small pieces. Also cook 3lbs. rice in water and add a little salt. Leave until next day and put through mincer. Add rice, marjoram, blood, salt and pepper to taste, and a little allspice. Mix together and fill into runners; if too stiff add a little hot water. Put sausages into a saucepan of boiling water to simmer for 20 minutes. White Puddings—Boil one pig's liver and fat from the cheeks. When cold, mince and add 2 cups of breadcrumbs. Boil an onion and strain the water into the liver, &c.; add pepper, salt,

and marjoram to taste. Mix all together and fill into runners. Prick before boiling. Boil in large saucepan with lid on for 15 minutes. *Metwurst*—Mince 10lbs. of beef and 20lbs. lean pork, then add 1 teaspoonful each saltpetre and sugar, a small handful peppercorns, 1 nutmeg, pepper and salt to taste. Mix well together; then fill into sheep runners and hang up for 24 hours. Smoke for two or three days." (Secretary, Mrs. C. Schulz.)

PINNAROO (Average annual rainfall, 14.54in.).

July 7th.—Attendance, 19.

PASTRY.—Mrs. Hill read a paper on this subject and displayed articles made from the following recipes:—"*Cornish Rolls and Pasties*—1lb. stewing beef, 2lbs. potatoes, 1lb. onions. For rolls, use a fine mincer, for pasties, the coarser one. Mince meat, onion, and potato, and mix well with salt, pepper, and thyme. When this is well mixed make pastry thus: 1lb. flour, 6ozs. dripping, 2 flat teaspoons cream of tartar, and 1 teaspoon carb. soda. Rub the dripping well into the flour, add the rising. Mix with cold water. For rolls, roll the pastry very thin; for pasties, a good deal thicker. Bake at once. *Flaky Pastry*—Suitable for apple pie and all meat pies, except Cornish pasties— $\frac{1}{2}$ lb. plain flour, $\frac{1}{2}$ teaspoon baking powder, 1 pinch salt, $\frac{1}{2}$ lb. fat, $\frac{1}{2}$ pint water. Method—Sieve flour, baking powder, and salt; divide fat into three parts. Rub one part into flour; mix flour with water into a soft dough. Lift dough on to a floured board, roll out into an oblong shape, spread one-third of the fat on the dough in small pieces, leaving about $\frac{1}{2}$ in. margin all round. Sprinkle lightly with flour and fold into three, turning the top down first. Turn pastry around with the closed side to the left hand. Roll out three times as long as it is wide. Spread another one-third of the fat and flour it. Fold into three and turn closed side to left hand. Roll out again. Fold once without fat and roll out to shape required. Never decorate the edge of flaky pastry, a cut edge rises much better. *Rough Puff Pastry* for tarts, pies, and rolls— $\frac{1}{2}$ lb. flour, $\frac{1}{2}$ teaspoon baking powder, 1 pinch salt, 5ozs. shortening, 1 egg yolk, 1 teaspoon lemon juice, 1 gill water. Method—Sieve flour, baking powder, and salt; add shortening in small pieces, the size of a nut; chop it in with a knife. Beat yolk, water, and lemon juice together. Mix flour with liquid into moist dough, using a knife for mixing. Turn on to floured board and knead lightly. Roll into oblong and put pieces of butter on in lumps. Flour lightly, fold over and roll, or press again, and continue this process until all the butter is used. Then roll out again and it is ready to use. *Puff Pastry* for jam tarts—1lb. flour, 1lb. butter, juice of a lemon, 1 gill of water, 1 pinch salt. Sieve flour and salt, mix water and lemon juice. Mix flour into smooth dough with water. Turn on to floured board. Roll out and put butter on in pieces, dredge lightly with flour, fold over and roll out lightly. The more times this is done the lighter will be the pastry. Use as little flour for rolling as possible, just enough to keep the pastry from sticking to the board. Continue this rolling out process and putting the butter on in lumps until all the butter is absorbed. Then give it an extra fold and roll out to get the butter well mixed in with the pastry. This can be and is better for being kept overnight in a cool place and next day can be rolled out once more and cooked. The lemon juice used in the mixing helps to make pastry digestible. Pastry should be made in a cool place, put on a clean, cold oven slide, and cooked in a hot oven. Sift flour, salt, and baking powder to remove lumps and mix. Rub fat into flour with tips of fingers, raising fingers out of the flour so that air may mix with the flour as it falls. When cutting pastry, make a clean cut, and leave no ragged edges. Use a hot knife. All pastry needs a hot oven. Pastry butter should be at least three days old. For pastry, keep all ingredients as cool as possible, and have a very hot oven to prevent the butter from escaping from the pastry." (Secretary, Mrs. F. Atze.)

RENDELSHAM.

August 2nd.—Attendance, 10.

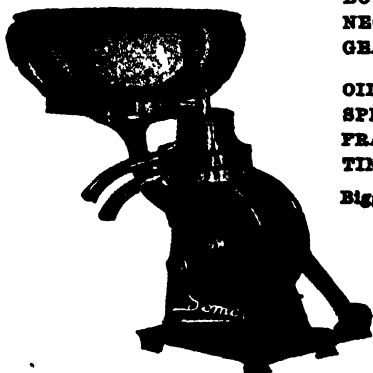
HOME GARDENING.—Miss P. Foster read the following paper:—"The first thing to be attended to is the cultivation of the surface of the soil, for when warm sunshine follows rain the soil is liable to set hard and crack on the surface. Especially is this the case with heavy soil, but a thorough early working, followed by regular attention to the surface with the hoe, will keep the soil in good condition. Weeds will make great headway if not checked, but the constant use of the hoe will keep them under. Roses are bursting into growth, and soon the garden will be bright with a variation of colours. The enemies of the rose will destroy the season's work, unless immediate

steps are taken to eradicate them. When the first signs of mildew appear, dust the foliage thoroughly with sulphur. This should be done in the morning when the foliage is wet with dew. Aphis is easily checked by spraying with a good strong tobacco mixture. A careful watch should be kept for suckers, and as soon as they appear pull the soil away lightly without disturbing the plant and cut close to the stem. In spring chrysanthemums may be taken from the cutting bed and planted where they are to remain. The soil should be fairly rich, but avoid rank manure; this produces coarse blooms. All lovers of dahlias should make a planting in September to get early blooms, and later on, say in December, make a final planting for autumn display. Good blooms cannot be obtained by planting old clumps as they are taken up; plant a piece with only one or two eyes as shoots on it; these will give much better blooms, and the plants will be more vigorous. If raising from seed, sow in September and plant out seedlings as soon as they are large enough to handle. Cut off all the blooms on early flowering Iceland poppies before they reach full bloom. If they are allowed to seed the plants will rapidly die off. Give poppies an application of liquid manure every week and the flowering will be prolonged. A handful of fine dry grass sprinkled over a bed of seedlings will promote rapid growth. For Iceland poppies and stocks this is particularly beneficial. When setting carnation cuttings bend back the five lowest leaves and bury these with the stem of the slip. Cuttings thus set are practically certain to grow into healthy plants. Powdered charcoal sprinkled round roots of carnations will greatly improve the colours of the blooms. During cold days the growth among vegetables is virtually at a standstill; the wisest course is to keep things going as far as possible by constant use of the hoe. Get as much air and sunshine in the soil as you can, and the result will be better crops and stronger plants. Time should be taken to make preliminary arrangements for next season's vegetables. Get beds or boxes ready for early seedling tomatoes. Do not make the soil over rich—a mixture of leaf-mould and loam is good enough. See that the drainage holes are clear; a stodgy seedbed means sour soil. A sprinkling of wood ashes on the surface after sowing will be beneficial. Plant seeds singly; 2in. each way is sufficient. Any seeds failing to germinate can be replaced. When second leaves appear, remove to another box. This will check leaf growth, and by retarding the flow of sap will make sturdier

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plants. In open positions broad beans, peas, cabbages, cauliflowers, and Brussels sprouts can be planted out. If using seedlings from an outside source, dip each plant in a solution made of 1 gallon water and 1 teaspoon of nicotine sulphate. This bath will eliminate aphids and green fly and give the plants a good start." (Secretary, Mrs. C. Andrews.)

TANTANOOLA.

August 2nd.—Attendance, 13.

CAKE RECIPES.—Mrs. M. Telfer supplied the following:—“*Bakette Ruffs*—One egg, $\frac{1}{2}$ cup each sugar, butter, chopped walnuts, and cocoanut, 5 cups Bakettes. Cream butter and sugar, add egg, and beat well, add walnuts, cocoanut, and Bakettes, mix lightly. Put 1 dessertspoon in paper patty and bake in very slow oven 20 minutes. Leave in pans until quite cold. Mixture is dry to crumbly before cooked. *Slugs*— $\frac{1}{2}$ lb. butter, $\frac{1}{2}$ lb. sugar, 1 egg, $\frac{1}{2}$ lb. flour, 1 teaspoon cream tartar, $\frac{1}{2}$ teaspoon soda, 2 tablespoons cocoanut. Roll lumps the size of walnuts into long shapes and roll in cocoanut. Bake until a golden brown. *Plain Cake*—One cup cream or $\frac{1}{2}$ cup butter, 1 cup sugar. Beat until sugar dissolves, then add 1 egg and beat again. Then add 3 cups S.R. flour, 1 cup milk, and a little essence. Bake in a moderate oven. This mixture can be divided into three parts and colored with cocoa and cochineal to make a ribbon cake. Also use a dessertspoon of cocoa and make a dark cake. It can also be made into lamingtons and date cake. *Cocoanut Shorts*—One cup S.R. flour, $\frac{1}{2}$ cup sugar, 1 tablespoon butter. Mix together and make a dough with a beaten egg. Roll out to fit a tin, spread with jam, then with the following mixture:—Beat 1 egg with 2 cups sugar, add 1 cup cocoanut; flavor with essence of almonds, spread on jam, and sprinkle with cocoanut on top. Bake until brown. *Rainbow Roll*—Two heaped tablespoons butter, 1 large cup sugar, cream 3 eggs, one at a time, beating well between each one, a pinch of salt. Gradually add $\frac{1}{2}$ cup milk, then sift in 2 cups of flour and 2 teaspoons of baking powder. Mix lightly, then divide in three parts. Color one with cochineal and the other with a dessertspoon of cocoa dissolved in two tablespoons of boiling water and a few drops of vanilla. Cool before adding to mixture. Have nut loaf tins greased ready to put mixture in, one dessertspoonful of each color until all is used; only fill tins half way. Cook three-quarters hour in moderate oven, then roll in pink or brown icing and then in cocoanut. *Cocoafoons*.—Beat 2 egg whites with $\frac{1}{2}$ teaspoon of salt until stiff. Whisk in 1 cup sugar (2 tablespoons at a time), and add slowly 2 cups cornflakes, 1 cup desiccated cocoanut, and $\frac{1}{2}$ teaspoon flavoring. Drop from a spoon on to a greased slide and bake 10 minutes in a moderate oven.” (Secretary, Mrs. E. Telfer.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Kybybolite	1/8/33	11	Question Box	Mrs. M. Kekwick
Warcowie	3/10/33	10	Discussion	Mrs. Crossman
Mundalla	29/9/33	14	Congress Report	Miss M. Kemp
Gladstone.....	29/9/33	72	“Rug Making,” Mrs. E. Orchard	Miss M. Sargent
Kangarilla	21/9/33	9	Congress Report	Mrs. M. Steer
Saddleworth ...	3/10/33	12	Address—Mrs. Warnes ..	Miss G. Frost
Kybybolite	5/9/33	33	Address—Mrs. Castine ..	Mrs. W. Kekwick
Auburn.....	29/9/33	22	Congress Report	Miss L. Dennison
Penola	6/9/33	43	Address—W. H. Downes ..	Mrs. E. Kidman
Penola	4/10/33	30	Congress Report	Mrs. E. Kidman
Taplan	28/9/33	17	Congress Report	Mrs. P. Flynn
Williamstown ..	4/10/33	8	Congress Report	Mrs. A. Cundy
McLaren Flat ..	5/10/33	16	Congress Report	Mrs. D. Elliott
Pinnaroo	6/10/33	16	Congress Report	Mrs. F. Atze
Parrakie	25/10/33	24	Congress Report	Miss J. Halliday

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All communications to be addressed:

“The Editor, Journal of Agriculture, Education Building, Adelaide.”

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A. P. BLESING,
Minister of Agriculture.

AGRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Agricultural Bureau Conferences.

District Conferences will be held as follows:—

River Murray Swamp Areas, at Murray Bridge, Thursday, February 15th.

Lower North, at Riverton, Thursday, February 22nd.

Yorke Peninsula, at Port Victoria (Wauralte Branch), Wednesday, March 7th.

South-East (Upper), at Wolsely, Wednesday, March 21st.

South-East (Lower), at Tantanoola, Wednesday, April 11th.

Dairying, at Milang, Wednesday, May 9th.

Eyre's Peninsula (West), at Ceduna, Wednesday, July 4th.

Upper North, at Wilmington, Wednesday, July 18th.

In each case the Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda.

Frost Prevention.

An illustrated article by Mr. J. B. Harris (District Horticultural Instructor) on Frost Prevention by Orchard Heater, and embodying the work of the Committee in the Light's Pass district, will appear in the January issue.

Seed Wheat from Turretfield.

Limited quantities of seed wheat will be available from Turretfield this season.

The varieties offering consist of NABAWA, WARATAH, SULTAN, FEDERATION, GALLIPOLI, SWORD, and RANEE.

The price for graded seed has been fixed at 3s. 4d. per bushel on trucks Sandy Creek, and as the amount of each variety available is relatively small, prospective purchasers should lodge their orders at an early date. All inquiries for seed wheat should be forwarded to the *Manager, Turretfield Seed Wheat Farm, Rosedale*.

Argentine Wheat Crop: Locusts.

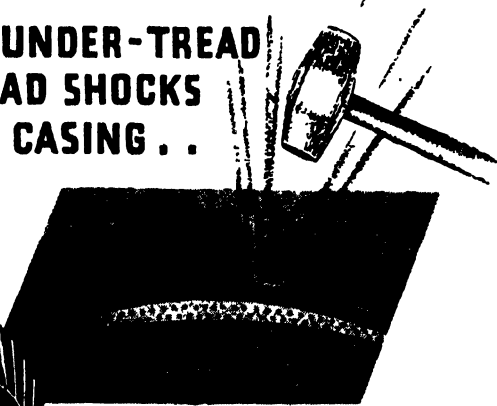
In his report for September the Argentine correspondent of the Empire Marketing Board stated that up to the end of that month 3,635,173 tons of wheat had been exported, leaving a balance of 481,379 tons still available for export. Outside of "orders" the principal destinations were Brazil, Europe, and the United Kingdom, the largest quantity being shipped to Brazil. Argentine has not been affected by the limitation of wheat exports, and it is felt that as the 7,000,000 tons allotted to the Republic for two years are more or less what would normally be her exportable surplus, there will be no great difficulty in keeping within the limit set. In the greater part of the wheat zone the reports indicate that there has been a wonderful response to changed weather conditions. Most of the fields are looking fine, and their condition is probably fully up to the average for this period of the year.

In August locusts were reported as being present in unusual numbers—even greater than last year, which was the worst for very many seasons. They usually reach the damaging stage about November, when the next crop of insects is in the hopper stage of development. In preparation for the coming fight, the National Government had voted a large sum of money, part of which had been spent in supplies of galvanised sheets used in the erection of barriers for trapping the insects. Past experience does not encourage the hope that these measures will be more than partly successful, and unless Nature takes a hand, there is very likely to be some damage. The extent of the damage will depend largely upon the stage of development of the plants when the insect gets busy. If the wheat is well advanced and approaching ripeness, they will turn to something more palatable if it is available.

THE GREAT AUSTRALIAN TYRE—AS BRITISH AS THE EMPIRE

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Close-Mating in Pigs.

A farmer purchases a pedigreed "in pig" sow; from the progeny he wishes to retain some of the best sows for breeding, and a boar. What would be the correct procedure in mating; would it be detrimental to future progeny if the boar was put to mother or any of the sisters of the litter? Replying to this question, Mr. W. J. Spafford (Deputy Director of Agriculture) says of farm livestock pigs show all effects from close breeding to a greater extent than do any of the other animals, and in-breeding as suggested is never practised with them. When closely related pigs are mated together the result is usually most unsatisfactory, for although large litters may be secured, the number reared is generally small, and the development of the youngsters very irregular. Frequently, whole litters are useless for any purpose, and in all cases it should be expected that some of the youngsters cannot be reared into normal animals. To save expense and to keep the herd vigorous, the best procedure would be to retain some of the youngsters from the pedigreed sow—if they are good enough to be worth keeping—and make an exchange with a young boar from the litter with one reared by someone in the neighborhood who is breeding the same kind of pigs.

Establishing Lucerne in the Bute District.

During a discussion at Bute on the control of eelworms it was suggested that lucerne might be of economic utility, in so far as it would give a permanent pasture on the lighter types of land which were the most seriously attacked by that pest. Further, if this plant was established, it would give an added advantage by assisting to control the drift to which these soils were liable. Some doubt was raised, however, as to the suitability of the rainfall for a satisfactory growth of the plant. Mr. W. C. Johnston (Agricultural Instructor) states that a striking answer to this question may be seen on the farm of Mr. D. P. McDonald, where an extensive area has been sown to lucerne.

The farm is situated on the western side of the Hummocks Range, about six miles in a south-easterly direction from Bute, and enjoys a rainfall of approximately 16in. per annum. The land is a mixture of types, from the lighter sands, highly liable to drift, to the heavier greyish loams, so eminently suitable for the production of wheat, while throughout the soil is an abundance of nodular limestone, so characteristic of many of our South Australian mallee soils.

The cultivation of lucerne on this farm is a recent undertaking, and it is a pioneering advance in the agricultural practice of the district. It is also one which is likely to enjoy much popularity in the event of wheat prices remaining at the present low level.

Asked as to the history of the venture, the owner explained that he had for many years entertained an idea that lucerne would do well on his land, but that he had been deterred from experimenting by the high price of the seed a few seasons ago. The outlay at that time was so great that it made a trial of the crop an expensive proposition, but when the price fell to the level of last season, it was considered a reasonable gamble. A sack of the seed was therefore obtained during the autumn of 1931 and was sown with the cereal crops during the ordinary seeding operations with satisfactory results.

The plant has established itself on all classes of soil in the field, but there was a definite indication that more stools were to be found on the lighter sandy land; in fact, on two sandhills there was a crop of lucerne that would cut approximately 30cwt. of pure lucerne hay, and it was observed that where cereals had been sown on the stubble the lucerne had completely choked them.

It is of interest to note that the land where the heaviest growth of lucerne is to be seen is of such a sandy nature that the production of cereals on it is a precarious undertaking as the soil is very liable to drift badly. Since the establishment of the lucerne it is expected that this disadvantage of the soil moving will be overcome.

Possibly one of the most remarkable features in the undertaking is the thickness of the stand when it is remembered that it was obtained from a seeding of approximately 11b. of seed per acre. It is evident that practically every seed must have germinated and established itself.

The success achieved in this instance with lucerne is of such magnitude that it gives every confidence in assuming that an equal stand of the crop may be expected on any land of a similar character, and in like climatic conditions. If it is so, then there are considerable areas of land along the Hummocks that it is reasonable to expect will grow lucerne to the same degree of perfection.

In the event of the result of this experiment becoming a widespread activity, it is beset with enormous possibilities, by no means the least of which will be the diversifying of the agriculture of the area. It will become a district in which the production of wheat will play an ever lessening part, while the development of animals for their products, an activity which is not very active at the present time, will become of much more importance. With this greater animal production will come the necessity for a rotation of crops, in which the growing of a leguminous crop will be of great moment and which will be an important advancement in the agriculture of the district, and one that will lead to a general improvement of the soils.

Inspection of Crops.

Early in October Mr. W. C. Johnston (Agricultural Instructor) visited areas in the hundreds of Wokurna and Wiltunga, where it was estimated that 75 per cent. of the crops sown in sand had become a total failure. Some 20 to 30 crops, all with the same symptoms, were inspected and the conclusion arrived at was that the trouble was due to a number of agricultural disabilities, culminating in a very heavy infestation of eelworms.

The land in these hundreds is generally of a poor agricultural type, being chiefly a light reddish sand, liable to excessive drift in seasons of low rainfall and high winds. The exception to this general rule is found in the flats between the hills, where there is a good type of loam. On these flats no difficulty is experienced in the growing of splendid crops of wheat, but for the last three or four seasons the sandy rises have been almost a total failure.

There was evidence that the failure of the crops was not due to the inefficient preparation of the land or to poor farming methods, as may easily be supposed, but that it was chiefly brought about through the land being overcropped with cereals. While overcropping is undoubtedly indicative of poor farming practice, it cannot be altogether maintained as such in a district such as this, where during the past decade, at any rate, farmers have cropped every available acre with exportable cereals in the hope of being able to liquidate their financial obligations.

Added to the effects of the too frequent cereal cropping are the disastrous results produced by excessive drift experienced during the 1927-1930 period. In this drift all the finer, richer particles of soil and humus were removed by the wind, leaving behind only the coarser and much poorer elements of the soil. In many places all the soil was blown away, leaving only the subsoil. In either case the soil is in a poor state of fertility, and it is unreasonable to expect it to produce satisfactory wheat crops.

It is the general experience that wheat germinates readily and makes satisfactory growth while it can draw on the plant food stored in the grain, but that as soon as it becomes dependent upon its roots to maintain it there is a loss of vitality, and it frequently dies. A superficial examination would suggest that the trouble was due to the attack of fungus or eelworms, but it is believed that these parasites are in reality secondary in their attack. Support for this argument can be found in the fact that outwardly healthy and excellently grown plants are often very heavily infested with eelworms.

The solution of the trouble lies in a more varied and wider rotation. In fulfilling this any plants that will make a satisfactory growth should be tried. It would appear that such crops as barley, rye, lucerne, peas, and the encouragement of clover are well worthy of a trial. It is understood that the chief hope of financial returns will be through the medium of livestock, and they will gradually build up the humus content in the soil.

Agricultural Implements.

In a broadcast talk last month, Mr. W. J. Barker, member of the Chamber of Manufactures, mentioned the names of Ridley, Bagshaw, Shearer, Smith, and Illman, who have been instrumental in producing "better farm implements." After referring to the stripper of John Ridley as a most unique invention which, with very slight modifications, remained the best harvesting machine for Australian conditions for a period of 40 years, Mr. Barker stated that the next most notable South Australian implement was the stump-jump plough. So far as he could learn the first stump-jump mouldboard plough appeared in the seventies and the names best known in this connection were J. L. Mellor and H. B. Smith. It was reported that Mr. Smith built the first stump-jump plough at Booleroo Centre in 1876 and that a man named Braybrook worked there and later went to Victoria to commence making ploughs at Braybrook. The name of Anderson was also mentioned in this connection. The manufacture of stump-jump tine cultivators and harrows followed, but no names were mentioned as inventors; these implements originated partly in South Australia and partly in the Wimmera (Victoria). Later the combine was invented in this State, and the foremost machine of its kind for separating wheat from cocky chaff and producing a clean sample was the winnower invented by Mr. Illman, of Dowlingville.

Dairy Certificates.

The following candidates have been successful in obtaining certificates under the Dairy Industry Act, 1928:—

Milk and Cream Testing.—John Thomson, David J. Bennett, Kathleen M. Beauchamp, Laurie J. Allison, Joyce M. Johnston, James F. Ayres, George V. Thiele, Walter L. B. Bell, Gwendoline Coblin, Ludwig M. Hansen, Leslie M. Carlyle, Samuel P. Burton, Gwendolyn L. Blair.

Cream Grading.—Daisy E. Aslin, Tennyson G. Clark, Laurie R. Curnow, Samuel P. Burton, Vincent H. Keenihan, Cecil Howard.

Horse Radish.

The Chief Horticultural Instructor (Mr. G. Quinn) advises the Secretary of the Hope Forest Branch of the Agricultural Bureau, who asked for information how to grow horse radish, that the usual practice is to plant roots procurable from nurseries and seedsmen.

The plant thrives best in very deep moist soil, deeply dug and enriched by rotted animal manure.

The roots are set about 12in. apart in rows laid out 2ft. from each other. It should be noted that the roots possess one or more buds or eyes near the crown, otherwise they may not sprout. The soil is not consolidated by pressure or treading in any way after planting. The autumn or late winter are suitable times for planting the roots. The tops die down in autumn, and the dried leaves may be removed before hoeing up the ground and applying manurial dressings to the land.

The seeds may be procurable, but raising the plants in this way means a delay of one or more years.

Where this vegetable is grown on commercial lines in Europe, two or three beds are grown so that the roots may be dug up for use over a succession of years, as the plants develop to saleable proportions.

VETERINARY INQUIRIES.

[Replies supplied by Veterinary Officers, Stock and Brands Department.]

Morgan reports aged mare with severe attack of mange.

Reply—Clip the affected area. Wash with warm water and soap to remove all grease, dirt, &c. Dry. Apply the following dressing:—Powdered sulphur, 5ozs.; olive oil, 1 pint. Shake thoroughly before applying. Give the mare good nourishing feed—crushed oats, bran, and good quality chaff.

Rendelsham asks treatment for worms in pigs.

Reply—A suitable treatment for these parasites is to give once daily for 3 successive days 1 teaspoonful of turpentine per 100lbs. live weight of pig. The day after administering the last dose of turps. give a purgative dose of 2-3ozs. magnos-sulph. (Epsom salts). To prevent reinfestation, the floors of the sties should be thoroughly cleaned once a week and feed troughs and drinking vessels scoured with boiling water also once a week.

Hallett has foal that knuckles over on the front feet.

Reply—As the foal gets older and stronger, recovery without assistance may occur, but assistance may be given by the application of splints made of strong hoop iron. *To Use.*—The legs from knee to hoof should be well padded with cotton wool and the splints applied in the following way:—A length of hoop iron sufficient to reach from below the front of the knee, down front of shank, under hoof and run up to behind the knee at the back should be cut off, well padded with cotton wool, and bandaged to keep wool in position. Put the covered splints into position and apply a firm bandage from knee to hoof to keep it there.

Bunora asks—(1) cause of blood in milk of cow, and (2) how to remove warts from teat of a cow.

Replies—*Re 1:* The occurrence of blood in the milk is due to the rupture of a small blood vessel in the interior of the quarter or the teat, occasioned either through injury—such as bruising—or at times to infection of the quarter with a mild chronic mammitis. In order to allow the ruptured vessel to heal up, the affected quarter should be milked out as gently as possible for a few days, and if it is found that “stripping” causes the bleeding to recur, this part of the milking process should be, for the time being discontinued. *Re 2:* If the warts are pedunculated (i.e., have prominent necks), they can be cut off close to the base with a sharp pair of scissors, and then the stump touched lightly with a stick of caustic. When the warts are broad and flat, they may be treated as follows:—First of all, scrub well with warm solution of washing soda, to which has been added a little lysol; then when all surface scale and debris have been thus removed, exposing the soft surface of the warts, paint daily for a few days with a solution of $\frac{1}{2}$ dram bluestone (copper sulphate) dissolved in 2 tablespoons of water. Paint this on to the warts only, with a small camel-hair brush. Another treatment which is often successful in removing warts, is to wipe the affected parts clean after each milking, and rub in a little castor oil.

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DAIRY INDUSTRY PRICES.

ROYAL COMMISSION REPORT TO HIS EXCELLENCY THE GOVERNOR.

[A Royal Commission, consisting of Messrs. W. J. Dawkins (Chairman), Professor A. J. Perkins, and J. W. Wainwright, was appointed in January to inquire into and report upon the disparity between the prices paid by the consumer for dairy produce, the London parities of dairy produce, and the prices received by dairymen for milk and cream, the cause of such disparities, and the remedies therefor. The report is dated October 20th, 1933, and portion of it is quoted below. It is proposed to complete the report in subsequent issues.]

(Continued from Page 435, November issue.)

E. THE CLAIMS OF HOUSEHOLDERS' MILK FOR A HIGHER UNIT PRICE THAN CORRESPONDING MANUFACTURING PARITY.

The claim of the producer of household milk for higher price per unit than that paid for milk required for manufacturing purposes may, of course, be questioned. Nevertheless, it is a claim which is accepted in most countries, although the margin between the two is apt to vary with circumstances. In the main, it is probably based upon the fact that the consumer has always been accustomed to pay a relatively high retail price for his limited daily requirements, and that the producer has always sought to share in the benefits that accrue therefrom. Additional reasons suggested are more costly handling charges and greater care that should attach to the handling of household milk; and, doubtless, these reasons may be accepted when adequate measures of hygiene and sanitation are enforced; but they can hardly be stressed unduly, when the milk of dairy farmers is purchased in bulk by large manufacturing and distributing agencies under contract, on the understanding that portion only of this milk was purchased for household purposes and the balance for manufacturing purposes.

In the 1923-32 period the margin between household milk and manufacturers' milk varied in England from 6d. to 8d. per gallon; in 1933, the former realised 1s. to 1s. 2d. per gallon, and the latter 4½d. only, or a mean margin between the two of 8½d., that is to say, a mean increase of 184 per cent. above manufacturing price.

In South Australia the margin between these two types of milk has never been as great, chiefly because a very large proportion of the milk usually converted into butter in this State can be considered as potential household milk, and has exercised considerable pressure on the metropolitan market. The result of this pressure has been that the wholesale price of household milk has been directly controlled by butterfat prices current at the time and that the margin between the two types of milk has been narrowed down. These facts may be illustrated by the position obtaining in March, 1933, at Murray Bridge, which is both a large manufacturing centre and a centre from which milk is forwarded to the metropolitan area for human consumption. At that time producers were receiving roughly 4d. per gallon for milk for manufacturing purposes, and 6d. per gallon for milk for metropolitan consumption. The margin between the two prices was therefore 2d. only, or an increase of 50 per cent. above corresponding butterfat prices.

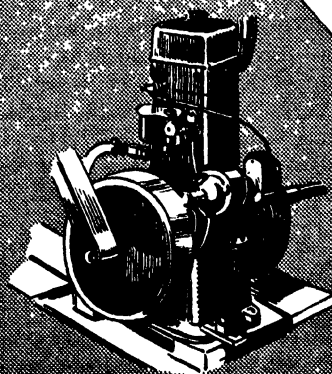
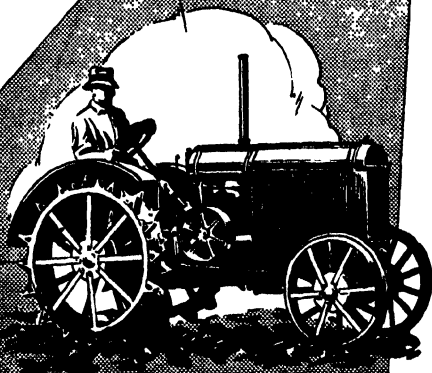
Thus it must be admitted that in South Australia the margin between the wholesale price of household milk and corresponding butterfat prices is very narrow; but it cannot be claimed that producers have established a right to a wider margin until such time as it can be shown that household milk is being produced and

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handled under conditions that satisfy modern views on hygiene and sanitation. Hence, your Commissioners' recommendations for the control of competition in the milk trade, both within and without the metropolitan area, are made quite as much in the interests of the consumer as those of the producer; and if they are to be given effect to it would be on account of the extra cost of stricter hygienic measures to be enforced upon producers, distributors, and vendors. That the enforcement of such measures will prove of advantage to both producers and consumers, without injuring the interests of legitimate distributors, can best be illustrated from evidence given before the Commission by a large Melbourne distributing firm, probably one of the best firms of its kind in Melbourne.

The firm in question distributes daily about 320galls. of milk, all of which is sold as pasteurised bottled milk. The milk is retailed at 3d. per pint delivered. No bulk milk is retailed by this firm. The usual Melbourne price for the latter was 2½d. per pint delivered in bulk.

The farms supplying this firm's milk are situated at Yarra Glen, about 31 miles from Melbourne. They are under the immediate supervision of the firm's officers and of a veterinary surgeon.

The mean price paid to producers on the farm was at the time 9½d. This price compares very favorably with 8d. per gallon, which was the selling price to vendors of pasteurised milk delivered from the Melbourne Railway Station.

Further, for milk containing more than 4.5 per cent. of butterfat, an additional penny per gallon was paid; another penny per gallon was allowed should the herd be tuberculin tested; and another should the bacterial count of the milk be below 20,000. It follows that farmers delivering high quality milk were receiving for the same 1s. and over per gallon on the farm; and since at the time the price paid for manufacturing milk was no greater than that paid in South Australia, namely, 4d. to 5d. per gallon, it follows that the margin between the two types of milk, namely, 5d. to 7½d. per gallon, was considerably greater than that noted for Murray Bridge.

Eighteen months ago the same firm paid as much as 1s. 6d. per gallon to producers on the farm, at a time when bottled milk was being retailed in Melbourne at 4½d. per pint.

In the opinion of your Commissioners, somewhat similar results, benefiting all concerned, from producer to consumer, are not at all unlikely in our metropolitan area, if wasteful competition be controlled, and sanitary and hygienic regulations be rigorously enforced.

F. TYPES OF MILK FOR HUMAN CONSUMPTION AT PRESENT OFFERING IN THE METROPOLITAN AREA.

Wasteful competition within the metropolitan area is attributable not only to the presence of redundant vendors, but also to an increase in the numbers of metropolitan cows, which in times of economic depression not only demoralises the business of legitimate vendors, but penalises regular country supplies, whose milk can no longer find its usual market. To this extent these surplus cows must be considered as one of the factors tending to lower the wholesale price of household milk, and to prevent its quality from satisfying minimum requirements of hygiene and sanitation.

It is from this particular aspect that it is proposed to examine the various types of milk usually available to metropolitan householders. These types may be classified under the following heads:—

- (i.) Untreated milk, sometimes called warm milk.
- (ii.) Chilled milk that has been brine cooled only.
- (iii.) Bulk pasteurised milk that has subsequently been rapidly chilled.
- (iv.) Bottled pasteurised milk.

(i.) *Untreated Milk*.—Untreated, or warm milk, is milk usually produced within the metropolitan area, but occasionally in immediately adjoining areas. In this connection the cowkeeper is both producer and vendor, since such milk is in the main delivered to consumers by members of his family, or by his employees. Occasionally only is warm milk delivered by free lance vendors, who have no dairies of their own. It is to be observed that, strictly speaking, warm milk is illegal milk, since it is delivered to consumers in contravention of the Metropolitan County Board regulation 36, section 13, to the effect that "Every cowkeeper and dairyman shall properly cool the milk after being drawn from the cow by immediately passing it over a cooler or aerator."

Many of the recently imported but surplus cows of the metropolitan area that contribute to the supply of warm milk, and compete with long-established vendors, are to be found within purely *residential* portions of the metropolitan area. It is recommended that local authorities should be given statutory powers to exclude all cows from well-defined residential areas, a practice which is in keeping with the modern policy of all large centres of population. It has been stated that it would be difficult to find a single cow within eight miles of the Melbourne General Post Office.

(ii.) *Chilled Milk*.—Milk that has been chilled immediately after being drawn can be described as the only milk produced in the metropolitan area, or in adjacent areas, that strictly complies with the regulations under which the Metropolitan County Board inspectors are supposed to function. It can, too, be taken for granted that milk of this type has usually been produced on farms adequately equipped for supplying consumers with a sound commodity. For the most part, this milk, like warm milk, is delivered to consumers by the cowkeeper or his employees.

The experiences of a dairy farmer who has been supplying the metropolitan area with specially chilled milk are given below in illustration of what can be done in this direction.

He is the owner of a herd of 66 milch cows, and delivers once a day in the metropolitan area 100galls. to 120galls. of milk at a temperature of 35° to 40° Fahrenheit.

The new-drawn milk is first allowed to cool down naturally to 65°. During the course of this preliminary cooling the milk is worked over with a perforated plunger—not a good method—in order to assist the escape of gases and remove undesirable odors. Subsequently the milk is said to be brine-cooled down to 30°. The temperature of the milk is never higher than 35° when placed on lorries in the morning for conveyance to the metropolitan area, and never higher than 40° when it reaches its destination. At this stage it is placed in refrigerators, from which it is distributed to consumers according to requirements. These low temperatures keep in check bacterial development and insure to the milk excellent keeping qualities.

At the time the evidence was given this dairyman was realising for his milk 10d. per gallon, delivered at Goodwood.

(iii.) *Bulk Pasteurised Milk*.—Pasteurised milk is milk which has been raised for a specific time to a temperature sufficient to destroy all non-spore producing pathogenic organisms that might be present, and subsequently shock-cooled to temperatures not exceeding 40 degrees. The great bulk of this milk comes from the country; it may be pasteurised at local depots or forwarded to metropolitan distributing depots, from whence it is delivered to vendors or to consumers. Occasionally milk produced within the metropolitan area may be treated similarly.

It is through these large quantities of milk which reach the city in this fashion that pressure is brought to bear upon the price of Adelaide household milk. Similarly, the ready availability of pasteurised milk at central depots has rendered possible the operations of free-lance vendors, who call at these depots for daily

supplies, and who need have no dairy premises or appliances of their own beyond a cart or bicycle and milk cans. They are even relieved of the task of cleaning their cans, which probably is a public advantage. Hence, within recent years the abundance of country pasteurised milk has been an important factor in assisting to swell the number of itinerant milk vendors.

Mr. Rutledge, Senior Dairy Instructor in Victoria, stated in the course of his evidence that in Victoria, no matter what the source of the milk supply might be, no vendor was allowed to operate within the metropolitan area unless he could comply with the department's minimum requirements in the matter of premises and equipment. The view is held there that adequate supervision is impossible without some such provision.

It is obvious that the adoption of the Victorian policy in this matter for the Adelaide metropolitan area would have the effect of reducing the number of vendors, and your Commissioners recommend its adoption accordingly.

(iv.) *Bottled Pasteurised Milk*.—The practice of delivering milk in sealed glass containers is of comparatively modern origin. Nevertheless, it is already in almost universal use in the larger cities of the United States, whilst in London it has captured 50 per cent. of the milk trade. It has become very popular in Melbourne, but in Adelaide has as yet made but slow progress. It has already been indicated earlier in this report that in the opinion of the Commission the use of bottled pasteurised milk should be rendered obligatory by statute for ordinary shop trade.

There is no question that from the standpoint of daily supplies, milk of good quality that is pasteurised and bottled is much superior to the average bulk milk that is hurriedly ladled out at the householder's back door, and which unavoidably comes in contact with unclean hands. From the vendor's standpoint, on the other hand, it presents the advantage of expediting delivery, and of doing away with losses on delivery, which by one witness were estimated at 1gal. in 30galls., and occasionally more.

In this connection it is very necessary to stress the fact that whilst bottled pasteurised milk, if efficiently prepared, can be admitted to offer complete immunity against pathogenic organisms, and high keeping qualities in the milk, these advantages cannot be expected to hold good unless the milk has been handled and treated at centres adequately equipped for the purpose. And, unfortunately, there is evidence in plenty to show if not yet in this State, then elsewhere, that milk is frequently bottled by incompetent hands, or by means of defective plant, or in unsuitable surroundings. It has indeed been stated that milk has been known to have been bottled from the tail of the milkman's conveyance in the course of the early morning delivery. In the circumstances, and since the householder's suspicions will have been lulled to sleep by the bottle, and since the usual precaution of scalding prior to use will be deemed quite superfluous, inefficiently or carelessly bottled milk is potentially more dangerous to the consumer than the customary milk ladled out at his back door, against which experience has more or less adequately armed him. Hence, since the progressive increase in the use of efficiently bottled milk is desirable, and its exclusive use in shops is deemed advisable, your Commissioners urge that no individual or firm should be allowed to bottle milk for sale except under special licence. They also urge that special regulations should be drawn up defining in detail the conditions under which bottling milk for sale will be permitted, and that licences shall not be issued to individuals or firms whom the licensing authority had reason to believe would be unwilling or unable to comply with its requirements. Breaches of the regulations in this direction should be followed by immediate cancellation of the licence.

From the moment milk enters the "holding" pasteuriser to the moment it is hermetically sealed in a glass container no human contact should be allowed. In other words, all necessary operations should be carried out mechanically under conditions of scrupulous cleanliness and in a still atmosphere, free from dust or

flies. With a view to preventing the bottling of stale milk it is recommended that a minimum bacterial count should be specified. Bottled milk should be maintained at temperatures below 40 degrees from the bottling to actual delivery to the consumer. Each bottle should bear the registered brand of the licensee and the date of bottling should be clearly indicated in ink on the capsule.

It is reported from Victoria that loss of bottles by legitimate bottlers is very considerable; not so much from breakages, but in the main from the actions of unscrupulous persons who do not hesitate to collect them for their own milk, which, presumably, would find a more ready sale under the brand of the rightful owner of the bottle. In this connection your Commissioners recommend that for the protection of both consumers and licensed bottlers the misuse of branded bottles should receive special legislative attention.

It is obvious that the practice of bottling milk and delivering it in an hermetically sealed container represents added service costs which might legitimately be recovered by an increased price to the consumer. Nevertheless, in the United States and in London, no more is charged to consumers for delivered bottled milk than for delivered pasteurised bulk milk. Possibly the more expeditious delivery of bottled milk and the saving of milk wasted in the delivery of bulk milk may be accepted as an adequate equivalent to added service costs. In Melbourne the difference in price is usually $\frac{1}{2}$ d. per pint.

G. CONTROL OF PRICES.

It has already been shown that various factors have of recent years led to chaotic conditions in the supply and delivery of milk within the Metropolitan County District. In the main these factors may be summarised as follows:—

(1) Abnormally low butterfat prices which have led to intense pressure on the metropolitan market by large quantities of surplus country milk seeking an outlet at almost any price.

(2) The tendency of those out of employment, or whose previous occupation was no longer profitable, to claim a share in delivering and distributing milk within the metropolitan area. This tendency has found encouragement in the presence of large quantities of available milk at metropolitan pasteurising depots.

(3) The increased number of licences to vendors and shops.

(4) The inability or unwillingness of the authorities concerned to enforce adequate hygienic and sanitary measures upon cowkeepers and dairymen.

Measures have already been indicated by means of which the number of city vendors should eventually be reduced to normal limits. There remains yet to be considered in what manner the pressure of surplus country milk can best be relieved, and by what measures an adequate price can be secured for producers without unduly penalising consumers.

1. *Control of Supply of Country Milk on Metropolitan Market.*—It has already been shown that in the past, and particularly so in the immediate past, the wholesale price of metropolitan household milk has been dominated by readily accessible supplies of country milk usually sold at butterfat prices; that the presence in the metropolitan area of large pasteurising plants has hitherto served to intensify this position, and that under its influence the margin between the wholesale price of household milk and that of milk sold on a butterfat basis has been reduced to approximately 2d. per gallon only. It has also been shown that this low price—recently 6d. to 8d. per gallon—is not in the best interests of producers, vendors, or consumers.

After very careful consideration of these and other facts, your Commissioners submit the recommendations that follow, in the belief that their acceptance and effective application should ultimately lead to more satisfactory conditions in the milk supply of the metropolitan area:—

(i.) That the sources of supply of all the milk in the metropolitan area shall be under the jurisdiction of one controlling authority.

(ii.) That towards such an end all dairy farms supplying milk for metropolitan consumption, whether situated in the Metropolitan County District or in the country, shall be specially licensed for that purpose by that controlling authority.

(iii.) That such licence, in accordance with existing practice, shall show, among other things, the name and situation of the farm concerned, the names and addresses of the licensee, and the maximum number of cows the owner is authorised to carry under such licence: Provided that such maxima on licensed farms may be varied on yearly renewal of the licence at the request of the licensee and with the consent of the controlling authority.

(iv.) That milk from licensed country dairy farms, for human consumption in metropolitan areas, shall be adequately cooled immediately after being drawn from the cows, and shall not reach pasteurising depots at temperatures in excess of a minimum to be prescribed: Provided that such milk may be sold as untreated milk, if it reach its metropolitan destination at temperatures not higher than 40 degrees F., be immediately placed in refrigerators, and kept there until required for distribution.

(v.) That all pasteurising depots handling household milk for distribution by their own employees or through the medium of vendors shall be specially licensed for that purpose, and shall receive such milk from licensed dairy farms only; that such depots shall keep such records as the controlling authority may prescribe, and that their books and premises shall at all times be open to inspection by the controlling authority's officers.

(vi.) That with a view to spreading the advantages of the metropolitan price for milk over as wide a field as is economically possible, and at the same time providing ample means for meeting metropolitan requirements in months of low production, the quantities of milk sold by licensed country producers to pasteurising depots for human consumption shall in each case be limited to a fixed weekly quantity to be indicated upon the licence certificate of the supplier, and that such quantity shall not be exceeded except with the consent of the controlling authority.

(vii.) That when the recommended authority first takes over the control of the milk supply of the metropolitan area it shall take early steps to ascertain the names of all cowkeepers who, in the 12 months immediately preceding the publication of this report have been supplying the area with milk, and of the weekly quantities of milk supplied by each cowkeeper. The authority shall register the names of all such cowkeepers, and if so desired shall issue to them a temporary permit to continue the supply of corresponding quantities of milk for a period of six consecutive months. And all such cowkeepers shall pay to the authority the value of one-half of the prescribed licence fees. At the end of these six months all those cowkeepers able to comply with the requirements of the authority shall be definitely licensed as metropolitan suppliers, whereas those unable to do so will be refused a licence, unless good cause can be shown that they will be able to comply with the requirements within not more than three months.

(viii.) That the purchasing pasteurising depot shall pay for the household quota of milk of each supplier at the metropolitan price prescribed by the controlling authority.

(ix.) That during a reasonable period pasteurising depots shall not sell or distribute for human consumption more than the sum total of household milk received and purchased by them from licensed producers during the course of that period; and that adequate penalties shall be prescribed for any infringement of this regulation.

(x.) That the matter of supervision of hygiene and sanitation on all licensed dairy farms, wherever situated, in licensed pasteurising depots, on the premises and conveyances of licensed vendors, and in all shops in which milk is sold shall be vested in the controlling authority recommended herein.

2. *Measures of Price Control.*—Whilst it is believed that the suggestion outlined in the immediately preceding paragraphs, together with earlier ones relative to wasteful competition within the metropolitan district should, if adopted, have the effect of very appreciably improving matters for both vendors and consumers, it is certain that producers will benefit little, if anything, from them unless they be associated with some degree of price control. If the principle of price control be adopted, the latter can be made to act effectively at two points only, namely, a minimum price for country cooled milk delivered at metropolitan depots and a maximum price for milk delivered on the consumer's premises; in other words, under such proposals, it would be illegal for a metropolitan depot to pay less than the prescribed price for country milk delivered on its premises for human consumption, or its corresponding country parity, and it would also be illegal for licensed vendors to claim from consumers a price higher than that prescribed by the controlling authority. It is obvious, on the other hand, that neither minima nor maxima prescribed by the controlling authority would necessarily represent the ruling rates of the day; they would do nothing to interfere with the right of wholesale purchasers of country milk to offer prices in excess of the prescribed minimum on grounds of quality, or on any other legitimate trade grounds; nor with the right of retail vendors to charge consumers less than the prescribed maximum on ordinary business grounds. In this connection it can probably be stated in principle that the margin between these two prices—the country producer's minimum and the metropolitan consumer's maximum—should be sufficiently wide to admit of healthy competition among vendors without impairing the average quality of the milk delivered.

It would probably be in the interests of all concerned that the price-fixing powers of the controlling authority should be such as to lead eventually to stability, if not permanency, in the prices paid for milk required for human consumption. Nevertheless, these powers should be sufficiently elastic to render possible occasional variations in prescribed prices, or even temporary suspension of the same, should circumstances render such actions advisable. In any event, although it would be unwise to fetter the controlling authority unduly in this matter, it can be suggested that prices to be prescribed should be made to conform as much as possible to the general economic conditions of the State, from the standpoint of a sufficiently wide cycle of years.

It is obvious that at the outset the prescription of prices can be little more than tentative and temporary in character, nor can finality be anticipated until measures recommended earlier in this report have had time to reduce the metropolitan competition of vendors to healthy limits. Hence, the figures that follow are not suggested for adoption, but are given in order to illustrate the probable consequences of price fixation on the lines indicated above.

Let us suppose that the controlling authority had fixed the minimum price to be paid to country producers at 10d. per gallon delivered in Adelaide, and the maximum price chargeable to metropolitan consumers at 3d. per pint delivered on their premises. In what manner is this regulation of prices likely to work?

In the first place, it is necessary to point out that the maximum and minimum prices, adopted for purposes of illustration, are by no means unreasonable. In this connection it will suffice to recall the case of the Melbourne distributing firm quoted earlier in this report. The daily retail sales of this firm averaged 320 galls. of milk, which were sold at 3d. per pint delivered as bottled pasteurised milk. The whole of this milk was secured from farms within 31 miles of Melbourne, and paid for at the average of 9½d. per gallon on the farms. This price of 9½d. per gallon on the farm can be taken to represent roughly 1s. per gallon on the firm's Melbourne premises. Hence, a minimum of 10d. per gallon at Adelaide wholesalers' premises and a maximum of 3d. per pint to Adelaide consumers can be accepted as figures that do not unduly clash one with the other.

Metropolitan cowkeepers will benefit in some degree from a policy of price control, but their position will be chiefly strengthened by all measures leading to the elimination of redundant vendors, to the limitation of the number of cows in individual herds, and of the pressure of surplus country milk. And the same can be said of a limited number of country cowkeepers, who prefer not to sell their milk through the pasteurising depots.

On the other hand, metropolitan vendors, who do not keep cows, and normally purchase their requirements from pasteurising depots, would probably have to pay proportionately more for their milk than they have recently done.

Licensed country cowkeepers who sold their milk to metropolitan wholesale depots would benefit not only from the control of metropolitan prices, but also from the reduction in the number of metropolitan cowkeepers that would arise from the refusal of some of the latter to comply with the requirements of the controlling authority.

As to consumers, the maximum of 3d. per pint would protect them adequately against attempts at undue exploitation. In addition, they would have the satisfaction of knowing that more rigorous enforcement of hygienic and sanitary precautions would necessarily lead to general improvement in the standard of milk delivered for human consumption. At the time of the preparation of this report, milk was being sold in the metropolitan district at prices varying from 1½d. to 3d. per pint; and it is certain that under a price control policy the lower sweated prices would tend to disappear, with the result that the average price would probably rise; but it is equally certain that normal competition would, except in times of shortage of supplies, tend to prevent the average from reaching the prescribed maximum.

H. QUALITY IN MILK.

The term "quality" when applied to milk infers complexities that are more numerous than is usually suspected. The latter may be summarised as follows:—

1. Natural composition of milk, and in particular its butterfat percentage.
2. Relative freedom of milk from objectionable foreign matter.
3. Presence of undesirable odors or flavors.
4. Abnormal development of common bacteria under the influence of uncontrolled temperatures.
5. Abnormal bacterial contamination.
6. Presence of pathogenic organisms.
7. Presence of adulterants, usually water, but occasionally skim milk.

All these factors join in varying degree to determine the relative quality of milk intended for human consumption, and it goes without saying that apart from factors of natural composition, milk, which is a natural and not a manufactured food product, should be condemned as unfit for human consumption whenever its quality can be shown to be appreciably depressed by the other factors indicated. It is certain, too, that most of the latter can readily be kept under control by the practice of scrupulous cleanliness from the moment the milk leaves the cow's udder to the moment it is delivered to the consumer, by cooling and aerating the milk very shortly after it has been drawn, by maintaining it throughout at low temperatures, and, when necessary, pasteurising and shock-cooling it as a final precaution.

1. *The Butterfat Percentage of Milk.*—Regulations under the Food and Drugs Act, 1908, stipulate that fresh milk shall contain not less than 3.25 per cent. of butterfat, but if artificially heated or pasteurised, not less than 3.50 per cent. It is, however, well known that heavy milkers of some breeds, notably Friesians, yield milk the butterfat percentage of which frequently falls short of the above standards. When milk of this character is intended for human consumption, as such, the only legitimate way of getting over the difficulty is to maintain in a herd a sufficient number of cows with high butterfat percentages, such as Jerseys,

in order to raise the percentage of the herd milk as a whole to the legal standards. To add cream to milk of low butterfat percentage, as is said sometimes to be done, is quite as much a breach of existing regulations as to add skim milk to milk which is deemed commercially too rich in butterfat, which also is said to be done. When, however, wholesale distributing firms secure their milk from various sources, blend it, pasteurise it, and subsequently sell it to retailers, or retail it themselves, no legitimate excuse can be made for tampering with the natural composition of the blended milk. The normal and high butterfat percentages of the majority of the herds will more than make good the deficiencies of a limited number. The only question that arises, in the circumstances, is as to whether milk intended for human consumption should not be purchased by all wholesale firms on the same basis as milk intended for the manufacture of butter or cheese, namely, on weight and butterfat percentage.

In this connection, it may be pointed out that although in South Australia the legal butterfat percentage of milk intended for home consumption is 3.25 per cent. only, Mr. A. J. Cooke, of the S.A. Farmers' Union, Ltd., stated in his evidence that his firm purchased large quantities of milk from the Murray reclaimed land, which carried several Friesian herds, and that the average butterfat percentage of this milk was 4 per cent. On the other hand, the records of the Department of Agriculture show that whilst the milk of individual cows frequently exceeded a butterfat percentage of 6 per cent., in some instances it fell below 3 per cent. Hence, it follows that from the standpoint of butterfat percentages the quality of milk sold to consumers without modification in its natural composition must vary within very wide limits; and since butterfat is an important animal food-stuff, other things being equal, it can be said that the food value of such milk will vary within the same limits. And yet, notwithstanding the fact that the average housewife, when given the choice, will welcome milk from which she can skim off most cream, the back-door price of milk is not based upon its relative food value, but generally upon the minimum figure which the necessities of the vendor enable him to accept. The position is anomalous, and is likely to continue so until such time as the average mind is educated up to a true appreciation of food values.

But if the retail price of milk cannot yet be controlled in this direction, there should be no difficulty in doing so in the matter of wholesale prices. A Victorian distributor informed the Commission that he paid 1d. per gallon more for all milk, the butterfat percentage of which was higher than 4.5 per cent. This may be considered as a step in the right direction, but by no means adequate. Mr. A. J. Cooke, on the other hand, stated in his evidence that his firm had entered into contracts with dairy farmers to pay current Adelaide butterfat prices plus 2½d. per pound of butterfat actually present in the milk. With butterfat at 9½d. per pound and milk averaging 4 per cent., this would represent 3.9d. on butterfat basis, plus 1.1d. bonus, or 5d. per gallon delivered at Murray Bridge. This same milk is subsequently sold as chilled pasteurised milk to vendors at 10d. per gallon. Intervening expenses may be assumed to be—freight, 1½d.; pasteurising, cooling, and handling, 2½d.; or a total of 3½d.; leaving presumably 1½d. to the firm for overhead and profits. Hence, 5d. per gallon at Murray Bridge may probably be taken to represent the parity of 7½d. delivered on the firm's Adelaide premises.

And since under this type of contract, other things being equal, the prices paid for 3 per cent., 4 per cent., and 5 per cent. milk at Murray Bridge would be 3½d., 5d., and 6½d. per gallon respectively, it can be said that the Farmers' Union have introduced a principle into the method of payment of milk intended for human consumption, which is equitably based upon "quality," to the extent that this term discriminates between milks of varying butterfat percentages. The hope may be expressed that other wholesale purchasers will not hesitate to adopt a similar principle.

But Mr. A. J. Cooke added that whilst his firm was purchasing milk intended for home consumption on the above basis, that is to say, paying on weight of milk *pro rata* to butterfat percentages, and complying with all other requirements of the Dairy Industry Act, 1928, some of its competitors operating in the same districts were ignoring butterfat percentages and assessing the quantities to be paid for on the reading of a measuring rod plunged in partially filled cans. Mr. Cooke contended that such actions were unfair to the trade, and contrary to the spirit of the Act, and that existing regulations should be amended in order to check such actions in the future.

In the latter view, however, Mr. Cooke was at fault, since whilst the Dairy Industry Act, 1928, gives ample powers to prescribe special measures for the payment of milk purchased for manufacturing purposes, it gives no powers to prescribe corresponding measures for the purchase of milk intended for human consumption. It is not therefore the regulations that need amending towards that end but the Dairy Industry Act, 1928, itself. At the same time, it can be added to Mr. Cooke's strictures that the use of a measuring rod under the conditions indicated by him is a practice that should be condemned on sanitary grounds.

In this connection your Commissioners are entirely in accord with Mr. Cooke's contentions that the payment for wholesale milk intended for human consumption should be upon the basis of weight of milk purchased and *pro rata* to the butterfat percentage of the milk, and subject to all such other conditions as are prescribed for the purchase of milk for manufacturing purposes. They are of the opinion, however, that these results can best be secured by new legislation for the control of the milk supply of the Metropolitan County District rather than by amendments to the Dairy Industry Act, and they make recommendation accordingly.

It will be obvious that if, as has already been recommended, the minimum wholesale price to be paid for milk by pasteurising plants were fixed by the controlling authority, it would be comparatively simple to provide for the payment of such milk on weight and a butterfat basis. In this connection it would suffice to adopt an average butterfat percentage, say 4 per cent., and stipulate that the metropolitan minimum wholesale price shall have reference to 4 per cent. milk, and that milk of lower butterfat percentages shall be paid for proportionally less, and milk with higher butterfat percentages proportionally more. Thus, if the minimum metropolitan wholesale price of 4 per cent. milk were 1s., the price of 3.5 per cent. milk would be 10½d. and that of 4.5 per cent. milk 13½d.

2. Other Factors in Quality of Milk.—Apart from butterfat percentages, other factors affecting quality in milk are more or less accidental, and for the most part related to the observance or neglect of adequate hygienic and sanitary measures. Important as these factors are—and your Commissioners had ample opportunity to take note of their incidence—it hardly comes within the scope of this report to examine them in detail. In the circumstances it should suffice to stress the fact that notwithstanding the existence for many years past of Board of Health Regulations on the subject, milk intended for human consumption is still being produced, handled, and distributed in South Australia under conditions that are neither hygienic nor sanitary. The comprehensiveness of these regulations may be judged from the preamble to regulation 5:—

“For the licensing of cowkeepers, dairymen, and vendors of milk, the registration and inspection of dairies, milk stores, and milk shops . . . ; and for securing the wholesomeness, cleanliness, and freedom from contamination of milk, and the cleanliness of receptacles, places, vehicles, and vessels used in the preparation, storing, delivering, and serving of milk.”

It was stated in evidence before the Commission that many of these regulations were out of date and could not be enforced, and that those responsible for their administration had been unable to secure suitable amendments. The opinion may be expressed that it is better to have no regulations at all than regulations that cannot be enforced; and it is recommended that all regulations relating to the milk supply of the metropolitan area be revised by the Board of Health in consultation with competent technical officers of the Department of Agriculture and the authority responsible for the control of milk within the metropolitan area.

It should be added that however up-to-date the regulations they must continue more or less dead letters unless enforced by a competent inspectorial staff numerically adequate to the purpose. An inspector, whose training is insufficient to enable him to account for the "why" and the "wherefore" behind each regulation, would be of comparatively little value among a people that does not yet appear to have acquired a milk "sense." Nor can compliance with the regulations become general until inspection of premises is frequent and followed by adequate penalties for ascertained breaches. These observations may be said to apply to the large distributing depots, the dairies, the shops, and farms alike, all of which should be subject to special licences, that can be cancelled for deliberate breaches of the regulations.

At this stage attention may be drawn to certain practices, which although covered in a general way under the heading of "cleanliness," and harmless enough in themselves if strict "cleanliness" be observed, are nevertheless objectionable and even dangerous, because the ideas of "cleanliness" of nine men out of ten are not those implied in the regulations. Practices of this character—some of which will be indicated—should, in the opinion of your Commissioners, be specifically prohibited by regulation, on the grounds that it is not only useless, but dangerous as well, to prescribe regulations for practices which will be rarely, if ever, observed, and the observance of which could never be adequately enforced.

The immersion of any object in milk intended for human consumption is objectionable, but cannot, perhaps, be avoided in special cases as, for instance, when bulk milk is ladled out to the consumer, or when milk is stirred up in order to get even distribution of butterfat. The use, however, of a measuring rod to determine the volume of milk present in partially filled cans; or the use of an ice sleeve to maintain the milk at low temperature should be prohibited.

It would probably be economically unwise to prohibit the use of milking machines; nevertheless, they are sufficiently intricate in structure to render them potentially more dangerous to consumers than the relatively clean hands of milkers. It can be stated that dairymen supplying Nestle's Warrnambool Factory with milk are prohibited by contract from using milking machines. Hence, it is recommended that dairymen supplying milk for human consumption within the metropolitan area shall be prohibited the use of milking machines, unless specially licensed for the purpose. Special rules should be drafted specifying in detail the precautions to be taken in order to keep these machines in hygienic condition, and licences should be liable to cancellation whenever a machine was kept in unfit condition.

In some respects quality is an elusive attribute concerning which the best informed opinions may at times be at variance; in others it admits of strict definition, and has been provided for in existing Board of Health Regulations. For the present, however, the latter do not go beyond questions of chemical composition of milk and prohibited foreign ingredients. It may be suggested here that when these regulations come again under review, as has already been recommended, the advisability of extending their incidence should receive careful consideration. Thus, the relative progress of normal bacterial growth in milk is generally accepted as a reliable measure of the extent to which temperatures have been adequately controlled; and in this connection standards for bacterial count

could be prescribed, or any other standards that might be thought adequate. The presence in milk of tubercle and coliform bacilli should be prohibited. The proportion of foreign matter in suspension allowable in milk should be prescribed. Possibly, too, standards for hydrogen ion concentration could also be specified.

In the above connection it is recommended that the regular collection of numerous milk samples from farms, pasteurising depots, and vendors' carts should form part of the normal routine of inspectorial work. It would probably be in the interests of efficiency if such work were the main occupation of a specially appointed inspector. These samples should be submitted for examination and analysis by competent bacteriologists and chemists. It would be well that the results of these examinations were tabulated and published in the yearly reports of the controlling authority.

Finally, it must be stressed again that in the matter of the milk supply of large centres of population it is inevitable that the wants and health of consumers should receive first consideration, and that suppliers and vendors must adjust themselves accordingly. In the above connection, it is essential that milk supplied should be as free from outside contamination as possible, although it must be admitted that the average consumer does not usually appear to be aware of the fact; but even relative freedom from contamination cannot be insured unless the premises upon which milk is produced are subject to frequent inspections; and the costs of effective inspection become prohibitive when spread over an unnecessarily large number of dairy farms or over an unnecessarily large number of districts. Hence, with the best will in the world, the natural desire of all dairymen within economic reach of the metropolis to share in the advantages of the relatively high metropolitan milk prices cannot be satisfied. The paramount claims of efficient control are so great that the number of licences issued for the purpose will unavoidably be limited. The amount of country milk distributed in the Metropolitan County District in 1932-33 was in the neighborhood of 2,400,000galls. If we assume country dairy farms to yield an average of 6,000galls. per annum per head on the basis of production of the three leanest months of the year, 400 herds would meet the metropolitan requirements, and approximately no more than 400 herds should be licensed.

3. Grade A Milk.—In most large cities there is a limited demand for high quality raw milk produced and handled under conditions that promise almost complete immunity from contamination or from the presence of pathogenic organisms. In New York and other cities milk of this type has come to be known as Grade "A" milk. It is drawn from herds of regularly tuberculin-tested cows, handled under very carefully regulated conditions, and is said to represent from $1\frac{1}{2}$ per cent. to 2 per cent. of the milk consumed in New York.

In England the following grades have been recognised since 1923:—

(1) *Certified Milk.*—Obtained from cows that were tuberculin tested and clinically examined every six months. This milk must show a bacterial count of not more than 30,000, and the Coliform bacillus must be absent in 1/10c.c. of milk. It is bottled on the farm under conditions of strictest supervision.

(2) *Grade "A" (Tuberculin Tested).*—Obtained from cows that were tuberculin tested and clinically examined every six months. This milk must show a bacterial count of not more than 200,000, and the Coliform bacillus should be absent in 1/100c.c. of milk. It may be delivered to consumers in bottles or sealed containers as received from the farm, or in suitable containers of not less than 2galls. capacity, or in bottles with the name of the licensed dealer by whom the milk was bottled.

(3) *Grade "A."*—Obtained from cows that are clinically examined every three months and diseased animals removed. This milk must in all other respects correspond to stipulations indicated for Grade "A" (Tuberculin Tested).

It is suggested that should new legislation be introduced to give effect to the recommendations of this report, special provisions should be made for licensing those who desire to supply Grade "A" type of milk. The conditions under which such milk should be produced and handled should be prescribed in detail, and producers should be given ample protection against unfair tactics of unlicensed dealers or of any others. The controlling authority should also be given power to recoup itself for whatever additional costs might be involved in the supervision of the production and handling of Grade "A" milk.

4. *Standardised Milk*.—Standardisation of milk is a practice which aims at mixing milk containing different percentages of butterfat so that the butterfat content may be averaged to a required ratio. No objection is raised to this practice, unless some butterfat is removed from or added to the milk.

PARAFIELD POULTRY STATION.

NOW BOOKING ORDERS FOR SUMMER, 1934.

EGGS FOR HATCHING AND DAY OLD CHICKENS

WHITE LEGHORNS.

EGGS.—7s. 6d. per Setting of 15 Eggs. Incubator Lots, £2 per 100.

DAY OLD CHICKENS.—15s. per dozen; £4 per 100.

BLACK MINORCAS.

EGGS.—7s. 6d. per Setting of 15 Eggs. Incubator Lots, £2 per 100.

DAY OLD CHICKENS.—15s. per dozen; £4 per 100.

**Free on Rail,
Salisbury.**

DELIVERY.—CHICKS—February and March.
EGGS—January and February.

Intending breeders should recognise the importance of establishing their flocks with only the very best of stock also, pay particular care to the size of the egg. The future of the poultry industry in South Australia is almost entirely dependent on the export trade; the size of the egg for export is of the greatest importance. The breeding stock at Parafield is carefully selected and every egg set or sold is of a minimum weight of 2ozs., and a large percentage considerably over.

All Eggs and Chickens sold from Parafield Poultry Station are guaranteed to be produced at Parafield.

EARLY BOOKING IS ADVISABLE.

Further particulars can be obtained from the Manager, Parafield Poultry Station, Salisbury, or Poultry Expert, Department of Agriculture, Flinders Street, Adelaide.

C. F. ANDERSON, Poultry Expert.

The existing regulations provide that milk sold for human consumption shall be the natural product from which nothing shall be taken and to which nothing shall be added, but the practice of removing some of the butterfat in order to reduce the butterfat content to a definite percentage slightly above the legal limit seems to be generally adopted in many cities.

The arguments in support of standardisation are based upon the fact that of all the component parts of milk butterfat is the one which varies most frequently and within the widest limits. These variations are influenced by quite a number of factors. They depend upon the breed of the cow, the season of the year, the morning and the evening milk, the progress of the lactation period, and the type of food.

Milk is usually purchased by wholesalers on the basis of its butterfat contents, the price increasing as the percentage of butterfat increases, and it is argued that if milk is purchased on such a basis its retail sale price should also be based upon the butterfat content; and that the only practical method of doing this is to fix a percentage of butterfat content for milk for human consumption year in and year out, and blend the milk so as to obtain the percentage and only in this way is the wholesale purchaser able to purchase milk at a price varying with the butterfat content. It is also argued that the value of milk as a food, other things being equal, varies as the butterfat content. The arguments against this practice are:—

- (1) That it is illegal.
- (2) That it is objectionable from the standpoint of the consumer, who would not agree to any interference with the natural condition of the milk.
- (3) That it is dangerous to allow any such tampering with the milk, as it may lead to other interference.
- (4) That the addition of water is the next step.
- (5) That if large distributing firms are allowed to "standardise" milk by the removal of a certain proportion of butterfat from the milk, the same practice cannot be objected to if adopted by the small dairyman, with the result that serious abuses are certain to arise.

In this connection reference may be made to the report of the South Australian Royal Commission on Milk Supply, 1913, issued in November, 1915, which contained the following paragraph:—

"It is also the experience of these cities that this country milk is generally controlled by a comparatively limited number of distributing agencies, and that amongst them standardising is a very general practice. Beyond stating that immunity from detection renders this the most objectionable form of adulteration it is not necessary to here discuss this practice in detail. There is reason to fear that this practice is not unknown in Adelaide, and with the growth of these depots the evil may be expected to grow with them unless effective measures are adopted to prevent it so doing."

At present the legal standard of milk sold in South Australia for human consumption provides for a minimum of 3.25 per cent. of butterfat. It is suggested that the legal limit should be raised to 3.5 per cent., which is the Victorian standard.

Your Commission is not agreed as to whether the practice of standardisation which involves interfering with the natural condition of the milk should be permitted, but if it is the existing law should be amended. It is recommended that power be given to a milk board to make such provision as it thinks fit for the control of blending and standardising of milk which is intended for human consumption.

(To be continued.)

[In the next issue will appear "administrative machinery" to put the foregoing into effect, and "recommendations as to the control of the milk supply." The Commission's report on the butter position will commence in a later issue.]

THE OFFICIAL AUSTRALIAN PURE-BRED DAIRY CATTLE PRODUCTION TESTING SCHEME.

CONDUCTED BY THE DEPARTMENT OF AGRICULTURE, SOUTH
AUSTRALIA.

RULES.

1. The official year shall commence July 1st and end June 30th.
2. (a) Only those cows will be accepted for test which are registered or have been accepted for registration in a recognised Herd Book, Calf Roll, or other Pure Stock Register.
(b) When a breeder owns more than one herd on separate farms, each herd shall be submitted for test and considered and recorded as a separate herd.
(c) Any cow entered for test, and any calf, the progeny of such cow, must be branded to the satisfaction of the Department of Agriculture in such manner as to ensure identification.
(d) Any cow which, on examination, is found to be affected with any disease or condition which may temporarily render her milk injurious may remain in the herd for testing, but her milk shall not be used for sale or for the preparation of any dairy produce for sale without permission.

3. PROPORTION OF HERD WHICH MUST BE TESTED.

All registered cows in a herd which has been submitted for test shall be tested annually unless exempted by the Minister of Agriculture on written application from the owner stating exceptional circumstances and endorsed by the Director of Agriculture, but in no case shall more than 50 per cent. of the females in lactation during each year be so exempted; and, further, all cows must be completely tested at least once before reaching the age of four (4) years, and at least once again before reaching the age of eight (8) years.

4. EXEMPTION FROM TESTING.

Exemptions from the test may be granted in respect of cows which come within the following category:—

- (a) Cows over ten (10) years of age, or those that are sick, diseased, or injured.
- (b) Any cow that aborts during a lactation period shall be deemed to have completed that period at the time she aborts.

5. WHO SHALL BE OFFICIAL TESTERS.

The official testing of cows shall be carried out by qualified officers appointed by the Department of Agriculture. The districts of testing officers shall be changed as often as possible.

6. WHERE TESTING SHALL BE CARRIED OUT.

It shall be optional for officers either to test on the farm or send the samples under adequate protection to be tested at some approved centre, i.e., the laboratory of the Department of Agriculture.

7. COWS TO BE STRIPPED OUT UNDER OFFICIAL SUPERVISION.

The testing officer shall see that all cows are milked out under his supervision at the milking prior to the official 24 hours' test commencing, and shall note the time each individual cow is finished in order that only a bare 24-hour period is allowed.

8. METHOD OF TAKING WEIGHTS AND SAMPLES AND RECORDING SAME.

The milk from each cow under test shall be weighed by the official tester on approved scales, and the weights be recorded. After thoroughly mixing such milk the official shall take samples for the official test. The samples from each milking shall be separately tested for butterfat. The weight and test percentage of each milking shall be recorded separately. No milk weight shall be credited to any cow unless the aggregate of all milkings in the 24 hours totals 4lbs. or over.

9. ACCOMMODATION OF TESTERS.

Every facility is to be afforded by the owners of the herds submitted to testers in carrying out their duties in connection with the scheme, and accommodation provided overnight, if necessary.

10. OWNERS TO PROVIDE TESTING EQUIPMENT.

Owners submitting their herds for testing must provide the necessary Babcock testing machine and equipment if required by the Department.

11. PERIOD OF OFFICIAL TEST.

The official lactation period shall be 273 days, which may be extended to 365 days on the request of the owner. Such request must be submitted in writing to the Department not later than one month prior to the expiration of the 273 days' period.

The official lactation period shall commence FIVE days after calving. The first five days' yields after calving shall not be included in the testing period.

12. COMPUTING OFFICIAL RECORDS.

The yield for the official record shall be calculated as follows:—

(a) The lactation period shall consist in the case of the 273 days' record of nine (9) sub-periods, covering respectively eight (8) sub-periods of 30 days and one (1) of 33 days, and in the case of the 365 days' record of eleven (11) sub-periods of 30 days and one (1) of 35 days.

(b) The cows shall be tested once in each sub-period at approximately equal intervals of time.

(c) The official yield shall be the sum of the yields of each sub-period.

(d) The yield for each sub-period shall be calculated as follows:—

(1) The milk yield shall be the amount of milk yielded over 24 hours multiplied by the length of the sub-period.

(2) The butterfat yield shall be the amount of butterfat calculated by test of the 24 hours' milk yield multiplied by the length of the sub-period.

(e) All cows as far as possible should be tested within the last week of their official lactation period. Cows that are tested for their first sub-period within 15 days after calving must be submitted to ten (10) tests in the case of the 273 days' official period, and thirteen (13) tests in the case of the 365 days' period in place of nine and twelve tests respectively. The ninth and tenth tests and twelfth and thirteenth tests to be averaged. If such cows are not tested during their tenth or thirteenth sub-periods they shall be credited with production for only eight and eleven sub-periods respectively.

13. ISSUE OF RECORDS AND CERTIFICATES.

(a) All calculations shall be made, recorded, and published in terms of pounds of milk and butterfat only.

(b) The Department of Agriculture shall issue certificates showing the records of each cow that attains or exceeds the official standard. Such certificates shall be worded and designed in a manner similar for each State.

(c) The Chief Clerk of the Department of Agriculture shall be also *Herd Testing Registrar*, and shall be responsible for the compilation of records and the issue of the certificates.

Records of all cows submitted to the test shall be published, including all those that fail to reach the official standard. The standards upon which certificates shall be issued are as follows:—

	Butterfat. Lbs.
Junior 2 year old	230
Senior 2 year old	250
Junior 3 year old	270
Senior 3 year old	290
Junior 4 year old	310
Senior 4 year old	330
Mature cows	350

In the above standards a Junior animal in each class is one which at date of calving has not attained to $2\frac{1}{2}$, $3\frac{1}{2}$, or $4\frac{1}{2}$ years respectively, and a Senior animal is one which at date of calving has attained or is over $2\frac{1}{2}$, $3\frac{1}{2}$, or $4\frac{1}{2}$, but less than 3, 4, or 5 years respectively.

14. TESTING AT IRREGULAR INTERVALS.

The tests shall be carried out as far as possible at intervals of 30 days. In the event of it not being possible to do so, the tests may be taken not more than 35 days or less than 25 days after the preceding test; and, if this is not practicable, the calculations for the period under review shall be averaged as in the case of an abnormal test (*vide* Rule 15) except that, in addition to the tests of the preceding and succeeding months, the weights and tests of the sub-period under review, if taken, will also be included in making the average. Additional visits may be made to take supplementary samples at any time considered fit by the Department. Such supplementary samples may be used in place of the original samples if considered advisable by the Department.

15. AVERAGING ABNORMAL TESTS.

When cows on their second or succeeding sub-period tests appear to be in normal health but record abnormally, *i.e.*, more than 25 per cent. above or below normal milk and/or fat yield, owing to being out of condition at the time of the official tester's visit, such tests shall not be registered, but an average made from the proximate and succeeding tests. When the first record is considered to be abnormal it shall be discarded, and the yield for the first sub-period shall be calculated on the average test of the next two periods. Any such abnormality shall be reported to the Department by the official tester. Individual weights and tests of each milking are to be considered separately, and averages shall be struck only for those that are considered abnormal.

16. WHERE FIRST TEST IS TAKEN 35 DAYS OR MORE AFTER CALVING.

Where owners are commencing to test their herds for the first time, or where it has been found impracticable to test certain cows until after they have been calved 35 days or more, the Department may, on the receipt of a statutory declaration from the owner or other acceptable proof as to date of calving, credit the cow's yield with the number of days' production due to her to a maximum of 90 days on the first 24 hours' test made by the official tester.

17. MILKING THREE TIMES A DAY.

No cow shall be milked more than twice per day unless she is yielding more than 60lbs. of milk per day, or unless special written consent is given by the Department. In such circumstances milking three times a day is permitted only until such time as the yield falls to 50lbs. per day, when twice-a-day milking must be resorted to.

18. FEEDING MILK OR CREAM TO COWS.

The feeding of whole milk or cream to cows undergoing test is prohibited as being a wasteful practice. Any records obtained from cows so fed will be disallowed.

19. PARTICULARS REQUIRED BY DEPARTMENT OF AGRICULTURE.

(a) Particulars as to the dates of services, calvings, purchases, sales, deaths, etc., shall be supplied to the official tester, and shall be published if the Department of Agriculture so desires.

(b) Owners must give, on the request of the Department, a declaration as to the class, quantity, or any other details regarding the ration fed during the period of the test, and allow, when deemed advisable by the Department, samples of the different food supplies to be taken for analysis and published if desired by the Department.

(c) All particulars required by the Department concerning any phase of testing shall be made by sworn declaration when deemed necessary by the Department.

20. FEES FOR TESTING.

Each owner shall pay to the Department of Agriculture on entry of his herd and annually thereafter at the commencement of the official testing year a herd entry fee of six pounds ten shillings (£6 10s.). There shall also be paid in advance a fee of ten shillings for each lactation period of each cow submitted for test. The minimum herd entry fee plus testing fees to be paid in advance for each official year shall be eight pounds ten shillings (£8 10s.).

21. TESTING GRADE CATTLE.

The testing officer shall have power to test crossbred or grade cattle when they are the property of members submitting pure breeds, provided he is not unduly detained thereby, but certificates will not be issued for them.

22. DISQUALIFICATIONS, &c.

(a) Should the owner of any herd entered for testing not conform to these regulations, such herd shall be subject to disqualification for such period as the Minister may determine.

(b) The Minister retains the right to refuse to test any herd or to terminate the testing of any herd if in his opinion the rules as laid down have been deliberately broken. The Minister may also refuse to test a herd for any other reason.

23. THE LEGAL ASPECT.

No person who has submitted any herd, cow, or heifer for testing, or for whom any herd, cow, or heifer is at any time tested by the Department, or by any of its officers or servants, shall have any claim for damages, whether arising out of breach of contract, tort, or otherwise howsoever, against His Majesty the King, the Government, or any person in the service or employment of his said Majesty or the said Government, for or in respect of anything done, or omitted to be done, under or in connection with these rules, or the performance, or non-performance, of any act or duty thereunder, or in carrying out or in attempting to carry out the testing of any herd, cow, or heifer, or for anything done or omitted in reference thereto, or in connection therewith.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on November 29th, 1933, there being present Messrs. A. J. Cooke (Chairman), A. M. Dawkins, R. H. Martin, J. B. Murdoch, G. Jeffrey, F. Coleman, A. L. McEwin, Professor Arthur J. Perkins, and H. C. Pritchard (Secretary). Apologies were received from Messrs. P. J. Baily, J. W. Sandford, and Dr. Richardson.

Next Meeting of the Board.—It was decided that the next meeting of the Board should be held on January 31st, 1934.

Life Members.—The honor of Life Membership of the Agricultural Bureau was conferred on the following members:—Messrs. C. H. Scholz (Pinbong), F. Hassam and L. C. Mann (Milang), H. Paech (Blackheath).

New Members.—The following names were added to the rolls of existing Branches:—Adelaide—Philip Mortimer; Balaklava—G. D. Oster, Howard Wills; Barmera—T. H. Meredith, A. J. West, R. L. Grubb, J. W. O. Carnie, E. Farmer, R. C. Wilson, W. Vasey, T. R. Bawden, W. D. Blight, R. Gaskell, D. Thomas, J. J. Elliott; Belalie Women's—Mrs. Roy Smith, Mrs. I. A. Perkins, Miss L. Crouch; Berri—T. G. Wilkinson, F. R. Clark; Blackheath—Harold Treloar; Blyth—H. Fuller; Coonawarra—R. C. Modistach, Harold Redman, Arthur Hoffmann; Coonawarra Women's—Mrs. G. Hill, Miss D. Modistach, Miss J. Redman, Miss F. Redman; Gladstone Women's—Mrs. E. S. Hillard; Greenock—E. B. Heyne, H. Kernich, F. Parkinson; Kelly—B. J. Miller; Koonunga—J. Neilson; Kybybolite Women's—Miss C. V. Patching, Miss M. C. Johnson; Laura Bay Women's—Miss E. McInerheney; Mangalo Women's—Miss M. Briese, Miss T. Trembath; McLaren Flat—Reg. Rayner, Ray. Beaumont; Milang—E. W. E. Pannell, G. Pannell, R. Pannell; Moorook—E. W. Chaston, Rob. Loxton, L. A. King, R. Moore, D. Thom; Mundalla Women's—Mrs. R. Golding, Mrs. A. Hokin, Miss A. Donnell, Miss E. Donnell, Miss E. Knowling; Narrung—B. Meek, Lewis Thacker (jun.), Roy Dabinett; Penola Women's—Mrs. H. Marks; Penwortham—R. O. Knappstein, P. Wayman; Petina—G. E. Hartree, R. K. Montgomerie; Pinkawillinie—W. E. Enwright, W. Hutchens; Port Elliot—S. D. Bruce; Roseworthy—L. Ey; Saddleworth Women's—Mrs. Friebe, Mrs. Vogt, Mrs. White, Mrs. Burton, Miss F. Bedford; Scott's Bottom—David Fitzpatrick; Tantanoola Women's—Mrs. R. Serle; Wallala—John E. Wilson; Warcowie—C. G. Kittle; Wasleys—J. P. Carrig.

No. of new members for approval, 77; present No. of members, 7,973; present No. of Branches, 334.

A large number of items were taken in Committee.

HOW TO MAKE NEATSFOOT OIL.

The following simple recipe for the manufacture of neatsfoot oil may be appreciated by farmers in view of this oil's value in keeping harness in good order.

Neatsfoot oil is made by boiling in a suitable receptacle the feet and leg-bones (up to the knees) of well-grown cattle. The material should first be thoroughly cleaned by scalding and scraping free from hair, dirt, &c.; it should then be covered with water, which should be brought to the boil and then allowed to simmer for about two hours. After the oil has risen to the surface it should be skimmed off and the mixture boiled again, and a second skimming made.

The oil thus secured should be strained through a piece of cheesecloth in order to extract pieces of flesh, &c., from the mixture, and the strained product should then be boiled again, great care being taken that it does not catch fire. Finally, it should be strained again, cooled, and bottled. Pure neatsfoot oil should be light-lemon in color.

The method described is for manufacture on a small scale; manufacture for trade purposes necessitates the use of a much more detailed and tedious process.—*New South Wales Agricultural Gazette.*

RESULTS AND PARTICULARS OF VARIOUS TESTS ON VINES CARRIED OUT AT BERRI EXPERIMENTAL FARM.

[By N. S. FOTHERINGHAM, R.D.A., Manager.]

For a number of years various tests on vines and trees have been carried out at this institution, and it is the purpose of this article to set down the results of the various tests on vines. The tree or citrus section will be submitted at a later date. In addition to results obtained various observations have been made, and where possible conclusions arrived at have been stated.

TESTS WITH HEAVY BEARING VARIETIES OF VINES.

The vines in the above tests were planted in 1919. The Doradillo was the main variety planted throughout this irrigation area for the production of spirit, and these tests were laid down to see whether a grape of heavier bearing and higher sugar content than the Doradillo could be found suitable to this district. The plot has not been regularly fertilised, and probably accounts for the medium crop averages. With the price of Doradillo grapes at £5 per ton for a 12° Baumé reading, and allowing for an increase or decrease of 5s. per ton per ½° Baumé rise or fall above 12° Baumé there is only one variety that can beat the Doradillo. This variety is Trebbiano, whose gross returns per acre worked out on the above basis would be £34 15s. 6d. per acre, whereas the Doradillo would be £29 7s. per acre. Trebbiano does not hang nearly so long on the vine as Doradillo, and that is an important factor to bear in mind in this area where the time of picking has extended well into June and even later.

FERTILISER TESTS ON VINES.

Previous fertiliser tests carried out at this orchard with Sultana, Currant and Muscat Gordo Blanco vines revealed that of the individual fertilisers supplying either nitrogen, phosphoric acid, or potash the one supplying nitrogen gave far away the best results. This was common to all varieties under test. Besides this fact it was revealed that when nitrogen was in combination either with phosphoric acid, or potash separately or in combination with phosphoric acid and potash, the crop results were much higher than with just nitrogen on its own. Nitrogen was supplied in the form of sulphate of ammonia, phosphoric acid as superphosphate, and potash as sulphate of potash. The maximum quantities of these fertilisers used was sulphate of ammonia 1cwt. per acre, superphosphate (36 per cent. W.S.P) 2 cwts. per acre, and sulphate of potash 1cwt. per acre.

It will be noted that the above were only light dressings, and did not give any indication of the amounts of fertiliser which could be applied to give maximum yields. In consequence of this a further series of fertiliser tests were laid down with much larger quantities of fertilisers per acre. These tests are situated on Block I. of this orchard, and the varieties of vines under test were Doradillo, Currant, and Sultana. Doradillo was substituted for Muscat Gordo Blanco on account of the large area that had been planted in this and nearby settlements. Block I. is situated on the Berri Flat, and comes under irrigation from the 40ft. channel. Its natural vegetation so far as can be gathered was mainly salt and blue bush, with occasional box trees. Small windswept patches were also present. It was originally laid down to lucerne, and carried that crop for approximately 10 years. The lucerne did well on the plot with the exception of the wind-swept patches of soil. This plot, rectangular in shape, was then worked up and laid down to the vines mentioned. The rows of vines were placed 11ft. apart. The plot when planted had first a row of Muscat Gordo Blanco vines, then Doradillo,

Currant, and Sultana, and this order was repeated throughout the plot. The Muscat Gordo Blanco formed a barrier row between each set of three varieties receiving the same fertiliser treatment.

The plot was divided into two portions so that each row had two tests. The distance apart of vines in the row are Doradillo 6ft., Currant 12ft., and Sultana 8ft. Most of the vines were planted in 1921, and the remainder in 1922. A perusal of the accompanying Table I., setting out the results of these tests, will show the amounts of fertiliser used per acre, and it will be seen that superphosphate and other fertilisers are applied in much larger quantities than in the early fertiliser trials which have been mentioned. In addition to this bonedust which mostly supplies phosphates is in comparison with superphosphate, and similarly nitrate of soda is compared with sulphate of ammonia, muriate of potash with sulphate of potash. Besides these there are various combinations of these fertilisers, green manuring with legumes, gypsum, sulphur, and no-fertiliser plots. There is no intention yet to try and make any comparison of the effect of the various fertilisers used.

It is indeed unfortunate that the ground on which these tests were set out was previously under lucerne. The lucerne has enriched the soil with nitrogen, and even the no-fertiliser tests are showing good yields. In fact the only tests showing poor yields are those which have been planted on wind-swept patches of soil and on which the lucerne itself did not grow well.

TABLE I.—RESULTS OF HEAVY BEARING VARIETIES OF VINES.

No.	Name.	1933 Season.		Average per Acre.		
		Fruit in lbs. p.a.	Baumé.	No. Yrs.	Lbs. p.a.	Baumé.
1	Alicante Black	20,164.65	10.0	13	14,297	11.38
2	Aramon	17,278.80	13.0	13	8,346	13.10
3	Belas Blanco	10,871.85	13.0	13	7,777	12.64
4	Doradillo	20,963.25	11.0	13	13,148	12.12
5	Palimeno Blanco	10,944.45	13.0	13	6,618	12.77
6	Pedro Ximenes	11,888.25	13.0	13	7,973	12.06
7	Pride of Australia	11,307.45	15.5	13	6,244	15.51
8	Santa Paula	12,106.05	12.0	13	7,411	12.60
9	Sweetwater	12,106.05	13.0	13	8,433	13.12
10	Temperano	13,921.05	13.0	13	10,422	13.25
11	Trebbiano	18,821.55	14.0	13	13,548	13.77
12	Ulliade	15,972.00	15.0	13	11,501	14.51

BARLEY

We have large Overseas Representation, and are in constant touch with the World's Markets, and strongly advise Growers, before selling elsewhere, to submit samples to us for valuation.

Delivery taken at any Railway Station, Siding, or Shipping Port.

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TELEPHONE: CENTRAL 4855 and 4856.

TABLE II.—RESULTS OF FERTILISER TESTS ON

Test No.	Fertilisers Applied.	DORADILLO.					OURRENT.
		1933 Season.		Average p. Acre.			1933 Season.
		Fresh Fruit, Lbs. p.a.	Baumé	No. Years.	Lbs. p.a.	Baumé	Fresh p.a.
1	Superphosphate, 36% W.S.P., 4cwts.	25,006-66	11-0	8	20,308	12-5	4,074-78
2	Superphosphate, 36% W.S.P., 6cwts.	27,904-19	11-0	8	18,066	12-2	3,930-00
3	Superphosphate, 36% W.S.P., 8cwts.	24,566-66	11-0	8	17,582	12-8	3,773-48
4	Super., 6cwts.; sulphate of ammonia, 2cwts.; sulphate potash, 1cwt.	28,953-16	10-5	8	16,844	13-0	3,510-00
5	Bonedust, 40% T.P., 3-25% N., 404lbs.	28,732-00	13-0	8	18,559	13-3	2,510-87
6	Bonedust, 40% T.P., 3-25% N. 605lbs.	24,341-43	11-5	8	15,841	12-7	3,405-00
7	No fertiliser	18,714-66	13-0	8	14,131	12-9	3,644-35
8	No fertiliser	21,615-00	12-5	8	14,295	12-9	4,140-00
9	Sulphate of ammonia, 20% N., 224lbs.	18,978-66	12-0	8	11,596	12-9	3,572-61
10	Sulphate of ammonia, 20% N., 448lbs.	21,615-00	11-5	8	15,624	12-3	1,425-00
11	Nitrate of soda, 15-5% N., 289lbs.	16,984-00	13-0	8	11,876	12-9	3,845-22
12	Nitrate of soda, 15-5% N., 578lbs.	22,927-14	13-0	8	14,707	12-9	2,130-00
13	Sulphate of potash, 48-6% K ₂ O, 1cwt.	17,937-33	12-5	8	10,397	12-4	3,285-65
14	Sulphate of potash, 48-6% K ₂ O, 2cwts.	20,813-02	12-0	8	12,427	13-0	3,300-00
15	Muriate of potash, 51% K ₂ O, 106lbs.	18,970-77	12-5	8	10,704	12-8	3,199-57
16	Muriate of potash, 51% K ₂ O, 212lbs.	20,400-00	13-0	8	12,848	12-8	3,090-00
17	Super., 6cwts.; sulphate of ammonia, 2cwts.; gypsum, 1 ton	16,324-00	12-25	8	9,222	12-9	3,127-83
18	Bonedust, 605lbs.; sulphate of ammonia, 126lbs.; sulphate of potash, 112lbs.	24,180-00	12-0	8	14,981	12-5	1,995-00
19	Sulphur, 224lbs.	17,985-00	12-5	8	11,107	12-3	2,797-83
20	Super., 6cwts.; sulphur, 1cwt.; sulphate of ammonia, 2cwts.	25,980-00	12-0	8	18,124	12-2	840-00
21	No fertiliser	20,175-00	12-25	8	12,891	12-7	3,357-39
22	No fertiliser	21,195-00	11-75	8	15,191	12-2	1,620-00
23	Super., 4cwts.; green manure annually	19,286-66	13-5	8	11,928	12-1	1,320-00
24	Rock phosphate, 269lbs.; green manure annually	24,840-00	12-0	8	16,059	12-3	1,995-00
25	Super., 4cwts.; green manure alternate years	25,545-00	12-5	8	16,800	12-6	1,535-22
26	Rock phosphate, 538lbs.; green manure alternate years	24,255-00	12-0	8	16,624	12-2	2,580-00

TABLE III.—RESULTS OF CINCTURING

Test Nos.	Method of Cincturing.
1	When flowers just opening, with single knife cut
2	When flowers just opening, with double cut and strip of bark removed
3	When flowers $\frac{1}{2}$ to $\frac{3}{4}$ open, with single knife cut
4	When flowers $\frac{1}{2}$ to $\frac{3}{4}$ open, with double cut and strip of bark removed
5	When $\frac{1}{2}$ to $\frac{3}{4}$ caps of flowers have dropped, with double cut and strip of bark removed and vines topped
6	When berries are $\frac{1}{4}$ in. in diameter, with double cut and strip of bark removed
7	When berries are $\frac{1}{4}$ in. in diameter, with single knife cut

TABLE IV.—RESULTS OF CINCTURING

1	When flowers just opening, with single knife cut
2	When flowers just opening, with double cut and strip of bark removed
3	When $\frac{1}{2}$ to $\frac{3}{4}$ flowers open, with single knife cut
4	When $\frac{1}{2}$ to $\frac{3}{4}$ flowers open, with double cut and strip of bark removed
5	When $\frac{1}{2}$ to $\frac{3}{4}$ flower cups have fallen, with double cut and strip of bark removed and vines topped
6	When berries $\frac{1}{4}$ in. in diameter, with double cut and strip of bark removed
7	When $\frac{1}{2}$ to $\frac{3}{4}$ flower caps have fallen canes only cinctured, with single knife cut

DORADILLO, CURRANT, AND SULTANA VINES.

CURRANT.

SULTANA.

1933 Season.		Average per Acre.				1933 Season.			Average per Acre.			
Dried p.a.	Drying Ratio.	No. Yrs.	Fresh.	Dried.	Drying Ratio.	Fresh p.a.	Dried p.a.	Drying Ratio.	No. Yrs.	Fresh.	Dried.	Drying Ratio.
1,592-61	2-56	5	10,913	3,822	2-86	19,989-26	5,284-85	3-78	6	13,741	4,127	3-33
1,695-00	2-32	5	10,761	3,972	2-71	20,925-00	5,310-00	3-94	6	14,420	4,285	3-36
1,520-87	2-48	5	10,653	3,894	2-73	16,393-24	4,338-53	3-78	6	12,916	3,960	3-26
1,860-00	1-88	5	9,087	3,594	2-53	21,660-00	5,220-00	4-15	6	14,015	4,125	3-39
1,061-74	2-36	5	9,814	3,636	2-69	17,776-32	4,746-18	3-74	6	14,913	4,477	3-33
1,605-00	2-12	5	10,548	4,089	2-58	21,600-00	5,460-00	3-96	6	14,570	4,390	3-32
1,678-69	2-17	5	9,886	3,814	2-59	22,245-00	6,000-00	3-71	6	13,528	4,058	3-33
1,920-00	2-16	5	10,008	3,813	2-62	17,415-00	4,620-00	3-77	6	13,265	3,988	3-33
1,707-39	2-09	5	8,270	3,323	2-49	15,621-62	4,280-29	3-65	6	11,470	3,416	3-36
855-00	1-67	5	9,282	3,735	2-49	20,085-00	5,085-00	3-95	6	14,663	4,298	3-41
1,893-91	2-03	5	8,325	3,400	2-45	17,015-63	4,826-25	3-53	6	9,128	2,762	3-30
1,050-00	2-03	5	10,464	3,996	2-62	20,700-00	5,130-00	4-03	6	12,938	3,818	3-39
1,793-48	1-83	5	8,939	3,311	2-70	16,714-50	4,537-50	3-68	6	9,680	2,929	3-30
1,650-00	2-00	5	10,362	4,182	2-48	21,269-53	5,723-44	3-72	6	12,024	3,639	3-30
1,850-87	1-73	5	5,139	2,247	2-29	18,135-00	4,837-50	3-75	6	8,121	2,444	3-32
1,560-00	1-98	5	9,741	3,567	2-78	21,555-00	5,640-00	3-82	6	12,360	3,843	3-35
1,764-78	1-77	5	6,830	2,832	2-41	19,200-00	5,205-00	3-69	6	10,614	3,191	3-33
900-00	2-22	5	9,753	3,840	2-54	22,410-00	5,850-00	3-83	6	15,475	4,565	3-39
1,348-70	2-07	5	7,696	3,030	2-54	19,377-79	5,348-09	3-63	6	12,203	3,729	3-27
420-00	2-00	5	6,546	2,559	2-56	26,910-00	6,870-00	3-92	6	15,364	4,579	3-36
1,492-17	2-25	5	8,474	3,268	2-59	22,485-00	5,985-00	3-76	6	13,457	4,046	3-33
660-00	2-46	5	9,549	3,648	2-62	21,570-00	5,955-00	3-62	6	15,143	4,613	3-28
746-09	1-77	5	8,734	3,274	2-68	23,392-74	5,924-03	3-95	6	16,228	4,775	3-39
870-00	2-29	5	9,831	3,585	2-74	19,755-00	5,130-00	3-85	6	14,065	4,205	3-34
616-95	2-49	5	8,746	3,266	2-66	23,949-27	6,464-12	3-70	6	13,964	4,142	3-37
1,080-00	2-39	5	8,568	3,156	2-71	24,150-00	6,225-00	3-88	6	13,228	3,905	3-39

TESTS ON CURRANT VINES.

Baumé.	1933 Season.			Average per Acre.			
	Fresh lbs. p.a.	Dried lbs. p.a.	Drying Ratio.	No. Yrs.	Fresh.	Dried.	Drying Ratio.
15-0	4,098-57	1,855-14	2-21	7	5,807	2,095	2-77
14-5	3,322-00	1,466-86	2-26	7	8,462	3,060	2-77
16-0	3,537-71	1,898-29	1-86	7	5,510	2,212	2-49
13-5	2,200-29	906-00	2-43	7	6,362	2,432	2-62
15-0	2,847-43	1,337-43	2-13	7	7,311	2,637	2-77
15-0	1,725-71	992-29	1-74	7	4,261	1,883	2-26
16-0	4,278-33	2,063-67	2-07	7	3,820	1,617	2-36

TESTS ON SULTANA VINES.

12-0	16,534-50	4,212-90	3-92	7	9,991	2,724	3-67
11-0	19,973-18	4,406-45	4-53	7	12,669	3,435	3-69
11-5	16,043-75	3,888-25	4-13	7	12,022	3,191	3-77
11-0	16,551-92	3,867-92	4-28	7	11,179	3,057	3-66
10-0	16,049-14	3,559-29	4-51	7	8,739	2,278	3-84
9-5	20,747-40	4,560-20	4-55	7	11,712	3,199	3-66
10-0	21,432-56	4,841-44	4-43	7	11,772	2,989	3-94

TABLE V.—RESULTS OF VINE

Row Nos.	Method of Training.
1 and 2	Each vine trained as an Espalier with one pair of arms. Vines trained alternately on bottom and middle wire. Spur pruned
3 and 4	Each vine trained as a Cordon. Spur pruned. Vines trained alternately on bottom and middle wire
13 and 14 . . .	Each vine trained as an Espalier with a pair of main arms set on the bottom and middle wire. Spur pruned
15 and 16 . . .	Each vine trained as an Espalier with a pair of main arms set on each wire. Spur pruned
25 and 26 . . .	Trained on T trellis as Espalier with one pair of main arms trained on a central wire running through post 6ins. below T piece. Spur pruned
27 and 28 . . .	Each vine trained as a double parallel cordon, the main arms being set on wires in T pieces. Central wire if trellis is 6ins. higher than side wires. Vines spur pruned
29	Each vine trained as a Cordon on T trellis. Main arms are formed on a central wire which is 6ins. higher than side wires. Rod and spur pruned

TABLE VI.—RESULTS OF VINE

Row Nos.	Method of Training.
5 and 6	Vines trained as Cordons. Main arm set on central wire. Fruiting canes lifted and tied to top wire. Rod and spur pruned
7 and 8	Vines trained as Cordons. Main arm set on central wire. Fruiting canes depressed and tied to bottom wire. Rod and spur pruned
17 and 18 . . .	Vines trained as Espaliers. Main arm set on central wire. Fruiting canes lifted and set on top wire. Rod and spur pruned
19 and 20 . . .	Vines trained as Espaliers. Main arm set on central wire. Fruiting canes depressed and tied to bottom wire. Rod and spur pruned
30 and 31 . . .	Vines being reformed to Cordons on T trellis. Rod and spur pruned
32 and 33 . . .	Vines being reformed to Espaliers on T trellis. Rod and spur pruned
34 to 37	Vines trained as Bordelais Espaliers. Fruiting rods horizontal. Rod and spur pruned

TRAINING TESTS ON CURRANT VINES.

Arms.	1933 Season.			Average per Acre.			
	Fresh lbs. p.a.	Dried lbs. p.a.	Drying Ratio.	No. Yrs.	Fresh.	Dried.	Drying Ratio.
Top	2,327-09	1,024-18	2-27	16	5,139	1,873	2-74
Bottom	2,618-79	1,166-79	2-24	16	6,160	2,258	2-73
Total	4,945-88	2,190-97	2-26	16	11,299	4,131	2-74
Top	2,229-86	1,017-70	2-19	16	5,185	1,975	2-63
Bottom	1,652-94	726-00	2-28	16	4,566	1,737	2-63
Total	3,882-80	1,743-70	2-23	16	9,751	3,712	2-63
Top	2,949-38	1,536-27	1-92	16	6,612	2,412	2-74
Bottom	2,353-02	1,160-30	2-03	16	6,017	2,211	2-72
	5,302-40	2,696-57	1-97	16	12,629	4,623	2-73
Top	3,117-91	1,575-16	1-98	16	5,229	2,054	2-55
Middle	1,782-59	732-48	2-43	16	3,978	1,411	2-82
Bottom	2,340-05	991-77	2-36	16	4,542	1,640	2-77
	7,240-55	3,299-41	2-19	16	13,749	5,105	2-69
—	2,890-30	1,342-42	2-15	16	9,898	3,600	2-75
—	3,073-40	1,581-07	1-94	16	11,982	4,593	2-61
—	5,738-86	2,765-71	2-08	16	13,899	5,160	2-69

TRAINING TESTS ON SULTANA VINES.

Baumé.	1933 Season.			Average per Acre.			
	Fresh lbs. p.a.	Dried lbs. p.a.	Drying Ratio.	No. Yrs.	Fresh.	Dried.	Drying Ratio.
12-0	16,702-76	4,251-73	3-93	16	8,052	2,355	3-42
12-5	16,230-34	4,258-20	3-81	16	7,842	2,296	3-41
11-5	17,383-88	4,379-00	3-97	16	7,486	2,182	3-43
11-5	20,479-38	5,134-00	3-99	16	8,648	2,526	3-42
11-5	21,319-31	5,237-81	4-07	15	9,421	2,684	3-51
10-5	22,332-90	5,334-07	4-18	15	10,613	2,889	3-68
11-0	20,928-60	5,131-25	4-08	15	10,003	2,829	3-54

CINCTURING TESTS ON CURRANT VINES.

It is well known that until the cincturing of the currant vine was adopted in South Australia the crops obtained were very light. The practice of cincturing is now general wherever currants are grown. There were aspects of this practice, however, that required investigation, and tests were set out to see whether:—(a) The nature of the cincture, i.e., whether made with a single knife cut around the stem of the vine, or whether made with a double knife cut about $\frac{1}{2}$ in. wide around the stem and the strip of bark removed, had any effect on the ultimate yield. (b) Another aspect was the consideration of the time or period of flowering at which the cincturing was performed.

The table below shows the tests carried out to try and determine the aspects just mentioned. The results so far indicate that a cincture made with a double cut and the strip of bark removed has a greater yield at all periods of cincturing than when only a single cut is given. They also disclose that it is better to cincture early than late.

CINCTURING TESTS ON SULTANA VINES.

Unlike the currant cincturing of the sultana vine is not necessary to obtain a good setting of berries, but it was thought that increased returns may be gained by the cincturing of this vine. Tests on somewhat similar lines to those practised on currants were laid down, and the results are tabulated below. The main point found out from these tests is that, where the Sultana vine is both cinctured and topped the vitality of the vine is considerably weakened so much so that it is now difficult to find suitable rods to furnish the succeeding crop, and in consequence its yield is low. The uncinctured row with which the cinctured tests were to have been compared was an outside row, and obviously held an unfair advantage over the cinctured tests, and is therefore not tabulated. Nothing definite can be established as to whether a single knife cut is advantageous over a cincture made with a double cut about $\frac{1}{2}$ in. wide with a strip of bark removed or *vice versa*, nor do the tests disclose anything definite regarding the time at which the vines are cinctured.

VINE TRAINING TESTS ON CURRANT VINES.

When this institution was established in 1911 the main varieties of grapes grown under irrigation were the Currant, Sultana, and Muscat Gordo Blanco. These were all grown for drying purposes. Various systems of training were used on these three varieties. Each variety will be treated separately.

CURRANTS.

The two main systems used in the trellising of the Currant vine are the espalier and the cordon. There were in the tests, however, modified forms of both these systems, and these are described in the accompanying results. In all tests with the exception of Row No. 29 the vines were all spur pruned; with this row, however, they are rod and spur pruned. The general conclusions that can be deduced from these results after a long period of years are:—(a) That the espalier trained spur pruned vine will give higher yields than a spur pruned Cordon trained vine. (b) That espaliers trained with two pairs of arms—viz., Rows 13 and 14—give higher yields than (a). (c) That espaliers trained with three pairs of arms—viz., Rows 16 and 16—give higher yields than the systems mentioned in (a) and (b). (d) That Currant vines trained as a cordon on a T trellis—viz., Row 29—and rod and spur pruned give slightly the highest yields of any. It is to be noted, however, that the fruit on the rod and spur pruned cordon trained vine is not nearly so bold as the fruit from any other spur pruned test, and that there is a large percentage of red berries—a type of Currant that is not wanted.

The vines in all these tests have been treated similarly except with the pruning and training. They had not until 1928 received definite yearly fertiliser treatment. It is intended at a later date to compare the yields since regular fertiliser dressings have been applied with the yields prior to that date.

TRAINING TESTS ON SULTANA VINES.

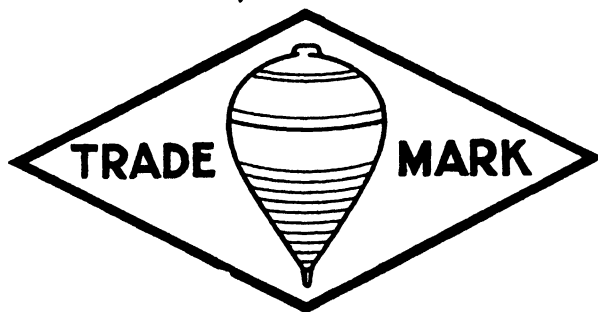
Unlike the Currant this vine does not usually produce fruit on spurs, and in consequence rods have to be relied on for the fruit-bearing wood. Odd spurs are, however, left to provide rods at suitable positions for the following year's crop. It will be noticed in the results that the depression of fruiting canes or rods is tried against the elevation of the fruiting canes or rods in two instances—viz., 7 and 8, v. 5 and 6, Rows 19 and 20, v. 17 and 18. In the first instance there is practically no difference in yield, whereas in the second instance there has been an increase of approximately 16 per cent. in favor of depressing the fruiting canes or rods. The other tests are relatively close to one another, and in no cases are the rods depressed.

In these times of fairly heavy fertiliser dressings and consequent strong growth the numbers of rods or canes left during pruning has been much increased, and it is not advisable to wrap all the canes or rods on one wire, as it leads to crowded foliage with its attendant danger of fungus disease, crowded and tangled fruit, which is difficult to pick and gets damaged in doing so.

TRAINING TESTS ON MUSCAT GORDO BLANCO VINES.

This vine produces the main quantity of Lexias or pudding raisins, besides being used as a wine and spirit grape. So far as trellising tests are concerned we find that the Thomery espalier trained spur pruned vine gives much higher returns than the cordon or bush trained vine, whether rod and spur pruned or open pruned to spurs of one bud. The fruit in all tests is very good, but it has to be stated that the fruit from the bush trained vine spur pruned to one bud yields fine large and bold fruit eminently suitable for high-class table raisins. The results of these tests are in the table following.

**TOP SPECIAL (45%)
And 48% MINERAL**



**THE SUPERS FARMERS RECOMMEND
TO ONE ANOTHER.**

—
"TOP" Manufactured by

The Adelaide Chemical & Fertilizer Co., Ltd.

TABLE VII.—RESULTS OF VINE TRAINING TESTS ON MUSCAT GORDO BLANCO VINES.

Test Nos.	Method of Training.	Baumé.	1933 Season.				Average per Acre.		
			Fresh lbs. p.a.	Dried lbs. p.a.	Drying Ratio.	No. Yrs.	Fresh.	Dried.	Drying Ratio.
9 and 10	Each vine trained as Thomery Espalier with one pair of arms; spur pruned to two buds	14.5	21,496.81	6,597.08	3.26	16	14,882	4,715	3.16
11 and 12	Each vines trained as a Cordon; spur pruned to two buds	14.0	20,280.37	6,159.42	3.29	16	11,742	3,799	3.09
21 and 22	Each vine trained as a Gooseberry bush and rod and spur pruned	13.0	22,352.82	6,255.96	3.57	16	13,114	4,016	3.27
23 and 24	Each vine trained as a Goblet and spur pruned to one bud	14.0	15,800.80	4,859.31	3.25	16	11,358	3,550	3.19

RESULT OF WHEAT CROP COMPETITIONS, SEASON, 1933-34.

Position.	Name and Address.	Variety.	Ap- parent Yield.	Free- dom from Weeds.	Free- dom from Disease.	True- ness to Type.	Even- ness of Crop.	Total.
		Maxima—	35	25	20	15	5	100

BALAKLAVA.

Judged by W. C. JOHNSTON, R.D.A. (District Agricultural Instructor).

1	J. D. Campbell, Baraba	Sword	35	24	18	14	3.5	94.5
2	R. P. Anderson, Halbury	Sword	34	23	18.5	14	4	93.5
3	J. A. Campbell, Stockyard Creek	Sword	32	24	18.5	13.5	3	91
4	R. Reid, Owen	Sword and Shaokley's Ford	34	22	17.5	13.5	3.5	90.5
5	J. D. Campbell, Baraba	Ford	33	23	18	13	3	90
6	A. Freebairn, Owen	Sword	31	23	18	12	3	87
7	Harkness Bros., Owen	Sword	29	23	18	13	3.5	86.5
8	J. A. Campbell, Stockyard Creek	Ford	29	23	18	13	3	86
9	D. J. Wilson, Stock- yard Creek	Ford	27	22	19	14	3.5	85.5
10	Harkness Bros., Owen	Ford	28	23.5	16	13	4	84.5
11	L. C. Mills, Balaklava	Sword	27	22	18	14	3	84
12	R. Goldney, Balaklava	Sword	24	23	16	13.5	3.5	80
13	P. J. Brady, Baraba.	Ford	27	20	15	13	3.5	78.5

JERVOIS.

Judged by H. D. ADAMS, R.D.A. (District Agricultural Instructor).

1	J. C. Sims, Cleve ...	Felix	32	23½	18½	13½	4½	92
2	D. C. McCallum, Rudall	Waratah	32	23	18	14	4	91
2	K. Nield and F. Coles, Mangalo	Waratah	30	24	19	13½	4½	91
4	J. C. Kobelt & Son, Darke's Peak	Waratah	29	23½	18½	14	4½	89½
5	J. J. Deer, Cleve ...	Ford	29	24	18½	13	4½	89
6	J. Brus & Sons, Mangalo	Gallipoli and Ranee	27	23½	18	13½	4	86
6	H. E. Steinko, Mangalo	Waratah	28	23½	18	13	3½	86
8	A. E. Phelps, Rudall	Nabawa	27	23	18½	13½	3½	85½
8	A. Spriggs, Cleve	Gluyas	29	22	17½	13½	3½	85½
10	M. Rodda, Mangalo	Sword	26	23½	18	14	3½	85
10	E. H. and C. K. Spriggs, Cleve	Nabawa	27	22½	19	13	3½	85
12	W. F. Wake, Rudall	Ford	24	24	19½	13	3½	84
12	H. F. Brine, Miltalie	Waratah	27	22½	17	14	3½	84
14	G. E. Davis, Darke's Peak	Golden Drop ..	24	23	19	14	3½	83½
14	H. A. Deakin, Rudall	Florence	26	23	17½	13½	3½	83½
16	F. I. Kestel, Rudall	Nabawa	25	22½	18	13½	3½	82½
17	A. Spriggs, Cleve	Waratah and Nabawa	26	21½	17	13	3	80½
17	J. Henderson, Cleve	Gluyas	25	22½	17	13	3	80½

RESULT OF WHEAT CROP COMPETITIONS—continued.

Position.	Name and Address.	Variety.	Ap- parent Yield.	Free- dom from Weeds.	Free- dom from Disease.	True- ness to Type.	Even- ness of Crop.	Total.
		Maxima—	35	25	20	15	5	100.

BUXTON.

Judged by H. D. M. ADAMS, R.D.A. (District Agricultural Instructor).

1	C. G. and G. W. Cant, Kimba	Gluyas.....	30	23½	17½	13½	4½	80'
2	F. Newman, Kimba .	Gluyas and Sword	28	23½	18	14	4	87½
3	F. Freeth, Pinkawillinie	Nabawa and Ranee	27	24	18½	13½	4	87
3	H. Cant, Kimba ...	Waratah	29	23	17½	13½	4	87
5	E. J. Beinke, Kimba.	Waratah	27	24	17½	14	4	86½
6	Lienert Bros., Buckleboo	Felix	25	23½	17½	13½	3½	83
7	R. G. Hall, Kimba ..	Gluyas	23	23½	18½	13½	4	82½
8	F. and G. Parsons, Kimba	Sword	22	23½	19	13½	3½	81½
8	A. H. Lienert, Buckleboo	Waratah	25	22½	17	13½	3½	81½
10	F. R. and L. O. Ferry, Kimba	Waratah	21	23	18	13½	3½	79
10	A. C. Wako, Kimba .	Ranee	21	23	18½	13½	3	79

MID-NORTHERN.

Judged by E. L. ORCHARD, R.D.A. (District Agricultural Instructor).

1	A. Maitland, Rochester	Nabawa	33.5	23.5	19.5	14	4.5	95
2	M. Smart & Son, Gulnare	Ford and Sword	33.5	22	19	14	4.5	93
3	Chapman Bros., Hoyleton	Ford	33	23	20	14	2.5	92.5
4	M. Smart & Son, Gulnare	Aussie	34	22	19	12	5	92'
4	Chapman Bros., Hoyleton	Sword	33	22	19	14	4	92'
4	H. S. and O. S. Freeman, Koolunga	Sword	32	24	18.5	14	3.5	92'
4	P. J. Saunders, Hoyleton	Sword	33	21	20	14	4	92
8	A. Maitland, Rochester	Ranee	34	23.5	18	11	5	91.5
9	James Hay, Yacka	Sword and Nabawa	32.5	23	18	13	4.5	91
10	J. and D. Teakle, Gulnare	Sword	31	23	18	14	4	90
10	Higgins Bros., Georgetown	Ranee and Free Gallipoli	33	22	18	14	3	90
10	Sadow Bros., Hoyleton	Ford	32	23	19	13	3	90
10	F. J. Pedlar, Koolunga	Sword	30	22.5	20	14	3.5	90
14	F. J. Pedlar, Koolunga	Ranee and Carmichael's Eclipse	29	23	18.5	14	3.5	88
15	Spencer Bros., Koolunga	Sword	31	24	16	13.5	3	87.5
15	Spencer Bros., Koolunga	Nabawa	31	20	19	13.5	4	87.5
17	H. J. Crouch, Crystal Brook	Ford, Sword, and Nabawa	29	23	17	13	3.5	85.5
18	Button Bros., Koolunga	Ford and Dan .	28	22	18	13	3	84
19	Button Bros., Koolunga	Aussie	28	21	17	14	3	83

RESULT OF WHEAT CROP COMPETITIONS—continued.

Position.	Name and Address.	Variety.	Ap- parent Yield.	Free- dom from Weeds.	Free- dom from Disease.	True- ness to Type.	Even- ness of Crop.	Totals
		Maxima—	35	25	20	15	5	100

ALBERT.

Judged by R. L. GRIFFITHS, D.D.A. (District Agricultural Instructor).

1	J. F. Andriske, Galga	Late Gluyas ..	27½	23½	19½	14	4	88½
2	A. G. W. Grant, Sandalwood	Gallipoli	27½	23	16½	14	4	85
3	T. H. Stott, Mindarie	Rajah	24	21½	18½	14	4	82
4	A. E. Carslake, Kunlara	Gallipoli	25	21½	17	14	3½	81
4	C. H. Russell, Halidon	Ranee	23	21½	19	13½	4	81
6	G. H. Sutherland, Copeville	Canberra and Gallipoli	21½	22	18½	14½	3½	80
7	T. C. Stott, Mindarie	Rajah	23	21	18	14	3½	79½
7	H. Bird, Halidon ...	Nabawa	22	21½	18½	14	3½	79½
9	J. W. G. Mann, Mindarie	Ranee 4H and Gallipoli	18	21	17	14½	3	73½

NORTHERN.

Judged by E. L. ORCHARD, R.D.A. (District Agricultural Instructor).

1	W. F. Wurst, Laura	Nabawa	34	24.5	18	14	4.5	95
2	F. H. Symonds, Caltowie	Sword	31.5	24	18.5	13	3.5	90.5
3	P. Curtin, Beetaloo Valley	Sword	34	23	15.5	13	4	89.5
4	R. A. Rundle, Gladstone	Ford and Sword	32	21	18.5	14	3.5	89
5	W. L. Staker, Gladstone	Nabawa	33	19.5	19	13	4	88.5
6	W. S. Bennett, Gladstone	Ford	31	22	19	13	3	88
7	W. H. Adams & Sons, Caltowie	Waratah	30.5	22.5	18	13	3.5	87.5
7	A. L. Borrett, Laura	Nabawa	32.5	21	17	13	4	87.5
7	W. M. Neate, Caltowie	Sword	30	23	18	14	2.5	87.5
10	W. H. Adams & Sons, Caltowie	Sword	32	21	17	13	4	87
10	G. W. Smith, Laura	Waratah	30	22	19	13	3	87
10	J. W. Prior, Gladstone	Nabawa	32	22	18	13	2	87
13	W. D. Pearce, Gladstone	Sword and Ford	29.5	22	18	14	3	86.5
14	A. D. Bray, Belalie North	Nabawa	29	22	18	14	3	86
14	Blesing Bros., Gladstone	Nabawa	29	22	19	14	2	86
16	R. A. Rundle, Gladstone	Ranee and Nabawa	33	20	18	11	3	85
17	H. K. Moore, Jamestown	Wannon and Sepoy	29	23	18	12	2.5	84.5
18	S. K. Moore, Jamestown	Ranee	29	21	19	12	3	84
18	H. C. Jaeschke, Wirrabara	Nabawa	28	22	19	13	2	84
18	C. H. Hollitt, Gladstone	Sword	29	22	17	13	3	84

RESULT OF WHEAT CROP COMPETITIONS—continued.

Position.	Name and Address.	Variety.	Ap- parent Yield.	Free- dom from Weeds.	Free- dom from Disease.	True- ness to Type.	Even- ness of Crop.	Total
		Maxima—	35	25	20	15	5	100

ALFRED.

Judged by R. L. GRIFFITHS, D.D.A. (District Agricultural Instructor).

1	A. C. Webb (1), Paruna	Sword and Nabawa	30	23	19	14	4½	90½
2	A. C. Webb (2), Paruna	Nabawa	29	22½	19½	14	4½	89½
3	A. C. Webb (3), Paruna	Ranee 4H	27½	23½	18½	14½	5	89
4	W. Paull & Sons, Alawoona (1)	Gallipoli	27½	21	19	14	3½	85
5	A. A. Patterson, Paruna	Sultan	25	24	17½	14½	3½	84½
6	G. J. Zimmermann, Meribah	Nabawa	23	23	19½	14	4½	84
6	A. A. Marsh, Meribah	Felix and Sword	24	23	19	14	4	84
6	E. M. Edwards, Paruna	Ranee 4H	25	22½	19	14½	3	84
9	W. Paull & Sons, Alawoona (2)	Nabawa	25	22	19	14½	3	83½
10	W. T. Gilbertson, Malpas	Ranee 4H	25	21½	19	14½	3	83
11	R. Edwin Thiele, Loxton	Snowy White..	23	23½	18	14	4	82½
11	J. C. Auricht, Taldra	Gallipoli	24	23	17½	14	4	82½
11	M. A. Zeppel, Malpas	Ford	24	21½	18½	14	4½	82½
14	G. E. Hyde, Paruna	Ranee	23	22	19	13	4	81
15	F. A. Hondow, Paruna	Gallipoli	22½	22	18	14	3½	80
16	J. C. Auricht, Taldra (2)	Nabawa and South African	18	22½	19	13½	4	77
17	A. G. Fetch, Meribah	Nabawa and Gallipoli	20½	20	18	14	3½	76
18	E. Gregory, Paruna	Waratah	19	22	16	14	3½	74½
19	A. E. Reichstein, Paruna	Silver Bart ...	18	19	16	14	3½	70½

NORTHERN YORKE PENINSULA.

Judged by W. C. JOHNSTON, R.D.A. (District Agricultural Instructor).

1	L. G. Northey, Kadina	Sword	34	22	19	13.5	3.5	92
2	F. W. Pontifex, Paskeville	Merriden	35	21	19	12	4	91
3	C. Rodda, Thrington	Sword	31	23	18.5	14	3.5	90
4	F. P. Price, Paskeville	Sword	29	24	19	13	3.5	88.5
5	G. E. Meier, Paskeville	Sword	28	23	19	14	3.5	87.5
6	J. H. Busenschutt, Paskeville	Waratah	30	21	18.5	13	3.5	86
7	R. M. Yelland, Cunliffe	Daphne	27	23	18.5	13.5	3.5	85.5
8	G. E. Rodda, Thrington	Sword	26	23	19	13	3	84
9	M. Lamming, Paskeville	Aussie	26	22.5	19	12	3.5	83
10	M. R. Wright, Cunliffe	Ford	27	21	19	12	3.5	82.5
11	R. S. Busenschutt, Paskeville	Sword	25	22	19	13	3	82
11	H. M. Meier, Paskeville	Waratah	26	22	18	13	3	82

RESULT OF WHEAT CROP COMPETITIONS—continued.

Position.	Name and Address.	Variety.	Ap- parent Yield.	Free- dom from Weeds.	Free- dom from Disease.	Ture- ness to Type.	Even- ness of Crop.	Total
		Maxima—	35	25	20	15	5	100

NORTHERN YORKE PENINSULA—continued.

11	T. Rodda, Thrington	Waratah	26	21	18	14	3	82
14	G. R. Yelland, Cunliffe	Ranee	24	23.5	18	12	4	81.5
15	T. Stanway, Boor's Plains	Waratah	25	21	18.5	13	3.5	81
15	E. L. Yelland, Cunliffe	Waratah	23	23	18	14	3	81
17	N. J. Cross, Boor's Plains	Waratah	23	21.5	18	13	3	78.5
18	N. J. Cross, Boor's Plains	King's White .	20	20	18	14	3	75
19	A. Reid, Thrington	Sword, Ranee, and Waratah	20	23	17.5	11	3	74.5
20	J. L. Bussenschutt, Paskeville	Ford	22	23	12	12	3	72

CENTRAL.

Judged by W. C. JOHNSTON, R.D.A. (District Agricultural Instructor).

1	T. W. Day, Reeves Plain	Sword	35	22.5	18	13	3.5	92
2	L. W. George, Wasleys	Sword	33	23	18	13	4	91
3	E. W. L. Dawkins and S. E. Aunger, Gawler River	Sword and Ford	33	23	17.5	13.5	3.5	90.5
4	S. E. Dridan & Sons, Roseworthy	Sword	31	23	18	14	4	90
5	J. Eden, Sheoak Log	Sword and Waratah	31	23	19	13	3	89
6	R. Perry, No. 2, Wasleys	Ford	32	22	19	12	3.5	88.5
7	W. K. Oliver, Wasleys	Nabawa	28	23.5	18.5	14	4	88
7	R. L. Lines, Wasleys	Sword	28	24	19	13	4	88
9	R. Perry, No. 1, Wasleys	Sword	31	21	19	13	3	87
10	R. Perry, No. 3, Wasleys	Sword	29	22	19	13	3.5	86.5
11	E. W. Day, Wasleys.	Sword	27	23	18	14	4	86
12	C. R. and R. P. Currie, Wasleys	Sword	26	23	19	13.5	4	85.5
12	Jones & Nettlebeck, Rosedale	Sword, Nabawa, and Leaks	29	22	18	13.5	3	85.5
12	W. K. Oliver, Wasleys	Ranee	31	21	18	12	3.5	85.5
15	G. D. Everett, Roseworthy	Ford	29	21.5	18	13	3.5	85
16	A. M. Dawkins, Angle Vale	Nawab	25	23	19	14	3	84
17	P. J. Carey, Wasleys	Nawab and Ford	28	23	16	13	3.5	83.5
18	J. H. Dawkins, Gawler River	Sword	27	21	17	14	3.5	82.5
19	M. H. Richter, Reeves Plain	Sword and Nabawa	26	22	17	13	3.5	81.5
20	J. P. Carrig, Hamley Bridge	Sword	25	23	16	14	3	81
21	A. Stott, Tempers	Sword	26	21	16	14	3.5	80.5
21	A. W. Roediger, Gawler	Sword, Florence, and King's White	26	20	18	13.5	3	80.5
21	C. S. Nankivell, Gawler River	Sword	26	21	17.5	12	4	80.5

RESULTS OF WHEAT CROP COMPETITIONS—continued.

Position.	Name and Address.	Variety.	Ap- parent Yield.	Free- dom from Weeds.	Free- dom from Disease.	True- ness to Type.	Even- ness of Crop.	Total.
		Maxima—	35	45	20	15	5	100

CHANDOS.

Judged by R. L. GRIFFITHS, D.D.A. (District Agricultural Instructor).

1	A. J. Beelitz, Parrakie	Waratah	32	23	18½	14½	4	92
2	E. S. Ross, Parrakie	Waratah	32	23	18½	14½	3½	91½
3	P. Ross, Parrakie	Gallipoli	32	23	18	14	4	91
4	W. J. Ross, Parrakie	Gallipoli	31	23	18½	14	4	90½
5	C. H. E. Hentschke, Lameroo	Gallipoli	30	23	8	14	4	89
6	J. Hamilton, Lameroo	Rajah	31	22	19	13	3½	88½
7	A. Afford, Parrakie	Gallipoli	28½	22	18	14½	3½	86½
8	H. F. Johnson, Parilla	Ranee and Caliph	27½	21½	19	13½	3½	85
9	Mattiske Bros., Pinnaroo	Gallipoli	26	22	18½	14	4	84½
10	C. Schumacher, Parilla	Ranee	26	23	17½	13½	4	84
10	J. H. and C. H. Spratt, Lameroo	Gallipoli	28	21½	16½	14½	3½	84
12	Young & Blacksell, Pinnaroo	Ranee 4H	25	21½	19	14½	3	83
12	Young & McInerney, Pinnaroo	Waratah	25	22½	17½	14½	3½	83
12	C. E. Koch, Lameroo	Sultan	25	22½	17	14½	4	83
15	J. S. Churches & Sons, Parilla	Ranee	22	23½	19	14	4	82½
16	H. G. Fewings, Pinnaroo	Gallipoli	24	21½	18½	14	4	82
16	J. L. Koch, Lameroo	Waratah	22	23½	18½	14½	3½	82
18	C. & L. Fischer, Pinnaroo	Bobin	23	21	19	14½	4	81½
18	A. G. Johnston, Pinnaroo	Gallipoli	24	21	18½	14	4	81½
20	A. J. A. Koch, Lameroo	Sepoy and Bencubbin	25	20½	19	13½	3	81
21	H. S. Angel, Pinnaroo	Bobin	22	21	18½	14½	4	80
22	C. R. Fuss, Lameroo	Felix	24	21½	16	13½	4	79
23	W. A. Kelly, Pinnaroo	Gallipoli	22	21	18	13½	4	78½
23	R. J. Billing, Pinnaroo	Gallipoli	23	20½	18½	14	2½	78½
25	Foale & Sons, Parilla	Gallipoli	21	23	16	14	4	78
26	A. M. McDonald, Geranium	Currawa	22	22	16	13	3½	76½
27	L. S. Prouse, Geranium	Nabawa	20	23½	17	13½	2	76
28	L. Prentice, Lameroo	Gallipoli	24	20	16	12	3	75

CHANDOS—JUNIOR.

1	A. Hutchens, Parilla	Gallipoli	28½	21½	17½	14	3½	85
2	A. G. Johnston, Pinnaroo	Gallipoli	24	21	18½	14	4	81½
3	M. Neindorf, Parilla	Bena	24	21	18	14	3½	80½
4	A. W. Blacksell, Pinnaroo	Gallipoli	23	20	18½	14	3½	79
5	C. Mattiske, Pinnaroo	Gallipoli	19	21	18½	14	3	75½

RESULTS OF WHEAT CROP COMPETITIONS—continued.

Position.	Name and Address.	Variety.	Ap- parent Yield.	Free- dom from Weeds.	Free- dom from Disease.	True- ness to Type.	Even- ness of Crop.	Total
		Maxima—	35	25	20	15	5	100

WESTERN.

Judged by E. L. ORCHARD, R.D.A. (District Agricultural Instructor).

1	E. T. Franks, Port Pirie	Nabawa	28	22	20	13	4	87
2	F. Jose, Nelshaby	Nabawa	27	22	20	13	4	86
3	E. J. O'Shaughnessy, Wandearah East	Nabawa	27.5	21	19	13	3.5	84
4	H. Williams, Port Pirie	Nabawa	26	20	20	14	3.5	83.5
5	L. C. Roberts, Port Pirie	Currawa	26	22	19	14	2	83
6	A. L. O'Shaughnessy, Wandearah East	Nabawa	27	20	19	13	3.5	82.5
7	J. H. Franks, Port Pirie	Nabawa	27	22	16	13	3	81
8	A. L. O'Shaughnessy, Wandearah East	Florence	28	22	15	12	3.5	80.5
9	J. S. O'Shaughnessy, Wandearah East	Nabawa	26	20	19	13	2	80

SOUTHERN.

Judged by R. HILL, R.D.A. (District Agricultural Instructor).

1	S. C. Crawford, Strathalbyn	Ford	35	18	18	12	4.5	87.5
2	E. T. and L. Jaensch, Hartley	Nabawa	27	23	19	13	4	86
3	Frahn Bros., Monarto	Currawa	27	21	18	13	4	83
4	A. B. Jaensch, Hartley	Nugget	28	23	15	12.5	4	82.5
5	Mrs. A. E. Hartmann, Monarto South	Ranee	31	20	17	10	4	82
6	H. H. Cross, Woodchester	Ford and Sword	28	21	17	12	3.5	81.5
6	S. C. Crawford, Strathalbyn	Ford	29	20	17	12	3.5	81.5
8	A. B. Jaensch, Hartley	Nabawa	26	20	18	13.5	3	80.5
9	E. E. Liebelt, Monarto South	Ranee and Nabawa	23	22	18	13.5	3.75	80.2
10	L. M. Thiele, Monarto	Nabawa	19	23	20	14	4	80
11	Phillips Bros., Woodchester	Nugget	25	21	16	13	4.5	79.5
12	C. Brook, Woodchester	Nabawa and Nugget	26	18	18	13.5	3.75	79.2
13	C. F. Altmann, Monarto South	Sultan	24	21	17	13	4	79
13	A. P. Braendler, Monarto South	Nabawa and Gallipoli	25	22	16	12	4	79
15	Frahn Bros., Monarto	Nabawa	20	23	18	13.5	4	78.5
16	G. Cross, Belvidere..	Nabawa	23	21	18	13	3	78
17	P. B. Frahn, Monarto	Nugget	23	23	15	13	3.5	77.5
18	E. H. Pearson & Sons, Brinkley	Ford	20	23	17	12	4	76
18	H. H. Cross, Woodchester	Nugget	22	21	15	14	4	76

RESULTS OF WHEAT CROP COMPETITIONS—continued.

Position.	Name and Address.	Variety. Maxima—	Ap- parent Yield. 35	Free- dom from Weeds. 25	Free- dom from Disease. 20	True- ness to Type. 15	Even- ness of Crop. 5	Total. 100
SOUTHERN DISTRICT—continued.								
20	C. F. Altmann, Monarto South	Nabawa	21	20	17	14	3.5	75.5
20	E. T. and L. Jaensch, Hartley	Nabawa and Bencubbin	21	20	19	12	3.5	75.5
22	Thomas Bros., Monarto South	Gallipoli	22	21	16	12	4	75
22	W. H. Schubert, Murray Bridge	Ford and Nabawa	20	22	17	12.5	3.5	75
24	Thomas Bros., Monarto South	Nabawa	20	21	18	12	3.5	74.5
24	E. T. and L. Jaensch, Hartley	Gallipoli and Nugget	24	21	14	12.5	3	74.5
24	Thomas Bros., Monarto South	Sword	20	21	18	12.5	3	74.5
27	G. Patterson, Monarto	Waratah and Nabawa	20	21	17	12.5	3.5	74
28	J. Hudd, Hartley	Waratah and Nabawa	20	21	16	12.5	3.5	73
28	C. T. Griffen, Strathalbyn	Waratah and Currawa	25	18	14	12	4	73
30	E. J. Jaensch, Hartley	Daphne	20	20	18	11	3.75	72.75
31	A. R. Strauss, Monarto South	Currawa	19	20	18	12	3.5	72.5
32	J. Hartmann, Monarto South	Gluyas and Sultan	20	21	16	11.5	3.5	72
33	J. F. C. Paech, Callington	Nabawa	16	21	17	14	3	71
34	C. A. Whittlesea, Langhorne's Creek	Gluyas and Gallipoli	17	20	18	12	3.5	70.5

LE HUNTE.

Judged by W. H. BROWNIGG, H.D.A. (District Agricultural Instructor).

1	E. H. Edmonds, Pygery	Nabawa	33	23	17	13	4	90
2	T. Knight, Wudinna.	Golden Drop ..	31	19	17	13½	4	84½
3	W. P. Bartley, Wudinna	Nabawa	28	21	16	14½	3½	83
4	S. C. Billingham, Minnipa	Ford	31	18	16	13	4	82
5	A. Franklin, Yaninee	Waratah	28	20	16	13	4	81
5	T. L. Nottle, Yaninee	Ford	29	20	16	13	3	81
7	G. A. R. Scholz, Pin- bong	Waratah	28	20	16	13	3½	80½
8	B. C. Black, Minnipa	Early Gluyas .	27	19	17	13	3½	79½
9	A. Franklin, Yaninee	Late Gluyas ..	26	21	16	12½	3	78½
10	V. Kitto, Minnipa ..	Caliph and Late Gluyas	27	20	14	13	3½	77½
10	G. A. R. Scholz, Pin- bong	Merriden	25	20	17	12½	3	77½
12	G. Williams, Minnipa	Nabawa	25	16	15	12½	3	71½
13	P. A. Lear, Yaninee	Canberra, Merriden, and Early Gluyas	21	18	15½	13	3½	71
14	F. L. Johnson, Wudinna	Nabawa	22	17	14	13	3	69
15	A. W. Christian, Yaninee	Withdrawn	—	—	—	—	—	—

RESULTS OF WHEAT CROP COMPETITIONS—continued.

Position.	Name and Address.	Variety. Maxima—	Ap- parent Yield. 35	Free- dom from Weeds. 25	Free- dom from Disease. 20	True- ness to Type. 15	Even- ness of Crop. 5	Total. 100.
MIDLAND.								
Judged by W. C. JOHNSTON, R.D.A. (District Agricultural Instructor).								
1	H. Michael, Hilltown	Dan	33	22.5	19	13	4.5	92
2	O. V. Roberts, Spalding	Dan	35	22	17.5	13	4	91.5
3	S. Garrard, Farrell's Flat	Gallipoli	32	23.5	18	13.5	4	91
4	A. S. Woods, Mintaro	Waratah	33	23	18	13.5	3	90.5
5	W. H. Brown, Alma	Sword	30	24	19	14	3	90
6	R. and L. Blatchford, Mintaro	Sword	30.5	23.5	18	14	3.5	89.5
6	O. V. Roberts, Spalding	Gallipoli and Dan	34	21	18	13	3.5	89.5
8	H. Schunke, Manoora	Gallipoli	30.5	22	18.5	14	4	89
8	P. McD. Smyth, Salter's Springs	Ford	32	23	18	13	3	89
8	G. Miller, Farrell's Flat	Bena	32	22.5	18	13.5	3	89
11	H. J. Torr, Farrell's Flat	Ranee	30.5	23	19	12.5	3.5	88.5
12	F. D. Lake, Owen	Sword	28	23	19	14	4	88
13	L. J. Harvey, Hilltown	Turvey	28.5	24	18	13	4	87.5
13	A. J. Jones, Manoora	Gallipoli	29.5	23	18.5	13.5	3	87.5
13	F. Mahoney, Farrell's Flat	Clarence	31.5	22	18.5	12.5	3	87.5
13	P. McD. Smyth, Salter's Springs	Sword and Ford	30.5	23	17	13.5	3.5	87.5
13	G. W. Woods, Mintaro	Gallipoli	29.5	23	18	14	3	87.5
18	W. Parham, Hamilton	Nugget	27	24	18.5	14	3.5	87
18	J. Ross, Mintaro ...	Waratah	29.5	23	18.5	13	3	87
18	R. F. Thomas, Hallett	Gallipoli	28	23.5	18	13.5	4	87
18	L. Martin, Farrell's Flat	Mogul and Sword	27.5	23	19	14	3.5	87
22	J. L. C. Freebairn, Alma	Florence	29	21.5	19	13	4	86.5
22	W. G. Miller, Hallett	Gallipoli	29.5	22.5	18	13	3.5	86.5
22	E. J. Williams, Tothill's Creek	Ranee and Gallipoli	29	23	18	13	3.5	86.5
22	S. H. Kelly, Riverton	Sword	31.5	21	18	12.5	3.5	86.5
26	Frost Bros., Manoora	Gallipoli	28	23	18	14	3	86
26	M. E. Glynn, Riverton	Waratah	28	23	18	14	3	86
26	W. H. R. Branson, Alma	Sword	28	24	17	13.5	3.5	86
26	C. H. J. Behn, Riverton	Ranee and Waratah	29.5	23	18	12.5	3	86
26	W. R. Durdin, Buchanan	Waratah, Sultan and Sword	27	23	18.5	14	3.5	86
26	A. E. Crossing, Farrell's Flat	Gallipoli	29.5	22	18	13.5	3	86
32	M. E. Glynn, Riverton	Sword	26.5	24	19	13	3	85.5
32	L. J. Harvey, Hilltown	Dan	27.5	23	18.5	13	3.5	85.5
32	F. Coleman, Saddle- worth	Ranee, Waratah, and Tuella x Ford	28	23.5	18	13	3	85.5

RESULTS OF WHEAT CROP COMPETITIONS—continued.

Position.	Name and Address.	Variety.	Ap- parent Yield.	Free- dom from Weeds.	Free- dom from Disease.	True- ness to Type.	Even- ness of Crop.	Total.
		Maxima—	35	25	20	15	5	100

MIDLAND—continued.

32	Molineux Bros., Tarlee	Felix	27	22.5	19	14	3	85.5
36	D. G. Kelly, Tarlee	Nabawa	27.5	22	18	14	3.5	85
36	G. Hazel, Kapunda..	Nugget, Rancee, Rancee 4H, and Gallipoli	26	23	18.5	14	3.5	86
38	W. P. Roediger, Buchanan	Dan	28.5	21	17.5	14	3.5	84.5
38	G. S. Ashby, Farrell's Flat	Nabawa	27.5	22	18.5	13	3.5	84.5
40	J. L. C. Freebairn, Alma	Waratah	28	21	19	12	4	84
40	J. McInerney, Riverton	Waratah	28	21.5	17.5	14	3	84
40	J. Ross, Mintaro ...	Sword	27	22	17.5	14	3.5	84
40	W. S. Kelly, Giles Corner	Waratah	26.5	21	19	14	3.5	84
40	Reg Durdin, Buchanan	Sultan and Sword	25	23	18	14	4	84
40	F. Coleman, Saddle- worth	Nabawa	25	23	19	13	4	84
46	L. V. Bell, Marrabel .	Rancee	25.5	23	19	12.5	3.5	83.5
46	C. J. Lake, Owen ...	Sword	26.5	22	18	13.5	3.5	83.5
48	A. L. Sandow, Auburn	Rancee	27.5	22	18	12.5	3	83
48	L. W. Frost, Saddle- worth	Dan	26	23	17	14	3	83
48	D. L. Clarke, Tarlee .	Nabawa and Sword	26	23	18	13	3	83
48	A. T. Hill, Tarlee ...	Sword	25	23.5	18	13.5	3	83
52	W. Kirk, Kapunda .	Rajah, Dan, and Ford	26.5	22	18	12	4	82.5
52	R. H. Hughes, Kapunda	Rancee and Gallipoli	28	20	18	12.5	4	82.5
54	M. E. Saint, Saddle- worth	Waratah	27	21	18	13	3	82
55	W. J. Armstrong, Buchanan	Rancee, Sword, and Gallipoli	25	21	18	13	3	80
56	T. Y. Freebairn, Alma	Waratah	23	23	17	13	3.5	79.5
—	John Kelly and M. Buckley	Withdrawn						

SOUTHERN YORKE PENINSULA.

Judged by R. HILL, R.D.A. (District Agricultural Instructor).

1	W. H. and J. Alder- man, Brentwood	Ford	34	20	18	13	4.75	89.75
2	W. L. Boundy, Min- laton	Ford	34	21	18	12	4	89
3	Miss B. and I. Fletcher, Minlaton	Ford	35	19	17	12	4.5	87.5
4	J. J. Honner, Brent- wood	Ford	35	18	19	11	4	87
5	A. E. Brechin, Curra- mulka	Nabawa and Ford	33	19	18	11	4	85
6	L. W. Williams, Min- laton	Nabawa	32	19	17	12.5	3.5	84
7	Miss B. and I. Fletcher, Minlaton	Gherka	31	20	15	12	4	82

RESULTS OF WHEAT CROP COMPETITIONS—continued.

Position.	Name and Address.	Variety.	Ap- parent Yield.	Free- dom from Weeds.	Free- dom from Disease.	True- ness to Type.	Even- ness of Crop.	Total.
		Maxima—	35	25	20	15	5	100

MID-YORKE PENINSULA.

Judged by R. HILL, R.D.A. (District Agricultural Instructor).

1	G. F. Pearce, Mait- land	Ford	35	21	18	13.5	4.5	92
2	J. S. Henderson, Artherton	Ford	34	22	18	13	4	91
3	O. H. Heinrich, South Kilkerran	Ford	28	22	19	13	4	86
4	E. G. Brown, Mait- land	Sword	35	19	15	12	4	85
5	H. O. Linke, South Kilkerran	Ford	33	20	14	13	4	84
6	E. F. Heinrich, South Kilkerran	Sword	26	19	19	13	4.5	81.5
6	Stan Heinrich, South Kilkerran	Geeralying	25	19	19	14	4.5	81.5
8	H. C. Schrapel, South Kilkerran	Ford	25	21	18	13	4	81
9	R. E. Hasting, South Kilkerran	Dan	25	20	16	13	3.5	77.5
10	W. A. Heinrich, South Kilkerran	Geeralying	20	19	20	12.5	4.5	76
10	E. W. Arnold, South Kilkerran	Ford and Free Gallipoli	32	19	10	11.5	3.5	76

FLINDERS.

Judged by H. D. ADAMS, R.D.A. (District Agricultural Instructor).

1	R. Kain, Yeelanna ..	Waratah	34	24	18½	14	4	94½
2	R. R. Wilson, Yee- lanna	Ford	33	24	19	13½	4	93½
3	Smith Bros., Yee- lanna	Ford	35	22½	18½	13	4	93
4	W. Watkins, Yee- lanna	Ford	32	24	19	14	3½	92½
5	R. Kain, Yeelanna ..	Gallipoli	32	23½	19	14	3½	92
6	W. Modra, Yeelanna.	Dan,	32	23½	19	13½	3½	91½
7	M. Barraud, Lipson .	Sword	31	23½	19	13½	4	91
7	Nankivell Estate, Lipson	Nabawa and Sword	31	24	18½	13½	4	91
7	W. Modra, Yeelanna	Ford	31	24	19	13	4	91
10	C. Octoman, Lipson .	Gluyas	33	23	18	13	3½	90½
11	Smith Bros., Yee- lanna	Ford	32	23	18	13	3½	89½
12	H. Glover, Yeelanna.	Gurka and Gallipoli	28	23	18	13½	4	86½
13	W. Procter, Yeelanna	Ford	23	23	17½	13	3½	80
14	R. Blacker, Stokes ..	Golden Drop ..	18	23	18½	14	3½	77

RESULTS OF WHEAT CROP COMPETITIONS—continued.

Position.	Name and Address.	Variety. Maxima—	Ap- parent Yield. 35	Free- dom from Weeds. 25	Free- dom from Disease. 20	True- ness to Type. 15	Even- ness of Crop. 5	Total. 100
FAR NORTHERN.								
Judged by E. L. ORCHARD, R.D.A. (District Agricultural Instructor).								
1	E. H. Hampel, Terka	Onas and Currawa	31.5	23	17	12	4	87.5
2	R. C. Llewelyn, Morchard	Ranee	28	22	19	13	3.5	85.5
3	E. H. Schulz, Terka	Nabawa and Onas	30	22	17.5	13	2	84.5
4	J. G. Crocker, Wepowie	Ranee	27	22	19	13	2	83
5	J. L. Lee, Pekina ..	Ranee	28	21	19	12	2.5	82.5
6	H. G. Kupke, Morchard	Nabawa	27	22	18	13	2	82
6	T. F. Orrrock, Wepowie	Ranee	26	22	19	13	2	82
8	E. W. E. Paech, Orroroo	Ranee	26	21	19	13	2.5	81.5
9	W. G. Gregurke, Wepowie	Felix and Waratah	27	21	18	13	2	81
10	J. F. Burns, Orroroo	Ranee	26.5	20	19	13	2	80.5
11	D. J. Crocker, Orroroo	Ranee and Waratah	26	21	18	13	2	80

PASTURE COMPETITION.

ADELAIDE HILLS DISTRICT.

[Judged by R. C. SCOTT, R.D.A., Superintendent Experimental Work for the S.A. Committee of the Australian Dairy Council.]

Competitor.	Position.	Density of Sward. 30	Quality of Pas- ture. 25	Free- dom from Useless Weeds. 20	General Manage- ment. 15	Area Sub- mitted. 10	Total. 100
H. A. Woolley, Mount Barker Junction	1	25	23	17	15	5	85
Dunleith Pastoral Co., Ashbourne	2	26	24	18	13	2	83
Illowra Estate Ltd., Inman Valley	3	28	23	19	10	1	81
Dunleith Pastoral Co., Ashbourne	4	26	24	17	10	2	79
Illowra Estate Ltd., Inman Valley	5	25	22	19	10	1	77
Illowra Estate Ltd., Inman Valley	6	18	20	18	10	10	76
Illowra Estate Ltd., Inman Valley	7	21	21	18	12	2	74
Illowra Estate Ltd., Inman Valley	8	21	21	17	12	1	72
A. W. Forrest, Springton .	9	21	19	16	13	2	71
W. J. Forrest, Springton .	10	20	17	15	12	6	70
E. J. Helbig, Greenock ..	11	20	17	15	12	3	67

SEED WHEAT FROM CROP COMPETITIONS.

In Wheat Competitions conducted in the undermentioned districts the following competitors exhibited crops which, in the opinion of the judge at the time of inspection, should produce grain suitable for seed purposes:—

Competition. Competitor. Address. Variety.

NORTHERN YORKE PENINSULA—

L. G. Northey, Kadina—Sword.
C. Rodda, Thrington—Sword.
F. P. Price, Paskeville—Sword.
G. E. Meier, Paskeville—Sword and King's White.
R. M. Yelland, Cunliffe—Daphne.
G. E. Rodda, Thrington—Sword.
R. S. Bussenschutt, Paskeville—Sword.
E. L. Yelland, Cunliffe—Waratah.
Yelland Bros., Cunliffe—Sword.

CENTRAL—

T. W. Day, Reeves Plain—Sword.
E. W. Day, Reeves Plain—Sword.
L. W. George, Wasleys—Sword and Ford.
B. Perry, Wasleys—Sword.
R. L. Lines, Wasleys—Sword.
C. R. and R. P. Currie, Wasleys—Sword.
W. K. Oliver, Wasleys—Nabawa.
A. M. Dawkins, Angle Vale—Nawab.
A. W. Roediger, Gawler—Sword.
J. H. Dawkins, Gawler River—Sword.

BALAKLAVA—

J. D. Campbell, Baraba—Sword and Ford.
Harkness Bros., Owen—Sword.
J. A. Campbell, Stockyard Creek—Sword and Ford.
D. J. Wilson, Stockyard Creek—Ford.
L. C. Mills, Balaklava—Sword.
B. P. Anderson, Halbury—Sword.

*ALFRED—

A. C. Webb, Paruna—Ranee 4H, Sword.
A. A. Patterson, Paruna—Sultan.
E. M. Edwards, Paruna—Ranee 4H.
A. A. Marsh, Meribah—Sword.
W. Paull & Sons, Alawoona—Nabawa.

*ALBERT—

G. H. Sutherland, Copeville—Canberra.

BUXTON—

E. J. Beinke, Kimba—Waratah.
F. Newman, Kimba—Sword.
C. G. and G. W. Cant, Kimba—Sword.

JERVOIS—

D. C. McCallum, Rudall—Waratah.
J. C. Kobelt & Son, Darke's Peak—Waratah.

WESTERN—

L. O. Roberts, Port Pirie—Currawa.

LE HUNTE—

W. P. Bartley, Wudinna—Nabawa.

MID-NORTHERN—

A. Maitland, Rochester—Nabawa.
F. J. Pedler, Koolunga—Ranee, Sword, Carmichael's Eclipse, Mogul.
Button Bros., Koolunga—Aussie, Ford, Nabawa.
H. S. and O. S. Freeman, Koolunga—Sword.
P. J. Saunders, Hoyleton—Sword.
Chapman Bros., Hoyleton—Sword, Ford.
Jas. Hay, Yacka—Sword.
J. and D. Teakle, Gulnare—Sword.
Higgins Bros., Georgetown—Free Gallipoli.
M. Smart and Sons, Gulnare—Sword.

Competition. Competitor. Address. Variety.

NORTHERN—

W. F. Wurst, Laura—Nabawa.
 W. D. Pearce, Gladstone—Sword.
 J. W. Prior, Gladstone—Nabawa.
 B. A. Bundle, Gladstone—Ford, Sword.
 H. C. Jaeschke, Wirrabara—Nabawa.
 W. M. Neate, Caltowie—Sword.
 F. H. Symonds, Caltowie—Sword.
 W. H. Adams and Sons, Caltowie—Sword, Waratah.
 Blessing Bros., Gladstone—Nabawa.
 W. S. Bennett, Gladstone—Ford.

FAR NORTH—

T. F. Orrock, Wepowie—Ranee.
 J. G. Crocker, Wepowie—Ranee.
 W. G. Gregurke, Wepowie—Felix.
 D. J. Crocker, Box 56, Orroroo—Ranee.
 E. H. Hampel, Terka—Onas.

***CHANDOS—**

A. J. Beelitz, Parrakie—Waratah.
 C. and L. Fischer, Pinnaroo—Bobin.
 H. S. Angel, Pinnaroo—Bobin.
 L. M. Symon, Pinnaroo—Ranee 4H.
 H. L. Badman, Pinnaroo—Sword.
 Young and Blacksell, Pinnaroo—Ranee 4H.
 Young and McInerney, Pinnaroo—Waratah.
 J. H. and C. H. Spratt, Lameroo—Gallipoli.
 A. J. A. Koch, Lameroo—Bencubbin.
 C. E. Koch, Lameroo—Sultan.
 J. L. Koch, Lameroo—Waratah.

MID-YORKE PENINSULA—

G. F. Pearce, Maitland—Ford.
 S. Heinrich, South Kilkerran—Gerralying.
 H. C. Schrapel, South Kilkerran—Ford.
 O. H. Heinrich, South Kilkerran—Ford.
 J. S. Henderson, Arthurlton—Ford.

SOUTHERN—

C. Brook, Woodchester—Nugget.
 J. M. Hudd, Hartley—Waratah.
 J. F. C. Paech, Callington—Nabawa.
 C. F. Altmann, Monarto South—Nabawa.
 E. E. Liebelt, Monarto South—Nabawa.
 L. M. Thiele, Monarto—Nabawa.
 Frahn Bros., Monarto—Nabawa.
 E., T., and L. Jaensch, Hartley—Nabawa, Bencubbin.
 A. B. Jaensch, Hartley—Nabawa.

MIDLAND DISTRICT—

F. D. Lake, Owen—Sword and Nabawa.
 W. H. Brown, Alma—Sword and Waratah.
 P. McD. Smyth, Salter's Springs—Sword and Ford.
 D. L. Clarke, Tarlee—Sword.
 A. T. Hill, Tarlee—Sword.
 G. Hazel, Kapunda—Gallipoli, Nugget, Ranee, and Ranee 4H.
 W. Parham, Hamilton—Nugget.
 Reg. Durdin, Buchanan—Sword.
 W. R. Durdin, Buchanan—Sword.
 W. Armstrong, Buchanan—Sword.
 L. V. Bell, Marrabel—Ranee and Clarence.
 L. J. Harvey, Hilltown—Turvey and Dan.
 J. Ross, Mintaro—Waratah and Gallipoli.
 R. and L. Blatchford, Mintaro—Sword.
 G. W. Woods, Mintaro—Gallipoli.
 A. S. Woods, Mintaro—Waratah.
 H. Schunke, Manoora—Gallipoli and Waratah.

MIDLAND DISTRICT—continued—

Competition. Competitor. Address. Variety.

M. E. Glynn, Riverton—Sword.

C. H. J. Behn, Riverton—Ranee, Waratah, Florence, and Baringa.

E. W. Williams, Tothill's Creek—Ranee and Gallipoli.

F. Mahoney, Farrell's Flat—Clarence.

G. Miller, Farrell's Flat—Bena.

L. Martin, Farrell's Flat—Mogul and Sword.

A. E. Crossing, Farrell's Flat—Gallipoli.

S. Garrard, Farrell's Flat—Gallipoli.

F. Coleman, Saddleworth—Nabawa, Waratah, Tuela x Ford, and Gallipoli.

FLINDERS—

R. Kain, Yeelanna—Waratah, Gallipoli.

W. Watkins—Ford.

*Owing to the quick ripening of the crops in these districts the judge states that grading will be necessary in these seed wheat crops to eliminate pinched grain.

OATS.

Mr. E. L. Orchard advises that he inspected oat crops on the farm of Mr. F. J. Pedler, Koolunga, and reported that crops of Guyra and Mulga oats were suitable for seed.

MIDLAND DISTRICT—

G. Hazel, Kapunda—Palestine.

C. H. J. Behn, Riverton—Calcutta Cape and Imbros Island.

F. Coleman, Saddleworth—Calcutta Cape.

EXPERIMENTAL FEEDING TESTS CONDUCTED AT PARAFIELD POULTRY STATION.

[By C. F. ANDERSON, Poultry Expert.]

A series of feeding tests are being conducted at Parafield Poultry Station with a view to ascertaining if suitable foods which are obtainable on the majority of our farms can be satisfactorily fed to poultry. The tests are each of 50 White Leghorn pullets, and commenced on April 1st, 1933.

The feeding is as follows:—

No. 1 Test.—Morning—Wet mash composed of 1 part crushed barley, 2 parts wholemeal (by weight), $\frac{1}{2}$ lb. meat meal, 50 per cent. chaffed greenfeed.

Midday—1oz. wheat per bird.

Night—1oz. wheat per bird.

No. 2 Test.—Dry mash composed of same proportions as No. 1 Test.

Midday—Greenfeed.

Evening—Wheat.

No. 3 Test.—Morning—Wet mash composed of 1 part bran, 2 parts pollard (by weight), $\frac{1}{2}$ lb. meat meal, 50 per cent. chaffed greenfeed.

Midday—1oz. wheat per bird.

Night—1oz. wheat per bird.

No. 4 Test.—Morning—Wet mash composed of 1 part bran, 2 parts wholemeal (by weight), $\frac{1}{2}$ lb. meat meal, 50 per cent. chaffed greenfeed.

Midday—1oz. wheat per bird.

Night—1oz. wheat per bird.

No. 5 Test.—Morning—2ozs. wheat per bird.

Evening—2ozs. wheat per bird.

Greenfeed in season.

The following are the numbers of eggs laid by each pen from April 1st, 1933, to October 31st, 1933.

Definite conclusions, however, cannot be given at this juncture with regard to the various methods of feeding. It is necessary for the tests to complete the 12 months before any satisfactory opinions can be formed.

No. of Test.	No. Eggs Laid		Total Eggs Laid	
	April 1st to	Month November.	April 1st to	November 30th.
No. 1	October 31st. 4,279	685	4,964	
No. 2	3,896	717	4,613	
No. 3	3,569	675	4,244	
No. 4	4,179	757	4,936	
No. 5	1,883	347	2,230	

RED COMB EGG ASSOCIATION.

OFFICIAL EGG-LAYING COMPETITION, 1933-34.

Conducted at the Parafield Poultry Station under the supervision of the Department of Agriculture.

LEADING SCORES TO WEEK ENDED DECEMBER 1st, 1933.—FIRST GRADE EGGS ONLY.

WHITE LEGHORNS.		
<i>Singles—</i>	Eggs Laid.	Bird No.
H. H. Hefford	131	67
A. G. Dawes	128	136
B. Rowe	127	105
<i>Trios—</i>		
W. C. Slape	337	55-57
A. G. Dawes	332	136-138
L. A. G. Pitt	304	91-93
<i>Teams—</i>		
L. A. G. Pitt	572	88-93
B. Rowe	559	103-108
G. C. Gavin	536	58-63
MINORCAS.		
<i>Singles—</i>		
V. F. Gameau	99	139
M. O. and C. A. Roberts	79	143
BLACK ORPINGTONS.		
<i>Singles—</i>		
A. G. Dawes	144	176
N. F. Richardson	141	205
A. G. Dawes	139	202
<i>Trios—</i>		
N. F. Richardson	379	205-207
L. H. Crawford	367	154-156
H. J. Mills	349	187-189
<i>Teams—</i>		
H. J. Mills	688	184-189
L. H. Crawford	618	151-156
L. Darcy	547	157-162
ANY OTHER HEAVY BREEDS.		
<i>Rhode Island Reds.</i>		
<i>Singles—</i>		
H. J. Mills	126	229
H. J. Mills	125	230
W. R. Williams	107	237
<i>Trios—</i>		
H. J. Mills	322	229-231
V. F. Gameau	253	226-228
V. F. Gameau	243	223-225
<i>Teams—</i>		
V. F. Gameau	496	223-228
W. R. Williams	441	232-237

RED COMB EGG ASSOCIATION.

OFFICIAL SINGLE TEST.

EGG-LAYING COMPETITION, 1933-34.

SECTION 1.—WHITE LEGHORNS.

Competitor.	Address.	Score to Month ending November 30th, 1933.			
		Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Totals
E. F. Ashmeade	398, Magill Road, Kensington Park	(1) 84	(2) 58	(3) 114	256
L. R. Badcock	77, Findon Rd., Woodville	(4) 81	(5) 104	(6) 98	283
C. J. C. Burton	Mallala	(7) 83	(8) 83	(9) 61	227
C. J. C. Burton	Mallala	(10) 75	(11) 57	(12) 103	235
W. A. Carter	2, Grosvenor St., Glandore	(13) 85	(14) 117	(15) 53	255
W. A. Carter	2, Grosvenor St., Glandore	(16) 99	(17) 114	(18) 56	269
B. Cooke	Kanmantoo	(19) 117	(20) 107	(21) 79	303
H. F. Cox	Samson Road, Glanville Blocks	(22) 44	(23) *	(24) 24	68
H. F. Cox	Samson Road, Glanville Blocks	(25) 72	(26) 84	(27) 101	257
L. H. Crawford	Military Road, Grange ..	(28) 48	(29) 97	(30) 89	234
L. H. Crawford	Military Road, Grange ..	(31) 66	(32) 8	(33) 63	137
R. C. Crittenden	William Street, Kilkenny North	(34) 107	(35) 115	(36) 42	264
Chas. H. Day	Box 28, Salisbury	(37) 101	(38) 67	(39) 87	255
J. H. Dowling	Glossop	(40) 97	(41) 87	(42) 72	256
T. Duhring	Mallala	(43) 103	(44) 94	(45) 84	281
T. Duhring	Mallala	(46) 84	(47) 40	(48) 65	189
H. Fidge	313, Cross Roads, Clarence Park	(49) 79	(50) 63	(51) 70	212
V. F. Gameau	Findon Road, Woodville .	(52) 61	(53) 89	(54) 86	236
W. Chas. Slape	Magill Road, Magill	(55) 104	(56) 119	(57) 114	337
G. C. Gavin	Salisbury	(58) 84	(59) 67	(60) 98	249
G. C. Gavin	Salisbury	(61) 110	(62) 77	(63) 100	287
H. H. Hefford	McHenry St., Murray Bdge.	(64) 68	(65) 65	(66) 9	142
H. H. Hefford	McHenry Street, Murray Bridge	(67) 131	(68) 88	(69) 48	267
W. H. A. Hodgson ..	Commercial Rd., Salisbury	(70) 89	(71) 100	(72) 62	251
W. H. A. Hodgson ..	Commercial Rd., Salisbury	(73) 77	(74) 83	(75) 54	214
E. A. Lamerton	Cross Roads, Edwardstown	(76) 72	(77) 36	(78) 104	212
C. H. Lines, jun.	Box 75, Gladstone	(79) 97	(80) 115	(81) 35	247
C. H. Lines, jun.	Box 75, Gladstone	(82) 101	(83) 84	(84) 80	265
V. F. Gameau	Findon Road, Woodville .	(85) 84	(86) 81	(87) 33	198
L. A. G. Pitt	24, John Street, Payneham	(88) 107	(89) 82	(90) 79	268
L. A. G. Pitt	24, John Street, Payneham	(91) 103	(92) 112	(93) 89	304
H. A. Rasmussen	Swan Terrace, Ethelton .	(94) 38	(95) 100	(96) 95	233
H. A. Rasmussen	Swan Terrace, Ethelton .	(97) 95	(98) *	(99) 49	144
S. E. Reedman	51, Gilbert Street, Gilberton	(100) 66	(101) 116	(102) 59	241
Bruce Rowe	"St. Kevern," Two Wells	(103) 79	(104) 78	(105) 127	284
Bruce Rowe	"St. Kevern," Two Wells	(106) 89	(107) 100	(108) 86	275
H. J. Stacey	Uraidla	(109) 70	(110) 80	(111) 90	240
H. J. Stacey	Uraidla	(112) 103	(113) 103	(114) 32	238
Thomas & Elson ...	53, Clifton Street, Hawthorn	(115) 23	(116) 25	(117) 98	146
Thomas & Elson ...	53, Clifton Street, Hawthorn	(118) 84	(119) 89	(120) 80	253
H. L. Twartz	Gawler	(121) 66	(122) 108	(123) 98	272
H. L. Twartz	Gawler	(124) 76	(125) 60	(126) 94	230
F. F. Welford	1, Ludgate Circus, Colonel Light Gardens	(127) 88	(128) 106	(129) 65	259
F. F. Welford	1, Ludgate Circus, Colonel Light Gardens	(130) 104	(131) 101	(132) 90	235

EGG-LAYING COMPETITION—SECTION 1—WHITE LEGHORNS—continued.

Competitor.	Address.	Score to Month ending November 30th, 1933.			
		Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Totals
A. P. Urlwin	Box 80, Balaklava	(133) 77	(134) 112	(135) 107	296
A. W. Dawes	230, Portrush Road, Glenunga Gardens	(136) 128	(137) 110	(138) 94	332
Total—Section 1		—	—	—	11,136
SECTION 2—ANY OTHER LIGHT BREEDS.					
V. F. Gameau	Findon Road, Woodville (Minorcas)	(139) 99	(140) 61	(141) 45	205
M. O. and C. A. Roberts	Torrens Road, Kilkenny (Minorcas)	(142) 33	(143) 79	(144) 55	167
Total—Section 2		—	—	—	372
SECTION 3—BLACK ORPINGTONS.					
Arthur Cook ..	187, Goodwood Road, Colonel Light Gardens	(145) 122	(146) 130	(147) 71	323
B. Cooke	Kanmantoo	(148) 34	(149) 10	(150) 51	95
L. H. Crawford	Military Road, Grange ..	(151) 71	(152) 75	(153) 105	251
L. H. Crawford	Military Road, Grange ..	(154) 120	(155) 117	(156) 130	367
Les. Darcy	Mypolonga	(157) 126	(158) 106	(159) 95	327
Les. Darcy	Mypolonga	(160) 59	(161) 104	(162) 57	220
J. H. Dowling	Glossop	(163) 66	(164) 51	(165) 19	136
H. Fidge	313, Cross Rds., Clarence Pk.	(166) 97	(167) 59	(168) 69	225
H. H. Hefford	McHenry Street, Murray Bridge	(169) 72	(170) 17	(171) 131	220
F. J. Hudson	54, Willcox Av., Prospect	(172) 70	(173) 118	(174) 26	214
A. G. Dawes	230, Portrush Road, Glenunga Gardens	(175) *	(176) 144	(177) 77	221
C. H. Lines, jun.	Box 75, Gladstone	(178) 92	(179) 45	(180) 76	213
C. H. Lines, jun.	Box 75, Gladstone	(181) 103	(182) 52	(183) 102	257
H. J. Mills	Edward St., Edwardstown	(184) 106	(185) 120	(186) 113	339
H. J. Mills	Edward St., Edwardstown	(187) 133	(188) 108	(189) 108	349
J. Rawe	Honeyton St., Seaton Pk.	(190) 113	(191) 55	(192) *	168
S. E. Reedman	51, Gilbert St., Gilberton.	(193) 79	(194) 67	(195) 113	259
S. E. Reedman	51, Gilbert St., Gilberton.	(196) 22	(197) 120	(198) 111	253
H. L. Twartz	Gawler	(199) 41	(200) 102	(201) 85	228
A. G. Dawes	230, Portrush Road, Glenunga Gardens	(202) 139	(203) 112	(204) *	251
N. F. Richardson ...	60, Beaufort St., Wood- ville Park, Kilkenny	(205) 141	(206) 122	(207) 116	379
W. H. L. Wittenberg	3, Rushton St., Goodwood	(208) 104	(209) 31	(210) 47	182
W. H. L. Wittenberg	3, Rushton St., Goodwood	(211) 64	(212) 99	(213) 109	272
W. Woodley	Tailem Bend	(214) 23	(215) *	(216) 75	98
W. Woodley	Tailem Bend	(217) 99	(218) 77	(219) 76	252
Total—Section 3		—	—	—	6,099
SECTION 4—ANY OTHER HEAVY BREEDS.					
H. Fidge	313, Cross Roads, Clarence Park (Rhode Is. Reds)	(220) 49	(221) 58	(222) 54	161
V. F. Gameau	Findon Road, Woodville (Rhode Island Reds)	(223) 102	(224) 59	(225) 82	243
V. F. Gameau	Findon Road, Woodville (Rhode Island Reds)	(226) 73	(227) 75	(228) 105	253
H. J. Mills	Edward St., Edwardstown (Rhode Island Reds)	(229) 126	(230) 125	(231) 71	322
W. R. Williams	28, Avenue Rd., Frewville (Rhode Island Reds)	(232) 76	(233) 83	(234) 58	217
W. R. Williams	28, Avenue Rd., Frewville (Rhode Island Reds)	(235) 82	(236) 35	(237) 107	224
Bruce Rowe	"St. Kevern," Two Wells (Barnevelders)	(238) 103	(239) 62	(240) 55	220
Bruce Rowe	"St. Kevern," Two Wells (Welsumers)	(241) 28	(242) 83	(243) 1	112
Total—Section 4		—	—	—	1,752

*Dead.

NOTE.—Only first grade eggs are shown above.

NARRUNG HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR OCTOBER 1933.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.		Butterfat.		Average Test.
			Per Herd during October.	Per Cow during October.	Per Herd during October.	Per Cow during October.	
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
5/C.....	33	31.94	24,141	731.54	1,201.34	36.40	4.98
5/D.....	34	33	24,180	711.18	1,335.46	39.28	5.52
5/E.....	37	31.77	25,483	688.73	1,344.27	36.33	5.28
5/F.....	35	32.06	28,489	813.97	1,355.39	38.73	4.76
5/R.....	64	56.35	37,993	593.64	1,572.73	24.57	4.14
5/S.....	13	13	10,586½	814.34	499.64	38.43	4.72
5/SH.....	17	18.37	13,549½	797.03	641.81	37.75	4.74
5/GG.....	19	15.42	8,852	465.89	419.49	22.08	4.74
5/EK.....	19-87	18.06	15,090	769.44	693.00	34.88	4.59
5/NN.....	15	14	11,873	791.53	605.68	40.38	5.10
5/QQ.....	16	14	9,718½	607.41	470.64	29.42	4.84
5/EE.....	21	18.55	11,209½	533.78	606.55	28.88	5.41
5/SS.....	16	16	9,672	604.50	436.82	27.30	4.52
5/TT.....	12	11.23	11,529½	960.79	581.61	48.47	5.04
5/VV.....	14	14	10,245½	731.82	444.58	31.76	4.34
5/WW.....	23	22	14,678½	638.19	686.48	29.85	4.68
5/XX.....	17	17	12,276	722.12	585.66	34.45	4.77
5/YY.....	14	12.97	8,032½	573.75	411.94	29.42	5.13
Means.....	23.33	21.57	15,977.72	684.97	771.84	33.09	4.83

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LAKE ALBERT HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR OCTOBER, 1933.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during October.	Per Cow during October.	Per Cow December to October.	Per Herd during October.	Per Cow during October.	Per Cow December to October.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
6/B ..	20	20	19,034	951.70	5,779.08	902.32	45.12	260.81	4.74
6/C ..	21	15-10	14,378½	686.91	5,969.74	667.10	31.89	260.88	4.68
6/F ..	24	23	20,386	847.33	7,844.98	1,117.80	46.58	397.55	5.50
6/H ..	27-42	25-74	22,681½	827.19	6,853.76	1,139.01	41.50	380.54	5.02
6/Y ..	11-97	10-77	9,743½	814.16	4,268.63	381.06	31.84	184.04	3.90
6/I ..	25-55	16-03	15,069½	592.42	6,519.95	688.71	27.07	280.57	4.60
6/L ..	26	20-52	19,255	740.58	6,211.61	728.67	28.03	237.39	3.78
6/O ..	21-13	14-58	15,143	716.65	8,055.55	654.82	30.99	355.48	4.32
6/P ..	15	10-90	7,202½	480.17	5,767.06	386.35	25.76	293.04	5.36
6/Q ..	22-81	18-32	20,467	897.28	7,910.97	832.81	36.51	341.03	4.07
6/R ..	28	22-87	26,820	957.86	7,677.94	1,094.62	39.09	322.12	4.08
6/T ..	22-16	17-55	17,707	799.05	6,427.04	793.18	35.79	285.53	4.48
6/V ..	25-06	24-13	28,437	1,130.92	8,111.15	1,236.74	49.26	369.96	4.25
6/X ..	27	20-29	17,590½	651.50	6,673.79	705.00	26.11	282.43	4.01
6/Y ..	28-10	20-58	15,608½	555.46	4,949.11	724.99	25.80	243.60	4.64
6/Z ..	28-52	20-87	17,536½	614.88	6,317.20	850.21	29.81	291.25	4.85
6/AAA ..	20	18	14,771½	738.58	3,950.45	748.90	37.45	206.55	5.07
6/BBB ..	27-06	20-94	19,423½	717.79	7,155.88	789.33	29.17	292.28	4.06
6/CCC ..	22	17-87	16,026½	728.48	6,199.36	622.45	29.29	255.61	3.88
6/DDD ..	25	22	20,126	805.04	6,787.40	864.81	34.59	297.60	4.30
6/EEE ..	27	24-77	27,640½	1,023.72	9,173.94	1,053.65	39.02	372.89	3.81
6/FFF ..	30-65	23-35	24,205	789.72	7,702.70	967.18	31.56	321.19	4.00
6/GGG ..	28	20-94	20,065½	872.41	8,832.13	785.22	34.14	348.53	3.91
Means	23-84	19-53	18,663.85	782.72	6,829.53	814.52	34.16	299.89	4.36

THE HILLS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR OCTOBER, 1933.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during October.	Per Cow during October.	Per Cow July to October.	Per Herd during October.	Per Cow during October.	Per Cow July to October.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
7/E ..	26-97	18-97	17,418	645.83	1,786.82	704.44	26.12	73.98	4.04
7/H ..	8	5	4,960	620.00	2,071.61	218.38	27.30	97.12	4.40
7/K ..	16	13	12,511	781.94	2,782.68	477.15	29.82	107.32	3.81
7/L ..	35-35	28-48	22,316½	681.30	2,169.14	1,033.47	29.24	104.19	4.63
7/P ..	24-84	23-84	21,778	876.78	3,052.53	984.79	39.65	142.94	4.52
7/T ..	17	11-16	10,322	608.06	1,549.26	449.27	26.47	68.75	4.36
7/PP ..	20	14-13	14,377	718.85	2,282.39	777.16	38.86	122.18	5.41
7/AA ..	14	13	10,741½	767.25	2,021.00	445.70	31.84	86.72	4.15
7/KK ..	21-94	16-90	20,587	938.33	2,962.50	815.46	37.17	122.71	3.96
7/MM ..	40-77	36-29	37,951½	930.87	3,055.20	1,456.91	35.73	115.32	3.84
7/Y ..	22-94	18-61	16,022	724.58	2,209.18	786.25	33.49	98.86	4.62
7/TT ..	18-26	17-10	17,022	932.20	2,492.88	672.76	36.84	105.79	3.95
7/UU ..	21-61	12-42	9,617½	445.05	1,471.69	443.35	20.52	67.18	4.61
7/VV ..	16-58	15-71	17,012	998.48	3,073.33	750.89	44.02	140.98	4.46
7/XX ..	20-23	13	12,880½	686.70	2,521.31	713.41	35.26	131.35	5.54
7/YY ..	22-97	13-62	9,329½	406.16	1,466.57	393.19	17.12	65.59	4.21
7/BBB ..	68-65	61-10	46,152	672.28	2,490.64	2,017.65	29.39	113.47	4.87
7/CCC ..	18-39	10-90	15,834½	861.04	2,357.69	682.77	37.13	109.37	4.81
7/DDD ..	18	12-77	11,335½	872.19	2,501.86	520.72	40.06	116.81	4.59
7/EEE ..	11-87	9-87	5,866½	494.23	1,844.61	291.21	24.53	91.92	4.95
7/FFF ..	20	19-87	14,935½	746.98	—	673.48	33.67	—	4.51
Means	23-83	18-65	16,646.48	729.23	2,370.84	728.11	31.90	106.18	4.37

DAIRY AND FARM PRODUCE MARKETS.

MESSRS. A. W. SANDFORD & Co., LIMITED, reported on December 1st, 1933:—

BUTTER.—Trading in this commodity throughout November was very difficult indeed, for, owing to the Commonwealth Dairy Produce Control Board having fixed prices above parity, the shipments had to go forward on consignment, and when these reached Britain, values had slumped badly. The result was that heavy losses were incurred, for the butter should have been sold at considerably higher prices than it subsequently realised. Production is now declining steadily, but this is the usual seasonal happening. Local values were maintained, but there were heavy quantities which were sent forward each week to Britain. Choicest creamery fresh butter in bulk, 1s. 0½d.; prints and delivery extra. (These prices are subject to the stabilisation levies.) Store and collectors', 4d. to 4½d. per lb. at store door, less usual selling charges.

EGGS.—Exporting of eggs continued throughout the month, and all which would pass the graders for export were sent forward from week to week. Supplies have now declined rapidly, so that within the next few weeks shipments will have about ceased. In the meantime there is a better local demand and all lots are being cleared readily. Prices for export came back and ordinary eggs maintained. Ordinary country eggs, hen or duck, 4d. per dozen; selected export quality eggs, 1½ozs. and over, 8d. to 8½d. per dozen.

CHEESE.—Heavy quantities came forward from the South-Eastern factories each week which were satisfactorily placed to local and Western Australian buyers. The easing in rates caused heavier buying on the part of local traders and the market is sound. New makes, large and medium, 6½d. to 6¾d.; loaf, 6½d. to 7½d.; semimatured and matured, 9d. to 9½d. per lb.

BACON.—The consumption of bacon throughout the month was maintained on an average level, although during warm spells the trade fell away a little, but recovered as soon as cooler conditions prevailed. Heavy quantities of hams were placed both on spot and for forward delivery for Christmas trade. Best local sides, 9½d. to 9¾d.; best factory cured middles, 10½d. to 11d.; large, 9d.; rolls, 8d. to 8½d.; hams, 1s. to 1s. 0½d. per lb.; cooked, 1s. 2d. to 1s. 2½d. per lb.

LARD sold steadily at quotations. Prints, 7s. per dozen.

ALMONDS were marketed in greater quantities last month, and where the quality was satisfactory prompt sales were made in the open markets, but small and stained consignments were not readily quitted. Kernels came forward in fair supplies and were sold satisfactorily. Softshells and Brandis, 8½d. to 9d.; hardshells, 5d. to 5½d. per lb.; kernels, 1s. 11d. to 1s. 11½d. per lb.

HONEY.—Except for the local trade there has not been much turnover, interstate buyers operating only sparingly. Heavy quantities are now coming forward of the new season's "take," and the quality generally is satisfactory. Rates are steady. Prime clear extracted in liquid condition, 3d. to 3½d. per lb.; lower grades, 1½d. to 2½d. per lb.

BEESWAX.—Manufacturers purchased rather more freely throughout November and there was no carry-over of stocks, consignments being quickly cleared at quotations; 1s. 0½d. to 1s. 2d. per lb. according to sample.

LIVE POULTRY.—The supplies of live poultry are now coming along in increasing quantities each week. Although consignors were advised to not delay the forwarding of birds, during November the markets were bare. However, it is expected that a good demand will continue right up to Christmas, and it would be advisable to market stock promptly to obtain best results. We advise consigning. Crates loaned on application. Prime roosters, 4s. to 5s. 6d.; nice conditioned cockerels, 3s. 5d. to 3s. 11d.; fair conditioned cockerels, 2s. 9d. to 3s. 4d.; chickens lower. Heavy weight hens, 2s. 5d. to 3s. 3d.; medium hens, 1s. 8d. to 2s. 4d.; light hens, 1s. to 1s. 7d.; couple of pens of weedy sorts lower. Geese, 3s. 6d. to 5s.; goslings lower. Prime young Muscovy drakes, 5s. to 6s.; young Muscovy ducks, 3s. to 3s. 11d.; ordinary ducks, 1s. 3d. to 2s. 6d.; ducklings lower. Turkeys, good to prime condition, 10d. to 1s. 3d. per lb. live weight; ditto, fair condition, 8d. to 9d. per lb. live weight; ditto, poor and crooked breasted lower. Pigeons, 3½d. to 6d. each.

POTATOES.—Old, 4s. 9d. per cwt.; new season's, 9s. 6d. per cwt.

ONIONS.—New season's white, 6s. per cwt.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department show the rainfall at the subjoined stations for the month of November, 1933, also the average precipitation for November, and the average annual rainfall.

Station.	For Nov. 1933.	Av'ge for Nov.	Av'ge Annual Rain-fall.	Station.	For Nov. 1933	Av'ge for Nov.	Av'ge Annual Rain-fall.
FAR NORTH AND UPPER NORTH.				LOWER NORTH—continued.			
Qodnadatta	0.2	0.36	4.70	Brinkworth.....	1.18	0.82	15.74
Marree	0.35	0.45	5.89	Blyth	0.99	0.91	16.77
Farina	0.63	0.48	6.47	Clare	1.11	1.28	24.53
Copley	0.65	0.53	7.94	Mintaro	0.96	1.09	23.42
Beltana	0.41	0.65	8.54	Watervale	0.86	1.38	26.91
Blinman	0.81	0.84	11.95	Auburn	0.93	1.32	23.98
Hookina	1.16	0.77	11.53	Hoyleton	0.52	1.03	17.32
Hawker	2.57	0.85	12.30	Balaklava	0.41	0.95	15.49
Wilson	4.09	0.75	11.78	Pt. Wakefield ..	0.45	0.71	12.93
Gordon	2.87	0.73	10.63	Terowie	1.82	0.87	13.35
Quorn	1.45	0.86	13.29	Yarcowie	1.83	0.86	13.57
Port Augusta ..	1.29	0.68	9.42	Hallett	2.02	1.01	16.40
Bruce	0.99	0.70	9.93	Mount Bryan ..	1.73	0.83	16.65
Hammond	2.28	0.73	11.31	Koorunga.....	0.84	0.92	17.89
Wilmington	1.05	0.98	17.43	Farrell's Flat ...	0.61	0.93	18.65
Willowie	1.73	0.72	12.19				
Melrose	2.18	1.24	22.85	WEST OF MURRAY RANGE.			
Boooleroo Centre	1.05	0.83	15.15	Manoora	0.93	0.96	18.83
Port Germein ..	0.65	0.79	12.43	Saddledworth ...	0.74	1.14	19.55
Wirrabara	1.86	1.07	19.21	Marrabel	1.08	1.10	19.84
Appila	1.16	0.87	14.57	Riverton	0.58	1.23	20.75
Craddock.....	1.87	0.69	10.83	Tarlee	0.98	1.13	18.11
Carrieton.....	1.39	0.77	12.31	Stockport	0.34	1.05	16.88
Johnburg	2.80	0.76	10.61	Hamley Bridge ..	0.36	0.95	16.54
Eurelia	1.95	0.94	12.87	Kapunda	0.91	1.13	19.79
Orroroo	3.13	0.91	13.21	Freeling.....	0.29	1.06	17.85
Nackara	2.98	0.80	11.16	Greenock	0.58	1.27	21.56
Black Rock	2.09	0.89	12.41	Truro	1.45	1.15	19.96
Oodlawirra	2.64	0.69	11.56	Stockwell	1.24	1.23	20.12
Peterborough ..	2.35	0.93	13.21	Nuriootpa	0.85	1.15	20.64
Yongala	2.41	0.97	14.42	Angaston	0.95	1.28	22.43
				Tanunda	0.45	1.21	22.02
				Lyndoch	0.32	1.21	23.45
				Williamstown ..	0.56	1.37	27.71
NORTH-EAST.				ADELAIDE PLAINS			
Yunta	3.21	0.72	8.50	Owen	0.46	0.72	14.33
Waukaringa ...	2.91	0.61	8.00	Mallala	0.21	0.95	16.56
Mannahill	4.22	0.67	8.28	Roseworthy	0.40	1.01	17.34
Cockburn	4.09	0.68	7.96	Gawler	0.33	1.05	18.96
Broken Hill	4.82	0.67	9.63	Two Wells	0.28	0.83	15.70
				Virginia	0.14	0.93	17.12
LOWER NORTH.				Smithfield	0.16	1.01	17.50
Port Pirie	0.39	0.77	13.17	Salisbury	0.18	1.02	18.54
Port Broughton	0.25	0.72	13.93	Adelaide	0.18	1.13	21.10
Bute	0.75	0.75	15.36	Glen Osmond ..	0.30	1.21	25.96
Laura	2.09	1.02	17.91	Magill	0.15	1.26	25.50
Caltowie	4.16	1.01	16.69				
Jamestown	2.07	1.05	17.71	MOUNT LOFTY RANGES.			
Gladstone	1.13	1.01	16.29	Teatree Gully ..	0.26	1.47	27.30
Crystal Brook ..	1.27	0.90	15.78	Stirling West ..	0.50	2.11	46.91
Georgetown	1.17	1.02	18.35	Uraidla	0.28	1.93	43.91
Narridy	0.56	0.88	15.85	Clarendon	0.69	1.53	32.82
Redhill	1.24	0.85	16.55	Morphett Vale ..	0.41	1.22	22.64
Spalding	1.01	1.09	18.99	Noarlunga.....	0.20	1.02	20.34
Gulnare	1.70	1.04	18.56	Willunga	0.42	1.22	26.01
Yacka	1.29	0.81	15.33	Aldinga	0.32	0.96	20.21
Koolunga	0.84	0.79	15.40				
Snowtown	0.81	0.87	15.64				

RAINFALL—continued.

Station.	For Nov. 1933.	Average for Nov.	Average Annual Rain- fall.
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MOUNT LOFTY RANGES—contd.

Myponga	0.58	1.40	29.48
Normanville	0.55	0.99	20.69
Yankalilla	0.68	1.05	22.85
Mount Pleasant	0.77	1.31	27.18
Birdwood	0.35	1.40	29.15
Gumeracha	0.38	1.65	33.39
Millbrook Res.	0.25	1.62	34.86
Tweedvale	0.54	1.59	35.89
Woodside	0.40	1.49	32.25
Ambleside	0.25	1.60	34.87
Nairne	0.53	1.40	28.09
Mount Barker	0.50	1.53	31.79
Echunga	0.51	1.57	33.15
Macolesfield	0.67	1.65	30.43
Meadows	0.69	1.86	36.12
Strathalbyn	0.64	1.07	19.34

MURRAY FLATS AND VALLEY.

Meninge	0.49	1.03	18.37
Milang	0.50	0.90	14.92
Langhorne's Ck.	0.48	1.01	14.76
Wellington	0.37	0.92	14.56
Tallem Bend	0.44	0.91	14.70
Murray Bridge	0.69	0.86	13.59
Callington	0.66	0.89	15.20
Mannum	0.63	0.70	11.47
Palmer	0.51	0.88	15.43
Sedan	2.63	0.66	12.11
Swan Reach	0.95	0.66	10.60
Blanchetown	0.86	0.71	11.04
Eudunda	1.29	1.06	17.11
Sutherlands	0.83	0.78	10.82
Morgan	0.75	0.63	9.20
Walkerie	0.93	0.62	9.66
Overland Crnr.	0.53	0.79	10.41
Loxton	0.47	0.72	11.59
Renmark	0.49	0.74	10.49

WEST OF SPENCER'S GULF.

Eucla	1.40	0.53	9.98
Nullarbor	1.10	0.64	8.73
Fowler's Bay	0.58	0.57	11.82
Penong	1.11	0.56	12.12
Koonibba	1.60	0.60	11.82
Denial Bay	0.63	0.52	11.36
Ceduna	0.86	0.59	9.95
Smoky Bay	1.56	0.44	10.28
Wirrulla	1.00	0.40	10.08
Streaky Bay	1.30	0.64	14.82
Chandada	1.27	—	—
Minnipa	4.04	0.53	13.68
Kyanoutta	1.58	—	—
Talia	1.33	0.66	14.63
Port Elliot	0.45	0.68	16.39
Yeelanna	0.71	0.60	15.72
Curamins	0.92	0.69	17.35
Port Lincoln	0.76	0.85	19.34
Tumby	0.56	0.85	13.92
Ungarra	1.14	0.90	16.73
Carrow	0.38	0.88	13.08
Arno Bay	0.90	0.68	12.44

Station.	For Nov. 1933.	Average for Nov.	Average Annual Rain- fall.
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WEST OF SPENCER'S GULF—contd.

Rudall	1.09	0.92	12.19
Cleve	2.30	0.86	14.66
Cowell	0.49	0.67	11.10
Miltalie	2.45	0.81	13.54
Darke's Peak	0.92	0.72	14.92
Kimba	1.60	0.52	11.52

YORKE PENINSULA.

Walleroo	0.59	0.70	13.91
Kadina	0.79	0.72	15.61
Moonta	0.47	0.73	15.05
Paskeville	0.49	0.70	15.46
Maitland	0.55	1.00	19.90
Ardrossan	0.41	0.75	13.93
Port Victoria	0.27	0.82	15.40
Curramulka	0.43	0.84	17.87
Minlaton	0.34	0.91	17.80
Port Vincent	0.14	0.78	14.40
Brentwood	0.33	0.86	15.45
Stansbury	0.19	0.86	16.81
Warooka	0.43	0.79	17.51
Yorketown	0.22	0.86	16.94
Edithburgh	0.21	0.90	16.34

SOUTH AND SOUTH-EAST.

Cape Borda	0.76	0.97	24.83
Kingscote	0.41	0.90	19.11
Penneshaw	0.50	0.99	18.85
Victor Harbor	0.41	1.10	21.27
Port Elliot	0.60	1.10	19.91
Goolwa	1.87	1.04	17.81
Copeville	0.44	0.70	11.44
Meribah	0.57	0.46	11.10
Alawoona	0.74	0.44	10.02
Mindarie	0.49	0.74	11.91
Sandalwood	0.57	0.80	13.57
Karoonda	2.14	0.66	14.33
Pinnaroo	0.94	0.95	14.54
Parilla	0.87	0.83	13.90
Lameroo	0.61	0.96	16.08
Parrakie	0.85	0.81	14.49
Geranium	0.65	0.89	16.41
Peake	0.77	0.83	16.03
Cooke's Plains	0.36	0.88	15.38
Coomandook	0.64	1.01	17.11
Coonalpyn	1.22	0.98	17.42
Tintinara	2.26	1.11	18.60
Keith	1.69	1.12	17.87
Bordertown	1.16	1.20	19.22
Wolsley	0.98	1.09	18.41
Frances	5.24	1.16	19.99
Naracoorte	2.72	1.33	22.59
Penola	3.45	1.49	26.06
Lucindale	2.48	1.16	23.16
Kingston	0.91	1.19	24.33
Robe	1.32	1.05	24.64
Beachport	2.22	1.11	26.93
Millicent	3.28	1.40	29.76
Kalangadoo	3.60	1.77	32.03
Mount Gambier	2.61	1.72	30.52

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page.	Dates of Meetings.		Branch.	Report on Page.	Dates of Meetings.	
		Dec.	Jan.			Dec.	Jan.
Adelaide	*	—	—	Gladstone	*	1	26
Alawoona	*	—	—	Gladstone Women's	†	19	16
Allandale East	*	1	26	Glencoe	†	12	9
Alma	*	—	—	Goode	†	—	—
Appila-Yarrowie	*	R	R	Goode Women's	*	R	—
Ashbourne	*	—	24	Greenock	†	4	8
Auburn Women's	*	R	26	Green Patch	†	—	25
Balaklava	*	R	R	Gumeracha	*	4	29
Balhannah	†	—	—	Hanson	*	—	30
Balumbah	†	R	R	Hartley	*	27	31
Balumbah Women's	*	6	3	Hindmarsh Island ..	*	—	—
Beetaloo Valley	†	—	29	Hope Forest	†	4	1
Belalie Women's	594	12	9	Hoyleton	*	18	15
Berri	*	7	22	Inman Valley	†	21	18
Belvidere	*	—	—	Jamestown	*	20	17
Blackheath	†	7	4	Jervois	*	14	11
Black Rock	572	R	R	Kalangadoo Women's	*	9	13
Black Springs	†	—	—	Kalangadoo	*	9	13
Blackwood	591	11	8	Kalyan	*	20	17
Blyth	574	22	26	Kangarilla Women's	597	21	18
Booborowie	*	—	29	Kanni	*	—	—
Booleroo Centre	*	1	26	Kapinnie	*	—	—
Boolgun	†	R	R	Kapunda	*	8	12
Boor's Plains	*	R	R	Karoonda	*	6	31
Borrika	†	—	—	Keith	*	—	25
Bowhill	*	—	29	Kelly	*	2	27
Brentwood	*	7	4	Ki Ki	*	—	—
Brinkley	*	—	31	Kulkerran	*	—	25
Brinkworth	*	—	29	Kongorong	*	—	29
Brownlow	*	—	—	Koolunga	*	—	—
Buchanan	†	—	—	Koonibba	*	—	25
Bute	†	21	18	Koonunga	574	—	—
Butler	582	R	R	Koppio	583	—	30
Caliph	*	5	2	Krning	*	4	29
Caralue	*	—	24	Kulkawirra	†	R	R
Carrow	*	—	31	Kyancutta	*	5	2
Charra	*	—	—	Kybybohte	†	—	25
Cherry Gardens	592	30	—	Kybybolite Women's	†	5	—
Chilpuddie Rock	†	—	—	Lameroo	*	2	27
Clare Women's	594	—	—	Langhorne's Creek ..	592	—	24
Clarendon	†	R	29	Laura	*	2	27
Cleve	*	2	6	Laura Bay	584	12	9
Collie	*	6	3	Laura Bay Women's	597	12	9
Coomandook	*	29	26	Lenawood and Forest	*	—	—
Coonawarra	567	7	25	Range	592	—	—
Coonawarra Women's	594	20	17	Light's Pass	†	—	—
Cummins	*	8	12	Lipson	†	2	27
Cungena	*	7	4	Lone Gum and	*	—	—
Currency Creek	†	4	29	Monash	588	—	31
Dudley	*	R	—	Lone Pine	*	—	29
Elbow Hill	*	—	25	Lowbank	*	—	31
Eudunda	*	4	1	Loxton	*	8	12
Eurelia	†	9	13	Lyndoch	*	R	30
Eurelia Women's	†	6	3	McLaren Flat	†	—	—
Farrell's Flat	*	29	26	McLaren Flat Wm's	†	7	4
Finnis	*	—	—	Macclesfield	†	21	18
Frances	566	—	—	MacGillivray	593	—	30
Frayville	*	—	—	Mallala	*	18	15
Gawler River	*	—	—	Maltee	*	—	25
Georgetown	*	2	27	Mangalo	584	—	—
Geranium	*	30	27	Mangalo Women's ..	†	R	R

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		Dec.	Jan.			Dec.	Jan.
Marama	†	—	—	Roberts & Verran..	*	—	—
Meadows	*	—	31	Rosedale	†	—	—
Milang	†	2	27	Roseworthy	*	—	—
Millicent	586	29	26	Rudall	*	—	30
Millicent Women's ..	598	—	R	Saddleworth	580	1	26
Miltalie	*	2	—	Saddleworth Women's	599	5	2
Monarto South	†	—	—	Scott's Bottom	*	2	27
Moorlands	588	—	31	Shoal Bay	*	—	30
Morchard	*	1	26	Smoky Bay	*	—	—
Morchard Women's ..	*	R	R	Snowtown	*	8	12
Mount Barker	*	18	15	South Kilkerran ..	*	—	30
Mount Bryan	*	—	—	Springton	*	6	3
Mount Compass	*	—	—	Stanley Flat	*	18	15
Mount Gambier	†	8	12	Stockport	576	—	—
Mount Hope	587	—	30	Strathalbyn	*	13	10
Mount Pleasant	†	8	12	Streaky Bay	*	22	26
Mudamuckla	*	9	13	Sutherland	576	7	—
Mundalla	†	—	—	Tailem Bend	*	7	—
Mundalla Women's ..	†	7	25	Talia	*	29	26
Murray Bridge	589	R	24	Tantanoola	*	2	6
Murraytown	575	—	—	Tantanoola Women's	†	6	3
Mypolonga	*	R	—	Taplan	*	—	R
Myponga	*	21	18	Taplan Women's ..	*	—	—
Myrla	*	—	31	Taragoro	*	R	25
Nantawarra	†	—	25	Tarlee	†	—	—
Naracoorte	*	9	13	Truro	*	R	15
Narridy	*	—	—	Tulkineara	*	7	25
Nelshaby	*	—	—	Tweedvale	*	21	18
Nelshaby Women's ..	*	—	—	Ungarra	*	7	—
Netherton	*	9	31	Upper Wakefield ..	*	—	—
Nunjikompita	*	30	25	Uraidla and Summer-	*	—	—
Nunkeri	*	R	31	town	*	4	1
O'Loughlin	*	11	8	Waddikee Rocks ..	*	2	27
Overland Corner ..	†	—	31	Waikerie	*	8	12
Owen	*	11	8	Wallala	*	13	10
Palabie	*	—	—	Wanbi	*	27	24
Parilla	*	19	16	Wandearah	*	—	30
Parilla Women's ..	*	20	17	Warcowie	†	—	30
Parilla Well	*	4	29	Warcowie Women's ..	600	—	—
Parilla Well Women's	*	26	30	Warramboo	†	R	R
Parrakie	†	—	—	Warramboo Women's	600	R	R
Parrakie Women's ..	†	R	30	Wasleys	†	14	11
Paruna	*	1	5	Wasleys Women's ..	603	7	4
Paskeville	†	—	30	Watervale	*	18	15
Pata	*	1	5	Wauraltee	*	—	30
Penola	*	2	6	Weavers	*	11	8
Penola Women's ..	†	R	R	Wepowie	573	—	29
Penwortham	†	—	31	Wepowie Women's ..	605	R	R
Petersville	*	—	30	Williamstown Wm's	†	6	3
Petina	*	23	27	Willowie	*	25	22
Pinbong	*	—	—	Wilmington	†	R	R
Pinnaroo	*	—	—	Wirrilla	*	R	R
Pinnaroo Women's ..	598	1	26	Wirrilla Women's ..	*	7	4
Port Elliot	*	—	—	Wirrulla	*	20	17
Pygery	†	—	30	Wolsley	*	11	8
Pygery Women's ..	*	—	—	Wudinna	*	—	—
Quorn	*	—	—	Yadnarie	588	—	30
Ramoo	589	—	29	Yandiah	†	R	12
Redhill	*	—	—	Yaninee	*	—	—
Rendelsham	570	2	27	Yeelanna	*	—	31
Rendelsham Women's	599	—	—	Yurgo	*	—	—
Riverton	*	11	8	Yurgo Women's	*	—	—

* No reports received during the month of November. † Held over. R In recess.

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

[Branch Secretaries are reminded that the following are exempt from payment of the Annual Bureau subscription:—Life members, Branch Secretaries, members appointed before August 1st, 1930, and new members who reside in the same house as (a) a life member, (b) Secretary, or (c) another member who already subscribes.

The subscription for all other members is 2s. 6d., commencing from August 1st in each year, provided that—subject to the above exemptions—nominations forwarded during the months of January to June must be accompanied by a payment of 1s. 6d. each nomination for that period.]

MEN'S BRANCHES. SOUTH-EASTERN DISTRICT.

FRANCES (Average annual rainfall, 19.99in.).

September 6th.—Attendance, 9.

PASTURE IMPROVEMENT.—Mr. Herold read the following paper:—"The practice adopted on our farm to improve the pastures has been to sow subterranean clover with the crop, cropping a fresh piece of land each year. The land is worked to a smooth bed, and the seed drilled to a depth of 1in. to 1½in. to avoid burying it too deeply. The clover seed is mixed with the grain and sown at the rate of 1lb. of clover per acre, which gives an adequate covering the first year. First-grade seed is always used because it gives a better return for money expended, and is also free from weeds. The following year the paddock is top dressed, sown with half a bag of superphosphate to the acre, also the next year and the third year after sowing. Top dressing is then left off until the paddock shows signs of going back, when superphosphate is applied again. Over top dressing is not a wise plan, because too many sheep have to be kept in the paddock to keep the grass from becoming rank, consequently the pasture is dirtied by the continual droppings of the sheep, and the surface of the land becomes spongy, similar to a sheep camp. Paddocks in this condition provide a harbor for lucerne flea, &c. To overcome this it is intended to re-plough such paddocks and re-sow them with perennial rye grass and *Phalaris*, there being still enough clover left to make an even ration of itself to mix with the other grasses." (Secretary, C. Koch.)

MILLICENT (Average annual rainfall, 29.76in.).

August 25th.—Attendance, 11.

QUESTION BOX.—Mr. G. Chapman sought information as to the best months for the joining of ewes and rams and the number of ewes to allot to each ram. Mr. H. Hutchesson preferred about the end of January. He usually allowed about 70 ewes for each ram. Mr. G. Major said he had generally made a practice of running 50 ewes to each ram. It was often found that rams knocked each other about fairly badly by fighting, and joining in separate lots of, say, about 75 ewes to each ram, was a good practice where that was practicable. He had tried yarding at night and found it beneficial. He usually left the ewes with the ram for six weeks exactly. If they were there longer, the period of lambing was not sufficiently uniform. Mr. K. Skeer asked at what age it paid best to dispose of fat lambs. It was the general opinion that it was good policy to avoid holding lambs beyond a reasonable selling age. There was always the risk that they would deteriorate beyond a certain age and weather conditions often had an adverse effect. Mr. H. Hutchesson asked for information as to the effect a heavy dressing of super would have on potatoes so far as blister was concerned. Mr. K. Skeer said blister was a condition arising from the nature of the ground. An insect lodged there and got into the potatoes. No ill-effects followed planting seed with blister. Clean plants resulted. However, blister would continue if planting was repeated in a paddock where it had once been noticed. In a particularly good season it might be avoided. Mr. A. Sapiatzer referred to very beneficial results that had been obtained in ridding land of blister tendencies. He advised the sowing of pease and rye and ploughing them in again at a very early stage. A variety of opinion on the subject of pickling of wheat and barley was forthcoming when Mr. Skeer brought up

an experience where, using a petrol drum, bluestone had escaped through the iron. Mr. Watson said he had tried pickling in these drums and had found barley results satisfactory, whereas there was only poor germination of the wheat. He accounted for the trouble as due to rust off the iron. Mr. Chapman advised the use of wooden receptacles only, and pickling in a preparation of 1lb. bluestone to 10galls. of water. Mr. Skeer advised the same consistency for barley and 16galls. of water to the same amount of bluestone for wheat. Mr. H. Hutchesson said he had secured good results from dry pickling wheat. Mr. Skeer said farmers were assured that bluestone pickling was only of benefit in combating ball smut. That was not present in local crops of barley, and as the process was not meant to deal with loose smut, what was the use of pickling barley? Mr. L. Hateley thought pickling was warranted. They always used a strong solution of 1lb. bluestone to each bag of barley. (Secretary, I. Hutchesson.)

IMPORTANCE OF GOOD QUALITY CREAM.

[Paper read by W. H. Downes (District Dairy Instructor) at the August meeting of the Coonawarra Branch.]

Owing to the comparatively restricted demand on the local market for dairy produce, and also because of the fact that supplies will soon be rapidly increasing, butter production will quickly exceed the normal requirements of the State. Immediately this occurs it will be necessary to export our surplus supply, and this is usually forwarded to the London market. Unfortunately this appears to be about the only available market remaining at the present time to which exporting countries may send their dairy produce. While capable of absorbing enormous quantities of this commodity the tremendous increase in dairying during the last few years has had the effect of heavily overloading this once so favored outlet to the extent of saturation point. Buyers in the trade, therefore, are able to be far more discriminating with regard to butter quality than was the case a few years ago, and the quality naturally needs to be very sound before they will buy. The rapid strides made in the improvement of buttermaking machinery, together with advanced scientific methods, have enabled most modern factories to overcome faults in manufacture which were previously common, but now are of comparatively rare occurrence. Unfortunately factory progress—great though it has been—does not overcome the grading problem, nor the necessity to keep up the standard of quality by this means. In order that factories may successfully compete in interstate trading, and be able to produce an article fit for exporting overseas, suppliers as a whole may expect a general tightening up in grading methods very shortly. It will be essential in the butter factories' interests to carefully grade all cream received, and there is little doubt that a fair percentage of cream, mediocre in quality, previously paid for as "Choice" will be reduced to either First or Second Grade. A supplier who receives notice that his cream is of inferior quality naturally feels upset, besides having to accept a lower rate for his produce. He may naturally think that he is being treated with undue harshness by the factory, but there is usually a very good reason for the fact that his cream has been graded down. While our sympathies extend to the man who is making a genuine effort to improve the quality of his cream it must not be assumed that the factory grader is at fault. Indiscriminate grading down of cream would quickly result in a depleted supply, which would not be in the best interests of the factory concerned. With the approach of warmer weather it will be more difficult for some suppliers to consistently receive the top grade price for their cream, unless they adopt the necessary measures to ensure that their produce is of sound quality.

The principal faults noticed in local cream are chiefly due to defects in flavor. These can be summarised as follows:—

Stale Flavor.—This is one of the most common defects noticed in South Australia, and is chiefly responsible for the fact that South Australian butters have not enjoyed the best reputation in past seasons. It is due to the fact that cream is kept far too long on the farm before being delivered to the factory, to such an extent that occasionally it is bordering on rancidity by the time it reaches its destination. While transport difficulties and small supplies of cream may be to blame for a good proportion of this trouble they are not responsible for all of it; quite often it could have been avoided if suppliers as a whole would realise the necessity of forwarding their cream in as fresh a condition as possible. This point will easily bear stressing, because by so doing the producer will greatly assist the factory in the production of a better article as well as enhancing his own prospects of receiving choice prices consistently.

Sour or Over-ripe.—This flavor is due to the presence of too much lactic acid in cream. Factors responsible for its occurrence are too low a test, warm conditions, and age. In the course of a little time a stale and cheesy flavor usually develops.

Fermented Flavor.—This may be due to several causes, the chief of which are enumerated:—(a) Cream kept too long, not in the best condition, particularly if it is low in butterfat test. (b) Mixing together cream of different temperatures before the warmest has cooled sufficiently. (c) Using a separator twice a day and only washing it once, or if washing it on each occasion the washing and scalding of the various parts is inefficiently done. (d) Keeping the afternoon's milk overnight and heating it up the following morning for the purpose of separating.

Tallowy Flavor.—This is a chemical taint noticed most commonly during warm weather. Though not confined to creams of high test it is, however, more frequently found in cream high in butterfat content. It develops as a result of cream becoming exposed to heat, or being air dried on the surface, as a consequence of which the chemical nature of the butterfat is permanently altered. It usually becomes more pronounced with age, and the process of pasteurisation, rather than producing an improvement, tends to increase this defect.

Metallic Flavor.—This is another chemical flavor which usually, though not always, is associated with low testing cream. It is produced as a result of the lactic acid contained in the cream coming into contact with certain metals. It will rarely occur if the separator parts and other utensils, buckets, cans, &c., are well tinned and kept well washed. Any neglect in either direction will soon be productive of this characteristic taint, which is another flavor that cannot be removed by pasteurisation.

Feed Flavors or Fodder Taints.—All green fodders when fed to cows have the effect of tainting milk to a certain extent, but while some are mild and not unpleasant others are so strong and objectionable as to be easily noticed in the milk. It is advisable to avoid feeding cows on fodder of a strongly tainting tendency where possible, provided the milk supply is not seriously affected by so doing. Nevertheless they cannot always be avoided, particularly as much of the South-Eastern pastures contain a big sprinkling of clovers. Under these circumstances the potency of these flavors may be reduced considerably by judicious feeding, aeration, and stirring. By turning cows into pastures of this sort immediately after milking, removing them a few hours before next milking, by cooling and aerating as well as daily stirring all cream, a vast improvement in the flavor will be immediately noticed.

Absorbed Flavors.—It is surprising how quickly cream absorbs and retains certain odors, especially when articles possessing pungent aromas are placed near it. Probably the best point to illustrate this tendency is demonstrated by the fact that timber used in butter boxes must be carefully selected and free from any resinous smell or timber taint. It is essential, therefore, that cream should be kept a reasonable distance away from anything likely to affect the flavor in this way.

While the various taints in cream have been mentioned and described singly, it is quite possible for cream to possess a combination of two or more flavors, such as stale and tallowy, sour and fermented, &c., the nature and extent of which will naturally depend upon the conditions under which it was produced, the treatment it receives on the farm, and the method of delivery, &c. As a factor of considerable importance to improved quality the regular, frequent delivery of cream should be once more stressed. The primary cause of inferior quality in South Australia is the usual tendency on the part of many suppliers to hold their cream too long. New South Wales several years ago took the drastic step of inaugurating a system of daily cream supplies, with the result that fully 95 per cent. of her manufacture to-day is of "choice" quality. In a State where summer temperatures are not conducive to good cream quality this may be regarded as a remarkable achievement, but in South Australia, where summer conditions are so much better, it would appear possible to better even these figures if the dairying community as a whole saw fit to discontinue depending on good weather conditions as a means of preserving their cream quality.

The supplier who takes a pride in his produce and who continually aims at securing top prices will be well advised to cool his cream during warm weather. This should be accomplished by the best means at his command, but for preference a proper water-cooled cream cooler and aerator are to be recommended. The low temperature thus attained will quickly check any bacterial development, and thereby considerably enhance the keeping quality. Stirring two or three times daily will tend to minimise any objectionable "feed" flavors present in the cream.

Cleanliness in every branch of the work is naturally of paramount importance if the best quality cream is to be produced. For this reason suppliers who are not in the habit of washing their separators each time they are used are strongly urged to do so. Rinsing dairy appliances in warm water alone is not conducive to satisfactory results. After being well scrubbed and rinsed all dairy utensils should be thoroughly scalded with boiling water. This latter treatment will eliminate many of the troubles

that cream is heir to; it kills all germ life present in or on the surface of these utensils as well as ensuring rapid drying, which will minimise the danger of further bacterial development. The remark is sometimes heard from men who evidently have not studied the question that the price of butterfat at the present time does not warrant any extra care or treatment of the cream. With markets glutted and a poor demand for dairy produce as a whole it is essentially the time for us to concentrate on sound quality, so that we have reasonable hopes of disposing of it at a decent price. Otherwise if the quality is to remain indifferent the possibility of selling is extremely limited, and then at a price totally inadequate for the work and toil connected with dairying.

Unfortunately South Australian butter is not in keen demand, due no doubt to the practice of incorporating too much cream of inferior quality in the choice butter in order that choice prices could be paid all round. The natural consequence has been to build up a well-earned prejudice against South Australian butter in a general way, and this is going to take some time to break down. Unfortunately, also, the careful cream supplier has been penalised to some extent by the careless man during the process, so that it is much to the interest and advantage of the former that stricter grading at factories be rigidly observed and insisted upon.

Roseworthy Agricultural College.

JERSEY BULLS FOR SALE

ROSEWORTHY PRETTY DUKE 7589.

Born, May 19th, 1929. Tattoo Ry. 032.

Sire—King Solomon of Dalebank 1699 by Makarini (Imp.) 995.

Dam—Pretty May of Dalebank 23560 by Duke of Dalebank 2642.

G.Dam—May 3rd of Dalebank 13845 by You'll Do of Dalebank 1711.

G.G.Dam—May 2nd of Dalebank 6626 by Pretty Mike 787.

Record of Dam.—As Junior 4 years old—Milk, 5,845½lbs.; average test, 5.30 per cent.; butterfat, 310.02lbs.

ROSEWORTHY SPRITE—Entered in Herd Book, Vol. 20

Born April 15th, 1930. Tattoo Ry. 041.

Sire—King Solomon of Dalebank 1699 by Makarini (Imp.) 995.

Dam—Roseworthy Fairy 19077 by King Solomon of Dalebank 1699.

G.Dam—Fairy Queen III. of Linden 7525 by The Chief of Linden 1065.

G.G. Dam—Fairy Queen II. 5528 by Admiral 1062.

Record of Dam.—	Lbs.	Per cent.	Lbs.
As Junior 2 years old	6,000	5.24	314.18
Junior 3 years old	7,270½	5.44	395.56
Junior 4 years old	8,098½	5.40	437.87
At 5 years	10,108½	5.64	570.68

Both bulls are eligible for sale under Government Subsidy. Bull calves also available.

SOUTHDOWN EWES FOR SALE.

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The PRINCIPAL,

Agricultural College,

Roseworthy, S.A.

DUCK RAISING FOR EGG PRODUCTION.

(Paper read by Mr. V. Smith at the September meeting of the Bendelsham Branch.)

This district is ideal for raising ducks for egg production. I favor the Fawn and White Indian Runner duck. When starting to raise ducks for egg production it must be realised that the care of the birds will involve a fair amount of time and work. Any person who thinks money is to be made out of poultry of any breed without the above is foredoomed to failure. One sees many small flocks of ducks. For several years numerous arguments have been advanced as to the advantages of ducks over hens in this district. I have produced more eggs in the last three months from 90 ducks than any one farm in the district, and some of the farms have upwards of 300 hens. This has not been accomplished without a fair amount of hard work and special feeding.

HATCHING.

When starting out to breed ducks the first question to decide is whether hens or ducks are to be used for hatching. It is definitely not possible to rear ducklings successfully if both hens and ducks are used in the hatching of them. The duck fouls the water very quickly, and so causes diseases amongst the ducklings if the water is stationary. The only way to prevent the water fouling is to have a running stream for the ducklings into which the mother duck cannot enter. A flushing of all watering utensils with a bluestone solution is essential and prevents much disease. This should be carried out every day. I prefer hens for hatching, because they are usually more reliable in completing the job. Moreover, in cold weather a hen will mother her brood and cover them and so keep them warm. I have had as many as 60 hens sitting on duck eggs in one shed, but found it a very costly blunder, especially where pullets were sitting near aged hens. I lost many settings of eggs due to pullets not returning to the right nest after leaving to feed. They often sneaked into an old nest, and when the old hen returned she forced her way into the same nest. This left the pullet's setting of eggs to spoil. In handling such cases be very careful and kind in handling the pullets, otherwise they will refuse to settle down again. A good plan is to place a bag over the box for a few hours after replacing the pullet. Do not use pullets if it is possible to avoid doing so.

When setting duck eggs always place them on the ground. A few handfuls of dry straw will help to keep the eggs clean underneath. The moisture drawn from the ground is essential to the incubation of the eggs. No harm will be done if a good, quiet sitter is lifted off the eggs every few days and lukewarm water sprinkled over the eggs. This applies especially to summer hatching, and in this district it is usually late spring or early summer when most broody hens are available.

FEEDING.

Before starting to set the hens see that there is a plentiful supply of the various green feeds—chou-mollier, mangolds, lettuce, silver beet, &c. If these plants are well grown when the ducklings are hatched, at least half the food problem will be solved. Ducklings are gross eaters of green food, and thrive on it. A good method of preparing the food is to use a large sized mince, as used for household purposes. Pick a good supply of fresh young leaves off the various plants, then add a dozen rabbits' livers, and put the lot through the mincer, afterwards adding sufficient bran and pollard to make the mixture into a crumbly mash. A sloppy mash is not suitable for ducklings. Forty per cent. of green feed can be used in cold weather and up to 60 per cent. in hot weather. If kept in a cool place a hopper containing about 10lbs. of this mixture will keep at least 50 ducklings up to three weeks old busily engaged all day. Chaff up an extra hopper of green feed and place it handy to the mash hopper. As the ducklings grow, the quantity must be increased, but the same methods can be continued.

Never give the ducklings free access to swimming water until at least one month old, otherwise losses from cramp may occur. Never place more than 20 to 30 ducklings in the same pen, as they will crowd under and around the hens, and many will be smothered. If four hens are set on one dozen eggs each, they should be all placed in a pen at one time, and all other stock kept away from them. They will not then be likely to return to a different nest after coming off to feed. Another advantage is that there will be sufficient ducklings of the one age to place in a pen of their own. Allowing for infertile eggs, and the usual casualties, about 30 to 35 ducklings should be hatched. As these will be hatched in fairly warm weather, three large hens, such as the utility Black Orpington, will cover the ducklings until old enough to fend for themselves. This means that the extra hen can be kept in a coop until she has ceased being broody, and so have her back laying some time before the other hens.

After about four weeks in the pens the ducklings can be given free range in the green-feed plots, and they will pick up a considerable amount of grubs and insects besides having a plentiful supply of green feed always fresh and palatable. The meat

or liver supply can now be reduced by half, and a little crushed wheat supplied in hoppers placed where the hens cannot reach it. A pen of 3in. netting will serve that purpose. When the drakes are about 12 weeks old they should be disposed of; this class of drake is rather small and does not pay to hold above that age. If they can be sold for 1s. 6d. per head locally, it is a better proposition than sending them to the city markets.

If a duck commences laying at about eight months old that is near the average age for a well-bred bird. A flock of ducks usually starts laying in a fair average number, all within a few weeks, and will cease almost as quickly. This is a decided advantage, because it saves penning off non-layers from layers, and saves two different diets being prepared; food used for fattening or growing purposes is unsuitable for laying birds. The latter naturally needs the more costly foods, and must have it if a profit is to be shown. I usually joint about 12 to 15 rabbits and boil them for one hour in a kerosene bucket. I then add about 6lbs. or 7lbs. of malting barley, and allow it to simmer for half an hour. If this is done in the evening the food is usually warm next morning. I then add about 5lbs. or 6lbs. of bran and half that amount of pollard, placing the whole in a tub. This is mixed thoroughly with a shovel, and placed on clean sheets of galvanized iron. This quantity will feed about 90 to 100 ducks. A supply of fresh water should be placed handy so that the ducks may wash their beaks out occasionally during the meal. It will be noticed the ducks will make frequent excursions to the water trough to wash their beaks out if the water is close handy. The ducks are then allowed out of the pen all day. At evening feed I give them the dry grain, on an average about 1½ozs. per bird. They are again penned up at 9 p.m. for the night. Clean drinking water deep enough for a duck to immerse its eyes should be supplied both day and night. The free use of a bluestone solution will keep the water pure and keep disease down to a minimum.

If egg production is profitable then why not devote the same attention to it as one would to any other class of farm produce. Egg production in the lower South-East is profitable, and more so than most other farm produce at present ruling prices. If one breeds a good class of duck, such as the Fawn and White Runner, they should commence laying in early April, when eggs are at their highest, and continue laying consistently until the end of October, and even longer. With normal seasons and prices one should average at least 1s. per dozen. Those facts, if worked out, should be convincing proof that there is a profit in ducks. (Secretary, F. White.)

VISITING DAYS AT KYBYBOLITE AND BERRI.

Visiting days at Experimental Farms are functions somewhat similar to the popular homestead meetings which most Branches of the Bureau arrange annually. At homestead meetings members have an opportunity of seeing what the other man is doing, gaining information and where appropriate offering advice. The additional advantage of such meetings at Experimental Farms is that first hand information may be gathered in connection with experiments and the benefit of this applies in a special manner when there is a near relationship between the work of the experimental farm and the work on the farm of the visitor. It is not surprising therefore to find that Bureau members and others attend these visiting days in large numbers for the purpose of seeing for themselves the results of experiments and of ascertaining the progress of trials intended to solve local problems which arise from time to time and which are subjects of constant discussion at Branch meetings.

Within recent years there has not been any lack of public interest in the work of farms under departmental control. It may even be said that such interest has increased: at all events, it can be inferred from recent attendances that farmers continue to recognise the value of experimental work and that no matter what set of conditions may occur—whether prices be high or low, or yields good or poor—the need for experimental and research work will always exist. Furthermore, the large attendances reported from visiting days manifest confidence in administration and are signs that the farming community realise that these farms are fulfilling—or are attempting to fulfil—the objects for which they were instituted.

At the Kybybolite Experimental Farm on November 10th the Manager (Mr. L. J. Cook) conducted a party of about 400 visitors over the experimental fields. Among the party were Hon. M. McIntosh (Commissioner of Public Works), Messrs. M.

Cameron, M.H.R., V. G. Petherick, R. W. R. Hunt, Ms.P. (members for the district), several members of both State Houses, Prof. Perkins (Director of Agriculture), Dr. A. E. V. Richardson and S. Shepherd (Advisory Board of Agriculture), and many visitors from Victoria.

Throughout the day occasional addresses were given at the respective experimental plots by Messrs. W. J. Spafford (Deputy Director of Agriculture), H. B. Barlow (Chief Dairy Instructor), R. C. Scott (Supervisor Experimental Work), C. F. Anderson (Poultry Expert), and L. J. Cook. Dr. A. E. V. Richardson (Director of the Waite Agricultural Research Institute) explained the experiments with pasture plants which are being conducted at Kybybolite in conjunction with the Waite Institute.

The catering arrangements were in the hands of the Kybybolite Women's Branch of the Bureau and the proceeds of the day's business will be devoted to the building of a hall in the district.

The Visiting Day at the Berri Experimental Orchard was held on December 4th, when Mr. N. S. Fotheringham (Manager) explained to 150 visitors the scope of the work at this institution, and with the aid of printed tables he indicated the results of various classes of experiments over a series of years. Growers along the River Murray are very much impressed with the work of the orchard and very seldom miss an opportunity of viewing for themselves the progress of the various tests with vines and fruit trees.

Mr. W. R. Lewis, on behalf of the Berri Branch, welcomed the visitors, among whom were Messrs. J. B. Murdoch (Advisory Board of Agriculture), Geo. Quinn (Chief Horticultural Instructor), F. R. Arndt (District Horticultural Instructor), and A. V. Lyon, of the Merbein Research Station. In the evening the Chairman of the Berri Branch (Mr. E. R. Moss) presided over a meeting, at which Mr. Geo. Quinn spoke on Frost Prevention as indicated in the recent trials at Light's Pass and Mr. Lyon dealt with the preparation of dried fruits for the London market and the treatment of downy mildew.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Rendelsham ...	7/10/33	14	Congress Reports	F. White
Frances	30/10/33	10	Address—A. H. Codrington	C. Kooh
Mount Gambier	3/11/33	11	Question Box	G. Gurry
Mundalla	24/11/33	All members	Annual Social	A. Ross

UPPER NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

BLACK ROCK (Average annual rainfall, 12.57in.).

August 17th.—Attendance, 8.

SIDELINES.—Mr. W. Cozens read the following paper:—"The most profitable sidelines for this district are sheep and cows. For the average farm I suggest a flock of about 300 sheep of mixed sexes, about 50 per cent. of each sex. The ewes should be mated to good rams, thus maintaining the strength of the flock. I recommend Merinos for this district; they are better wool producers and do not trouble the fences like the longwool breeds. At the end of the year, if the flock is not too large, the oldest ewes and wethers should be sold. The next best paying proposition is cows. Eight or nine good cows should be kept on the farm, to calve at different periods, thus having fresh cows in all the year round. The Friesian and Jersey are good breeds for milk and cream, but the Shorthorn produces a larger calf, which sells much better than that of the smaller breeds. Always breed from a pure bred bull if possible. Pigs can be raised at a profit if looked after and fed in the proper manner. Each farmer should have two or three good sows, which should have two litters each year. The Large White-Berkshire cross produces a good type of bacon pig, which grows very

quickly. Crushed grain and milk is the most economical feed for pigs. They should also have a small paddock for exercise. Another very satisfactory sideline is poultry; the best breed for the farm is the Black Orpington, the hens being excellent layers and good table birds." (Secretary, R. Kitto.)

WEPOWIE (Average annual rainfall, 12.46in.).

July 3rd.—Attendance, 15.

FARM CROP INSURANCE.—Mr. L. Jasper read a short paper on this subject. He emphasised the advisability of covering the crop against "hail and fire," so that in the event of damage the farmer had something to carry him on instead of a complete loss if destroyed uninsured. Members generally agreed with the principle, but stressed the point that premiums were excessive—in instances almost prohibitive—and for crop insurance a reduction should be made, for no person would knowingly destroy his crop. Different districts should have different scales of charges, for a district without railways and picnickers, &c., risks of fire were not at all great.

July 31st.—Attendance, 12.

CROP ACREAGE REDUCTION IN AUSTRALIA.—Mr. T. Orrock read the following paper:—"Much prominence has been given in the press recently to the proposal that the main wheat-growing countries of the world should consider a compulsory limitation of wheat production. Apparently this has been suggested with the object of reducing the surplus of wheat and thus forcing up prices. Quite a number of prominent men consider that the plan should be adopted in Australia. Some of the reasons advanced are satisfactory from a farmer's standpoint, provided prices rose so that as much revenue would be received from, say, 750 bags as from 1,000 at present prices. If a manufacturer finds he is over-producing, he immediately reduces hands and the taxpayer has in many cases to support more unemployed. If the acreage of wheat were reduced 25 per cent. in Australia, the farmer might receive more value for his produce, but with the extra time at his disposal he would be able to handle the whole process, from planting to delivering the crop, without employing the usual extra labor. Less labor would be needed at the sidings, there would be less railway revenue, and reduced handling and shipping at the ports. Then, if the object of using up the world wheat surplus was achieved, wheat prices would be forced up so that all the extra unemployed that had been forced out of work by reduced production would have a hard time. As a community

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we should protest against such a procedure in this country. Another reason why Australia should continue to grow as much wheat as possible is because of the ever-increasing markets of the East, and the fact, according to statistics, that averages of the United States of America and Canada are already down 10 per cent. According to official reports from Japan, Australia exported 684,309 short tons of wheat to that country in 1932, out of a total import of 829,562 tons, increasing her shipments by 114,023 tons over 1931. Australia's proportion represented 82.49 per cent. for 1932 of Japanese imports, compared with 71.05 per cent. in 1931. Further, China is also increasing imports of our wheat and flour. Shipments of wheat and flour to these markets have doubled during the last 12 months, and are developing at a rate that no one in our country anticipated. Australia has never had a surplus of wheat worth mentioning, and if a portion of our population find it hard to buy bread with a surplus in the world, how would it be if this surplus never existed? Wheatgrowers should resist in every way the suggestion of limiting production. Keep on sowing more and more wheat. The time is not far distant when there will be a shortage of wheat all over the world." (Secretary, E. Roocke.)

MIDDLE-NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

BLYTH (Average annual rainfall, 16.77in.).

September 22nd.—Attendance, 12.

"At what stage should wheat and oats be cut for hay, and what are the best methods of stooking and stacking."—Mr. A. Schulze, in the course of a paper on this question, emphasised the need for preparing the binder before entering the crop, and to have everything in perfect working order. Wheaten hay should be cut just when the grain was leaving the milky stage. Oats could be left a little longer, because he desired more grain. The hay should be stooked soon after cutting, and left in the stooks for about 2 weeks before carting, the length of time depending on weather conditions. When stacking, the sheaves should be placed with heads out, the roof with the butts out, and the stack covered with straw as soon as possible. The higher a stack could be built the better, because of greater weight; and mice had greater difficulty in entering a tightly-built stack. (Secretary, R. Eime)

KOOLUNGA (Average annual rainfall, 15.40in.).

August 29th.—Attendance, 15.

Mr R. Bentley read a paper dealing with the care of the brood mare at foaling. He stressed the need for having the mares under observation as foaling time approached, and dealt at length with measures that were necessary in the event of a mal presentation of the foal. (Secretary, I. Jones.)

KOONUNGA.

June.—Attendance, 17.

PESTS AND THEIR EXTERMINATION.—Mr. J. Helbig read the following paper:—"Rabbits were imported into Australia for the purpose of meat production. However, the climatic conditions were so favorable for their multiplication that they very soon got beyond control, and instead of a source of revenue they became a pest. In the early days a rabbit canning factory was established in Eudunda, in those times which did quite a good trade. It was chiefly on account of the rabbits that most of the farmers left the tablelands. Extermination of rabbits was a very serious problem in those days. When I was a lad of 14 my father was share farming on the Balden Estate, and some of the farmers that were there before us told us that the damage done to their crops was so serious at harvest time that every morning they would have to start chains further into their crops because of the ravages done by the rabbits during the night. All the large dams on the run were fenced in with wire-netting, in two corners of which a V-shaped inlet was provided with a round opening in the inward corner into which a 2ft. long funnel-shaped netting spout was inserted to stand about 18in. above the ground at the end; through this little spout the rabbits could get in for a drink, but could not find their way out. They accumulated in such numbers inside the fence that after being killed loads of dead rabbits had to be carted away every morning. Later on again it was discovered that a mixture of bran and phosphorous was a very effective remedy to get rid of rabbits. The mixture was made into little lumps the size of pigeon eggs, and towards evening men on horseback with bags full of baits around their shoulders rode around the run and spread them about the warrens. The method of poisoning was very thorough, and in a very short period the rabbits were cleared out, also opossums. Hunters told me that where they used to get 200 or more opossums in a night they had a job to get a dozen or so after the phosphorous poison. Another introduced pest was the fox. It was calculated that

the fox would keep rabbits in check, but he also soon proved a pest. The eaglehawk was also a serious pest; they played havoc with lambs and poultry. The crow has a particular fancy for fresh eggs on the farm. Yet another pest imported from abroad was the starling—also with a good intention—to destroy the tick on sheep, but like all the other pests it was not satisfied with what was intended for it. Cherries, grapes, and other fruits were more palatable. The destruction of the starling is one of the most serious problems of fruitgrowers, and should receive serious consideration from the Agricultural Bureau. Also the Government should take up this matter seriously. Starlings are very hard to poison, and the only reasonable chance of checking them seems to be to destroy the eggs and young ones at breeding time. It might be possible through the Agricultural Bureau to form bird destruction clubs, raise a levy of so much per acre on all fruit and grape growers, and with the funds available pay a bonus on all eggs and heads collected; the menace is becoming so serious that this matter should not be treated lightly. The same applies to sparrows and also grass parrots with the exception that they can be more easily poisoned. The best time for poisoning is seeding time; after having harrowed the land strew good clean wheat over the top, especially near bushes where birds harbor. Let them eat it all up, and then repeat the procedure with a few packets of poisoned wheat. The minors and silver eyes are also troublesome pest; they are hard to poison, and shooting seems the only remedy. Ticks on horses and cattle are not common pests in this district, and only occur on rare occasions. They are best checked or destroyed by mixing lard or fat with a little kerosene then rubbing the animals with same. Ticks on pigs are of a more serious nature and more common, but are very easily destroyed by brushing the pig with some waste motor oil. It is also a good plan to have a post in the centre of the piggery with old ropes or bags nailed around it and same well saturated with oil. A pool of water with oil poured into it, and where they will wallow, will keep them clean. The sheep tick is another very serious pest. Sheep can be kept entirely free from tick by thoroughly dipping every year with a reliable dipping powder or liquid. Large sums of money are annually expended by householders for the extermination of flies. One of the most common means of destroying the flies is by hanging up glued flypapers to which they will stick. Another common method of destruction is by spraying with prepared fluids. Rats and mice are pests that seem to appear periodically and do an enormous amount of damage. Mice can be easily destroyed with poisoned wheat or other poison, but rats are more difficult to get at because they are particular and cautious. One way to get them is to pour good wine in small cups for several nights, then later dose the wine with strychnine, and the result will be surprising. Rats are exceptionally destructive in sheds without floors; they also do immense damage in haystacks where they are very difficult to destroy, but very often they mysteriously disappear as suddenly as they seem to arrive." (Secretary, G. Cartwright.)

MURRAYTOWN.

August 25th.—Attendance, 12.

A paper was read by Mr. F. Tregenza on "Efficient Farm Working," in the course of which he said that it was better to concentrate on doing a small area properly than to try large areas and slum the working. In the discussion which followed, Mr. Starr said that there was no inducement for a farmer to make an extra clean sample when harvesting, because he only got the same price for clean or dirty wheat when selling. He thought all wheats should be graded. Mr. Bleischke asked what depth the writer fallowed, and Mr. Tregenza replied 3ins. to 3½ins. Mr. Clogg said that if rains held off until late in the seeding period it was practically impossible to kill all weeds if the crop was to be sown in reasonable time. Mr. Joppich spoke of keeping all work done up to time in its season, and also re the cleaning of wheat for seed. The Hon. Secretary said that if it was right to dock wheat under f.a.q., then the merchants should pay extra for any over the f.a.q., because to make a seed wheat sample from the header a quantity of wheat would be blown over the tail of the winnower. Mr. Ryan said that to make a perfectly clean sample all wheat should be put through a winnower before being taken off the farm. (Secretary, E. Pitman.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Yandiah	3/11/33	12	Address—E. L. Orchard..	O. Borgas
Beetaloo Valley	30/10/33	14	Address—J. B. Harris ...	B. Giddings
Black Rock	10/11/33	11	Congress Report	R. Kitto

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

SUTHERLANDS (Average annual rainfall, 10.82in.).

August 3rd.—Attendance, 85.

The meeting took the form of a debate between a team of three members of the Brownlow Branch and three members of the Sutherlands Branch on the subject "That Sheep are of Advantage on the Average Murray Flats Farm." The Brownlow team debated the affirmative and Sutherlands team the negative, speakers being as follows:—Brownlow—Messrs. G. H. Biar, A. O. Steinborner, H. Semmler; Sutherlands—S. Baehnish, V. Weis, W. Twartz. Mr. Charles Brooks acted as adjudicator, and gave his decision to the Brownlow team by a majority of 15 points. Mr. Biar contended that the average Murray Flats farm would consist of approximately 800 acres, and 100 sheep could be kept as a sideline. The cost of making the farm sheepproof would be covered by the return from the sheep in the first year. The return from 100 sheep in a year with wool at 7d. per pound and an 80 per cent. lambing—lambs valued at 10s. each—would be £35 for the wool and £40 for the lambs. Mr. Steinborner thought sheep were better than any other livestock for short grazing and keeping fallows clean. Mr. H. Semmler said sheep would have feed for six months on stubble which would otherwise have been burnt off. The fact that a majority of farmers kept sheep was ample proof that it was a profitable investment. Mr. Baehnish said prices for lambs and wool were so depressed that farmers were turning to more profitable sidelines such as dairying and poultry keeping. Mr. Weis said farmers could make more profit by keeping dairy cows than by keeping sheep. Oats could be grown and fed to cattle, which would not be possible if sheep were grazing on the land. Farmers were at present living on their weekly return from the sale of butter and cream. Mr. Twartz said the time used in the care of sheep was a great loss to the farmer. Sheep were a false investment because of the expense for beginners due to the erection of sheep-proof fences, woolsheds, dipping arrangements, and erection of yards. (Secretary, E. Schiller.)

STOCKPORT (Average annual rainfall, 16.88in.).

July 27th.—Attendance, 12.

THE FARM GARDEN.—Mr. R. Koch read the following paper:—"The creation of a garden and orchard on farms in this district is made somewhat difficult, because water of a suitable quality is not available during summer, but it is not impossible. For instance, fruit and citrus trees can be grown with a fair degree of success without artificial watering, provided that during the first year or two they are given special attention during summer. The best time of the year for planting any fruit or orange trees is during July and August. Most of the cold of winter is escaped, while in an average year spring rains will give them a fair start. Orange and lemon trees when bought from the nurseries are generally dug up with a little less than a cubic foot of soil left on the roots, about which is tied some thin hessian. Providing this soil is there naturally it should on no account be removed before planting. The best way to plant the tree is to dig a hole about 2ft. square and 2ft. to 2ft. 6in. deep. If the clay is rather shallow it should be removed from the bottom of the hole and substituted with good soil or broken-up bones and crockery. After filling in the hole to within about 1ft. or 9in. of the top the tree should be placed in the hole with the soil and hessian complete and firmly pressed down. During the first summer or two it may be necessary to water the trees at intervals. The best way to do this is to take the surface soil away from around the stem of the tree for a distance of about 2ft. and then fill the miniature dam with water; when it has properly soaked away mulch the soil which has been watered and replace the surface soil. This tends to keep the roots well down and it will be found that a given amount of water will do more good in this way than if it is poured around the tree at random. For citrus trees it is necessary to keep them protected from strong winds. Quite an inexpensive breakwind can be made from titree. If care is taken in selecting straight brushes and the same are woven tightly together between several wires and then neatly trimmed at the top, it will not be unsightly. One of the most important items in the growing of fruit trees is the cultivation of the soil. During the latter part of winter the soil in between the trees should be ploughed to a depth of about 5in. or 6in. It should be harrowed, and after every rain in summer worked over with a cultivator-harrow or garden cultivator. Vegetables can be grown with a fair degree of success in the district during the winter, and cucumbers, beans, and tomatoes can be grown during summer providing suitable water is available. The best time for planting potatoes is the latter part of July. A patch of good soil should be

selected to which has been applied a liberal dressing of stable manure. The soil should then be ploughed or dug to a depth of about 6in. and the potatoes planted. If the ground is ploughed the potatoes are planted in the furrow, taking every third or fourth furrow, if a single furrow plough is used. The ground should be harrowed two weeks after planting. After the potatoes are up and fairly well established, the soil in between the rows should be cultivated after every rain, taking care not to disturb the roots and young tubers. Cabbages, cauliflowers, swedes, lettuces, beetroot, onions, &c., should be sown in seed-boxes, and when the plants have grown to a suitable size, planted out. The soil must be kept well cultivated and free from weeds. Carrots, radishes, turnips, &c., should be planted in well-worked seedbeds and subsequently thoroughly weeded. Cucumbers and beans should be planted in a prepared trench or plot and seed placed about 6in. apart, sowing seeds which have been sprouted, damp flannel being used for preference. With tomatoes it is necessary to first raise seedlings and then transplant in rows about 1ft. 6in. apart. In order to get the best results with tomatoes they should be trained on a low trellis. This prevents the fruit from rotting and induces better cropping. Melons, trombones, and marrows and similar vegetables can often be grown with reasonable success without watering, providing the soil is suitable and properly cultivated. To properly look after a garden takes no small amount of time, but most people will find their patience well rewarded. A neat and well-kept garden and orchard helps to beautify any farm homestead as well as being a considerable saving in the form of greengrocer and fruiterer's bills." Mr. D. Higgins read a paper, "Calf Rearing." (Secretary, L. Klaffer.)

THE ANIMALS AND BIRDS PROTECTION ACT AND ITS RELATION TO AGRICULTURE.

[Paper read by E. Boehm, Sutherlands, at the September meeting of the
Greenock Branch.]

Most people have a very vague and nebulous idea of the real aim and object of protective legislation, and in this paper it is my intention to justify the existence of the Act, and also to acquaint you with certain facts concerning the economy of South Australian animals and birds—especially referring to their bearing on the man on the land. The object of the South Australian Animals and Birds Protection Act is to prevent the wholesale slaughter or exploitation of unique, rare, and interesting native animals and birds. In the early days hundreds of thousands of interesting native animals were destroyed annually in many districts, and quite often without adequate reason. While some kinds were able to hold their own against the warfare which man waged against them, others were not able to do so, and therefore rapidly disappeared. It was therefore found necessary to place legislative restriction on such wholesale decimation, and the Act under review was passed and became law. As regards birds, trappers formerly captured thousands of some kinds, and they were sent to Europe. If this had been permitted to continue a number of species would have died out altogether before very long. The attractive prices which some kinds realised overseas acted as a stimulant to bird-catchers, and it will be seen that without protective legislation all that would ultimately have been left of some of the most sought after ones would have been a few dried and stuffed skins in our museums.

Wholly protected animals in this State at the present time include the different species of bandicoots, animals ranging in size from a little bigger than an ordinary rat to the size of a rabbit. They are all marsupials, and belong to the pouched group of mammals. Their food consists of vegetable matter and insects. Many years ago bandicoots were numerous in the southern districts of the State, but now they are practically extinct over most of their former habitat. A few still linger in the Mount Lofty Ranges, on Kangaroo Island, and in the Far North. One kind lives on Nuyt's Archipelago in the Great Australian Bight and off the West Coast. None of the bandicoots are of economic importance nowadays because they are far too rare.

The banded anteater is another protected animal. It is about the size of a rat, and is of a rusty color with whitish transverse bars. The tail is bushy. This interesting marsupial became extinct many years ago, and all that is left are a few specimens in our museum.

The duck-billed platypus—a curious animal which lays eggs in a burrow in the banks of the stream which it frequents—is exceedingly rare, if not extinct, in South Australia. There may be a few families living in the extreme South-East, and in any case they do not harm anything man needs, and therefore merit their protection. Dormouse opossums are also protected. They are tiny rusty-brown creatures about

the size of a mouse, and live in hollows in trees. They are of no economic importance. The same remarks apply to the flying squirrel and the native bear. The native porcupine or echidna feeds on ants, and does not interfere with anything produced by the agriculturist. It is oviparous or egg-laying like the duck-billed platypus, and is one of the most interesting and primitive creatures in the world.

WALLABIES AND OPOSSUMS.

Other wholly protected species are rock and toolache wallabies, both of which are almost extinct, and protection came too late to save this exceedingly beautiful wallaby. White kangaroos, which are also protected under the Act, do not represent a separate species.

The only wholly protected animals on which there can be any debate on economic grounds are the opossums. In districts where fruit is grown the bush-tails do a certain amount of damage when they become numerous, but as they only breed once a year and produce only a single offspring at a time there is no fear of these multiplying rapidly and developing into an economic menace within a few years. While I admit that the brush-tailed opossum is one of the best known of Australian marsupials, and the only one that appears to be adapting itself to the advance of human enterprise, one cannot lose sight of the fact that during the open seasons of the past which, it must be borne in mind, coincide with the period when the young are still dependent upon the mothers, they have been ruthlessly slaughtered to supply the demands of the skin trade.

In consequence, their numbers have been very much depleted during recent years, in spite of occasional reports from a few isolated areas to the effect that they are extremely numerous and are proving a great pest. Such reports are nearly always exaggerated, and are only an attempt to have an open season declared so that those people who wish to make a few pounds out of skins may do so at the price of many interesting and distinctively Australian animals.

I shall now deal with the animals which are only partly protected under the Act. Fallow deer are not native to Australia, and are not likely to become a pest in the State. They are protected between July 1st and December 31st. Kangaroo rats are protected for the same period, yet they are extinct in the agricultural areas, and there is no possibility of their establishing themselves again. A limited number of these interesting animals is still to be found in the Far North. Wombats are protected for only six months of the year, yet they are fast disappearing, and may become extinct in the settled districts before very long. They still have a stronghold on a few stations in several districts, but it is a precarious hold, and total protection should be granted to them.

Undoubtedly the presence of numbers of wombats in the more densely settled areas would be undesirable, particularly as they dig holes and heap up a large quantity of soil and stones, but there are vast tracts of country where they could live without doing considerable damage.

KANGAROOS.

Kangaroos are protected from October 1st to March 31st, except on Eyre's Peninsula, where the protection comes in the period between March 1st and July 31st. In some districts kangaroos are still numerous enough to constitute a pest, for they do considerable damage to crops, but where the State as a whole is concerned the protection accorded them is inadequate. And I will say the same of wallabies, of which a number of kinds were found in the State in the early days, but which are now nearly all extinct except on Kangaroo Island. As in the case of the opossum the does of the kangaroo are killed during the open season when the young are still dependent upon them, so that the destruction is doubled. The abundance of kangaroos in a district does not give a true indication of the species over a large area. Favorable conditions in a limited area will cause animals from the less favorably situated districts to migrate to it, and thus the number is increased. Wholesale slaughter in this area where the animals are numerous means a reduction of the number in all the adjoining areas. This is one of the chief reasons for the rapid disappearance of certain kinds of animals. They concentrate in a favorable locality in bad times, and owing to the large number in that locality they are slaughtered.

It seems to me that even kangaroos should be totally protected over the whole State, because they are becoming rarer year by year. There is no reason to justify the open season other than getting skins for sale and indulging in the sport of killing.

The Animals and Birds Protection Act enables the farmer to destroy kangaroos if they are damaging his crops in the closed season, providing that no part of the animal is sold. This protects the landowner, and there is no excuse for an open season other than making money by the sale of skins and having the pleasure of murdering interesting and characteristically Australian native animals.

Species which are unprotected include the fox, rabbits, hares, wild dogs, rats and mice, and domestic cats run wild. Seals are not protected except within Spencer's and St. Vincent's Gulfs, Pearson Island, and north of a line from Cape Catastrophe to Cape Borda; thence to Cape Hart and the Murray Mouth. Rats and mice have little in their favor, but it is regretted that several interesting and rare native kinds do not enjoy Legislative protection. They live outside the settled districts, and do not harm anything we need. Domestic cats run wild perform a signal service where rabbits are numerous, but they are doing a tremendous amount of harm by slowly but surely exterminating some of the rare small native animals and birds. The domestic cat run wild vies with the fox in being one of the most baneful disturbing influences now at work among our small native fauna. It behoves every landowner to discourage the cat and the fox for these reasons alone. Seals are unprotected because fishermen claim that they prey too extensively on useful fishes, but naturalists generally feel that our seals should be totally protected.

BIRDS.

The great majority of the 374 kinds of birds recorded for South Australia are wholly protected under the Act. They are either insectivorous, carnivorous, granivorous, fructivorous, or honey-eaters. Those which are insectivorous deserve every bit of protection they can possibly get. We have not the severe winters of Canada and Europe, and therefore we need the insect-eating birds to keep the different kinds of insects in check, otherwise they would increase phenomenally, and disaster would overtake agriculturists. The quantity of insects which some birds eat is remarkable, and one needs to know the full facts before their real value can be appreciated. Most of the protected species are insectivorous. The carnivorous birds include hawks, owls, and butcher birds. They do a valuable service to the maintenance of Nature's balance by preying on sick birds, thus preventing the spread of disease, and by controlling mice, rats, and rabbits. It is a grave mistake to regard all hawks and owls as pests, and to condemn all kinds for the misdeeds of a few.

The granivorous birds include finches. None of the native finches are harmful, and they therefore deserve protection. The fructivorous species do not find favor with orchardists and gardeners, but fortunately none of them do any considerable damage. Honey-eaters—which include several parrots—destroy honey-dew, the exudation of scale insects. The sooty mould of citrus trees breeds in this honey-dew, and by feeding on it the birds assist the gardener to combat sooty mould fungus.

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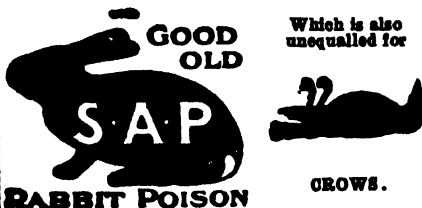
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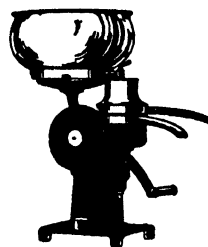
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Partially protected birds are the maned goose and ducks of different species. They are protected between August 1st and February 14th. Some of the ducks are very rare, and should be on the totally protected list.

Quail of all species are protected from August 1st to February 18th. While the stubble, button, and painted quail are common, other kinds are very rare, and should not be permitted to be shot. Snipe are protected between March 1st and September 30th.

Totally unprotected species are the blackbird, crow, corella, galah, sulphur-crested cockatoo, cormorant, starling, sparrow, greenfinch, goldfinch, musk lorikeet, Adelaide roseella, silvereye, goshawk, eagle, blue mountain parrot, and native hen.

Mr. W. D. Bruce (Chief Inspector of Fisheries and Game), who was asked to comment on the above paper, said the fox was largely responsible for the destruction of many of our small animals and ground birds. Our few remaining specimens of the khola or native bear had also been taken by foxes, and this pest had very considerably reduced the numbers of scrub and rock wallabies. The only place in the State where these animals were in any great numbers, and where they had increased to such an extent as to become a nuisance to farmers, was on Kangaroo Island. There was no reason why wallaby skins should be taken for gain, because the skins were practically worthless, and it did not pay to market them.

The provisions of the Animals and Birds Protection Act empowered every land-owner or occupier of land to be a protector of our native fauna, and the Act made it an offence for any person to enter or be upon any land—other than Crown Lands—for the purpose of taking any animal or bird without permission of the owner or occupier of the land, so that any person who was desirous of making his holding a sanctuary could do so under this provision.—[Ed. Journal.]

INSURANCE.

[Paper read by Mr. L. Burton at the October meeting of the Saddleworth Branch.]

This is a common subject of discussion, and affects all producers, whether it be life, fire, burglary, accident, employer's liability, or some special risk. The most common is fire insurance and most people with any property at all have fire cover. It is very cheap and well worth the few shillings a year involved. Fire insurance costs from 4s. less 10 per cent. discount per £100 upwards, the rate increasing for more inflammable classes of property and their contents. Also factories or stores in the vicinity of one's property which may contain the means of starting a fire.

No fire insurance risk is given unconditionally, and policy holders should read through the conditions set out therein. This is particularly necessary with new companies who offer enticing cover to get business. The older firms have a set policy and do not deviate from it. The first thing in taking out a fire policy is to give a true description of the property to be covered; any misrepresentation in the case of fire will cause the claim to be disputed. For instance, do not say the division walls of the house are brick and stone, when perhaps one is matchboard. Do not over-insure. The fire insurance companies, as an association, employ highly paid officials (fire assessors) and in the event of the destruction of a building, &c., by fire an assessor makes a valuation of the damage. If the house is covered for £1,000 damages by fire, and the property is only valued at £500, then in the case of fire and complete destruction the assessor's valuation of £500 will be paid, and the extra premiums that have been paid for a £1,000 cover will be a waste of money. It is better, when taking out a policy, to make a conservative valuation of the property to be insured and not insure for more than that.

EXTRA RISKS AFTER POLICY HAS BEEN TAKEN OUT.

This is a point often overlooked by policy holders and it should be attended to at once. By not advising the company the policy holder leaves himself open to having the policy declared void in the case of fire. These extra risks involve additions or partitions to the house or property of inflammable material, such as wood. If, for example, the back verandah is enclosed with iron lined with wood or with weather-board, and a bathroom and heater is installed at one end, this is an additional risk and the company should be advised so that the description of the property is true and up to date. If electric light and power points are put in the home, advise the company immediately; this is an additional risk. The company will stamp the policy "Electric light and power instalment allowed and fire from this source covered by policy." The same applies to the use of and installation of petrol air plants. In the case of lighting the home with petrol air gas, the companies require that the gas producing plant must be installed away from the house and protection provided between the plant and the house. If the house is covered with one company and the contents

insured with another, advise the companies concerned immediately. Electric light companies and the Postmaster-General's Department always instal current or telephones in accordance with the Underwriters' Association conditions and proper earth wires and lightning arrestors are provided. If the wiring is not in accordance with the regulations it must be rectified. The electric light companies will pass the wiring of any electrician if requested to do so; if it fails to come up to regulations, then they will not instal their meters. Even if a wireless plant is installed make adequate protection by providing the lead in from the aerial with lightning arrestor and an outside earth. These arrestors are cheap and can be installed in a few minutes. Such property as money in notes and coin, deeds, and company scrip for shares, and Commonwealth bonds are not covered by an ordinary policy, therefore do not leave such valuables in a house unless kept in a fireproof safe. Any bank or safe deposit will accept these for safe custody. Loss or damage by explosion is not covered by ordinary risk, so that all ammunition and explosives must be kept in a very safe place. All implements and haystacks should be insured to their market value.

EMPLOYER'S LIABILITY INSURANCE.

This insurance is compulsory and it behoves everyone to see that all their employees are covered. An open policy at a very cheap rate can be obtained from any company and this will cover permanent and casual employees. If any casual labor is employed, even a man weeding the garden or chopping wood for a day a week, or a day a month, see that he is covered with an employer's liability. Many claims have been upheld by the court. A man calls at your farm or house and wants work, and if you employ him for only half a day or an hour or two still makes you liable to pay damages for any accident incurred.

LIFE ENDOWMENT INSURANCE.

The most important feature is to give a correct description when applying for cover. Proof of age is most important, supply concrete evidence such as the production of birth certificate. All questions asked in the proposal form must be true; many a life policy claim has been upset because the original proposal form was incorrect as to answers of vital questions. The payment of all claims is subject to the personal statements made in the original proposal.

ACCIDENT AND SICKNESS POLICIES.

These require special care in complying with the conditions. Most people pay their premiums and believe that they have full protection. It is only when they come to make a claim that they realise that certain printed conditions on the policy negatives the company's liability in a great many circumstances. Many policies contain a clause reading:—"This policy does not cover injuries sustained while the insured is performing any unlawful act . . . or acting in violation of the rules, regulations, or by-laws of any person, corporation, company, or public authority having power to make same, or otherwise exposing himself to any unnecessary danger or risk." A case under a policy such as this comes to my mind. John Brown took out a policy for £500 containing the above clause. He was fatally injured in a collision between a motor car and a buggy which he was driving. His executors lodged proof of death with the company and a claim for £500—the amount of the policy. The company made inquiries into the cause of death and then denied liability. Their letter of advice to the executors stated that Brown sustained injuries whilst performing an unlawful act, namely, driving a buggy at night without a light and consequently the claim was null and void. The matter went to the Supreme Court in Victoria and the

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presiding Judge was asked to give his decision whether the driving of a buggy at night without lights represented an unlawful act within the meaning of the policy. The Judge upheld the insurance company, and in conclusion stated "I regret that it is not obligatory on the company to bring under the notice of the proponent at the time the policy was taken out and to inform him of the actual protection afforded. The clause exempts the company from liability if injury occurs while any breach of the traffic regulations, however trivial, is being committed, whether the breach be the cause of the injury or not. When I reflect that we are so hedged in with regulations to-day as to make it scarcely possible for any of us to avoid committing a breach of some regulation with the possibility of injury while doing so, it seems to me that an accident policy in the terms of this one affords no protection in many cases." Policy holders must make a point of reading their insurance policies, and have any part that is not clear to them explained by some experienced person. This is absolutely necessary when the insurance is taken out with some company that is not one of the old established institutions. Many of the new insurance companies have so worded their policies that they do not give the degree of protection that the assured believes he is receiving. What appears to be a very complete policy is very often whittled down by printed conditions in the policy. So read through all your policies and understand the conditions and you will have a good idea of the actual protection the policy gives you. Sickness policies contain dozens of complaints which exempt the companies and this branch of insurance should be left to lodges.

COST OF INSURANCE.

I am a firm believer in life assurance to provide for old age or the family, fire insurance, employer's liability, and motor car comprehensive policies. The cost is small. Every farmer should insure his improvements to at least half their market value. Crops and haystacks are essential items for insurance. Besides the peace of mind that the cover affords, the cost is trifling. In crop insurance it would take over 100 years of premiums to make up the loss of one fire. A house property would take at least 200 years of annual premiums to pay the loss of one burn out, &c. When farm incomes are small, there are not many farmers who could withstand the disaster of being burned out. Cover the crops for a reasonable amount, also improvements, &c. Do not over-insure; it is an unnecessary waste of money. Careful valuations on the conservative side is what the companies will pay in the event of a claim.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Truro.....	20/11/33	14	Address—M. Tohl	L. Davis
Tarlee	20/11/33	15	Tour of District	N. Clarke
Light's Pass ...	27/11/33	20	Address—D. Farmer	C. Verrall

WESTERN DISTRICT.

BUTLER.

August 15th.—Attendance, 22.

LAMBS FOR THE FREEZERS.—Paper read by Mr. G. Young:—"The Merino ewe if used for the mother should be large-framed and plain-bodied. Merino lambs, if they mature early, sometimes develop into quite attractive export carcasses, but the majority of them, by the time they reach maturity, become leggy and long in the neck and cannot compare with the short, thick carcass produced by the Down cross. Last year endeavors were made to popularise the pure Merino on the English market, but this will be a difficult job. The South Down crossbred lamb, or other Down cross, is firmly established in England, and the only hope of successfully marketing the pure Merino is to ship separately under a special Merino brand and push the sales by the use of a special propaganda. Even then it is doubtful whether the prices realised would compare with those obtained from the attractive Down cross. As regards the sire for the export trade, the South Down stands alone. The experience at Port Lincoln Freezing Works proves that when the Merino dam is crossed with a Down sire, such as the South Down, Shropshire, or Suffolk, a very good export lamb is obtained. The South Down especially has been outstanding, and this is the sire on which New Zealand and Victoria have built up their export trade. The average age

of maturity is 3½ to 4 months old; when a lamb is over 5 months old it is generally considered that it is not then a spring lamb for export. It then has a tendency to lose its bloom and become "hoggetty." The dressed weight required is 28lbs. to 32lbs. During the past two years the demand has become stronger than ever for light weight lambs. People generally are not rearing big families and their spending power is very limited. The result is that not only with lambs, but with all classes of meat, the demand is universally for small joints. During the last few months in London third grade light weight lambs have been quoted above first grade heavy weights. The difference between live and dressed weight varies according to breeding, condition, and travelling. Various tests have shown that, generally speaking, a dressed lamb loses 50 per cent. plus 2lbs. of its live weight; a lamb weighing 60lbs. live weight should dress approximately 28lbs. This does not always follow. If lambs are two or three days away from their mothers before killing, they may lose 50 per cent. and 4lbs. or 5lbs. The killing season on Eyre's Peninsula is much later than the other side of the gulf. At Port Adelaide killing is commenced about the end of June, and sometimes in September at Port Lincoln. The killing season lasts about three months. It should be possible to have spring lambs ready in August, but if the season is extended beyond November grass seeds become troublesome. Lambs are preferred in wool, as an assurance is then given that they have not been taken off their mothers. If lambs are shorn they must not be separated from their mothers any longer than is absolutely necessary. Two or three weeks should then elapse before they are killed to allow any surface bruising or shearing cuts to disappear. There is always a danger of the lambs receiving a setback through being shorn. Cartage by rail has been proved by experience to be preferable to cartage by motor lorry; the percentage of bruising on the railway has been very small compared with the lorry. This is sometimes due to carelessness on the owner's part. The cost by rail is approximately 1s. per head per 100 miles, which compares favorably with motor transport. The advantage of the lorry is that the lambs can be picked up at the yard and there is no further handling. Handling is very important; the lambs should not be grabbed on the back to be caught. This leaves bruises; they should be caught by the leg and with two men to load and clasping their hands under the brisket the lamb is lifted gently into the lorry. This applies where there is no ramp or race. The blowfly pest should be treated with something that will not cause hard lumps to remain on the carcass; kerosene and oil is very effective and soothing. The London market at present is much more favorable than at this time last year, but it is impossible to forecast the future. Skins are selling better. The indications are that returns will be better than last year." (Secretary, P. Lange.)

KOPPIO (Average annual rainfall, 22.40in.).

August 30th.—Attendance, 15.

DRAINING SWAMP LANDS.—The following paper was contributed by Mr. G. Gardner:—"In times of low prices for all products off the land it is necessary to make every acre as productive as possible, and to carry the maximum number of livestock. There are many acres in this and surrounding districts that are of very little value in their present condition, growing nothing but rushes, cutting grass, and native couch grass. There are hundreds of acres of this class of country in patches of from two to 20 acres. These flats and gullies are waterlogged, and in many cases fairly heavily charged with salts, but if some economic system of drainage could be adopted this almost useless land might be made the most fertile part of our holdings. There could be no general scheme because the land to be treated is in separate, disconnected plots, and each plot would have to be treated according to conditions. That would mean a lot of extra fencing and labor, but the small paddocks would be very useful, and if the drainage was successful would soon compensate for the extra work and would enhance the value of the farm. Some years ago I put a small drain through the centre of one of those waterlogged flats and as there was a fair fall it soon washed out and became about 2ft. deep, with the result that the land on either side of the drain for about 3 chains is now well drained and produces a good stand of grass and herbage, whilst the remainder of the flat is still boggy and waterlogged. In the early days of settlement of this district when farm work was done with two horses, or more often four bullocks and a single plough, it was customary to work these wet flats in lands about ½ a chain wide, throwing up the crown and leaving small drains about 11 yards apart. The land so treated grew heavy crops of oats, etc., and gave big returns off small areas. I also advocate more top dressing and the conservation of fodder in the form of ensilage or hay so that stock will be hand fed when rains are late, and not have to put them on the market when there is not much demand for them." Mr. Schultze instanced how a swampy flat was drained and fodders were greater, producing good crops and many kinds of vegetables. Mr. Smart had a good black

flat which a few years ago had been very productive, but of later years had been spoiled by magnesia or salt. He thought it would be impossible to get rid of the magnesia off some patches. Mr. Low cited a case in the South-East where very wet land had been drained by ploughing in very narrow lands and planting clover. Mr. Brennand thought it was a mistake to plough where the salt patches existed, because ploughing increased the salt area. (Secretary, T. Gardner.)

LAURA BAY.

August 8th.—Attendance, 21.

ECONOMICAL FARMING.—Mr. E. Shearer read the following paper:—"Every farmer should take advantage of the benefits to be obtained from such Government institutions as Roseworthy College and the Agricultural Bureau. The rotation of crops for this district should be fallow, wheat, oats. It is impossible to keep fallow clean without the assistance of sheep. A flock of 200 sheep is sufficient for the average farm. Sheep not only lessen the cost of production of wheat on fallowing, but also reduce the butcher's bill to a minimum. The wool cheque (200 x 7lbs. at 6d.=£35) has an attractive value, in that it usually comes along at a particularly depressed period. For economy in the household it is essential that the farmer has a few cows—enough to supply household needs. Three pure-bred cows and a bull eat far less than the usually 10 or so mongrels one too often notices. Compare the herd-testing results in the *Journal* with the housewives' returns and see why pure-bred stock should be kept. To improve the present stock, buy a subsidised bull of good milking strain rather than good cows. One good bull is worth three scrub bulls, which should be sold to the butcher before they are old enough to do any damage. Friesian cows are best for this district. Do not overstock with cattle; sheep have first claim on the feed in the scarce season. It is far easier to feed half a dozen cattle on oat-chaff than it is to handfeed 200 sheep. Pigs are a paying proposition if not kept too long. For the first five months a pig eats about 3lbs. corn per day; this given twice a day with milk and as much clean water as the pig can drink is all that is required. With the exception of the horse, no animal responds to care and surroundings better than a pig. The pigsty should be clean, dry, and protected from heat and cold. One hundred laying Leghorns will give 20doz. eggs for sale, in addition to those used in the home. This is equivalent to 10s. per week. Barnyards lay when the price is low, and are either setting or 'doing nothing' when prices are high. The cockerels should be separated as soon as possible, fattened and used for the table. Infertile eggs are the best for the export market. Hens begin to go back after the third year, so why keep them? If possible a few hens should be penned for breeding purposes and the roosters constantly exchanged for better ones. The fowl shed should be high enough to walk around in; the perches need only be 18in. high and about 2ft. apart. Fowls are early risers, therefore the door should be opened early. Do not forget to shut the door at night to guard against foxes. For economy's sake co-operate with your fellow-farmers. Farmers would be the strongest body in the land if they pulled together for the good of the industry instead of from a selfish individualistic point of view. In two years, if individualism is carried on, the farmer will still be in the same old position of opposing his neighbor instead of uniting and forcing other people to see that the farmer and other primary producers must be prosperous for the world to progress." (Secretary, W. Eason.)

MALTEE.

August 3rd.—Present: 10 members.

PRUNING THE VINE.—Address delivered by Mr. O Chant:—"The Parts of the Vine.—The trunk or main stem arising from the soil supports the framework, lifting it to the desired height above the ground. From this arises the main arm or arms (usually two in the trellised vine) which support the secondary arms and the annual fruiting shoots arising from the secondary arms. These annual shoots or canes bear buds which produce the crop in the following summer, and are called the fruiting wood. At times—when the pruning has been too severe for definite reasons or on account of incorrect judgment on the part of the pruner—shoots develop from the main stem or main arm called 'water shoots.' These indicate that the vigor of the vine has been under-estimated in the number of buds left upon it at the winter pruning. But these water shoots may be utilised to fill a space in the framework of the tree if such is the case, or a properly placed water shoot will afford the opportunity of renewing a secondary arm. Another type of annual shoot grows from a bud on the buried portion of the vine, and is known as a sucker. This has no value except that perhaps the parent vine be damaged very badly, when the case would necessitate the removal of the parent to train the sucker in the former position of the parent vine. This is only adopted when the parent vine was originally grown from a cutting.

Structure of the Shoot or Cane—The annual shoots of the vine particularly, are clearly divided into distinct portions—nodes and internodes. The internode consists of a large central pith enclosed in woody tissue which is in turn contained in a thin closely adhering covering of bark, composed of continuous and closely packed parallel fibres. The node, or thickened portion, holds no central pith, its space being occupied by a wedge-shaped septum which is more compact in character than the fibres which surround it. The bud is joined to the upper end of this wedge-shaped septum at the node, and is protected by the bark being wrapped around it at this point. This non-pithy septum has a distinct value, especially in wet countries where pruners often cut through these woody divisions when severing the canes as a step towards avoiding decay. Physiologists claim that the bud is—for nutritive purposes—primarily connected with the internode above it, in that the bud draws nutriment from this part when it starts to grow in the spring, but whether the vine will be benefited sufficiently to compensate the extra labor involved in severing these dead terminals at the next winter's pruning, is open to question. But the possibility of injuring the grape vine during tillage operations is certainly increased by the long projecting internodes. On the other hand, these terminal internodes are a definite advantage when left at the end of a cane for tying the cane on the wire, for this part soon dies, and growth is not restricted through tying on the wire.

The objects of pruning may be briefly summed up:—(a) To increase the size, appearance, and quality of the fruit. (b) To secure regular crops over a long period. (c) To accomplish both these aims on the most economic lines.

In the application of the art we strive:—(a) To modify the form of a tree to meet the requirements and to counteract unfavorable climatic conditions. (b) To reduce or stimulate the production of wood growth or fruit bearing as the case demands. (c) To remove injured or worn-out parts. It is well to take into consideration the following rules or laws which seem to invariably operate in the growth of plants:—(1) The vigor of a plant or a shoot is dependent upon the leaf surface, i.e., the tree with most leaves is usually the strongest grower. (2) The nearer a shoot approaches the vertical position the stronger will be its growth. The sap in plants flows most freely to the highest point of each shoot. (3) The nearer a shoot approaches the horizontal position so its vigor diminishes. Vertical shoots usually run to wood alone, while those tending towards the horizontal usually produce fruit. This goes to show that fruit bearing is an attribute of moderate weakness rather than of great vigor. (4) The lesser the number of buds upon a branch the stronger will be the growth made by each individual shoot which arises from these buds. Therefore, heavy pruning of the top tends to increase the production of strong wood growth. This is because there is a balance between root and top so that when the top is reduced the roots send up still the same amount of food for the reduced number of buds. Prune the top of newly-set trees. (5) If the root

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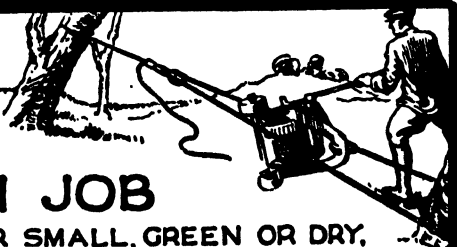
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system be reduced the vigor of the top growth will be correspondingly diminished. Therefore prune the roots of rank-growing unfruitful trees. When roots are damaged and removed in shifting a tree from the nursery the top should be reduced also to maintain the balance or otherwise stunted growth or decay will result. (6) When a number of shoots are growing at different levels upon the same plant, generally the topmost shoot absorbs most sap and outgrows those below. This gives rise to the practice of pinching out the growing points of the highest shoots on young trees. This lessens this natural advantage. (7) Deformations of any kind diminish the activity of plants or of those plants situated directly above them. (8) Within certain limits the fruit production of any plant or shoot diminishes with increased activity of its vegetation. When a mature tree is forced into making vigorous growth its production of fruit is lessened. (9) The smaller the number of fruits the better their quality and size. This fact is taken into account when pruning the tree. Some fruitgrowers thin their crops while still in a very early stage of development. In this way each fruit receives a larger share of the plant food elaborated.

Season for Pruning.—Winter pruning is usually looked upon as the most important, and is done when the wood has ripened and the leaves have fallen from deciduous trees. The general effect of pruning in this period is to stimulate increased growth when the season of vegetative activity returns. It is of great value in shaping young trees or renovating older trees which lack vigor. Also by reducing growth to get a better shape, &c., the buds are also reduced, and thus the fruit production is also taken into account. Summer pruning is carried out when the tree is in a state of vegetative activity. A reduction of the green parts of a tree tends to administer a check, because it suddenly removes some of the absorbing surface—the leaves. The admission of strong sunlight has a stunting influence because it retards the flow of sap to the extremities of the branches. Fruit bearing seems to go hand in hand with decreased vegetative activity so that summer pruning has been utilised to induce the fruiting habit in trees of strong growth. This early application of summer pruning is useful in giving a temporary check to a vigorous shoot which threatens to outgrow its fellows and thus upset the balance of the young tree.

Pruning Tools.—(a) Pruning Knife: Thin blade which is concave with the handle on the same side convex. Useful for smoothing the edges of rough saw cuts, finishing off the rough ends made by the secateur in forks and sharp angles, and in pruning roots of young trees. Makes a very clean cut. (b) Pruning Shears or Secateurs: The best makes have a strong framework which refuses to bend under very great pressure. In all good types the blade is removable, and can be replaced by a new one costing about 1s. This blade should have no shoulder so that very little lateral pressure will be exerted upon the shoots, thus bruising them for some distance. In cutting a shoot the blade should always be held next to the plant.

Treatment of the Fruiting Wood.—The spur may be defined as a portion of the last season's wood carrying from one to three buds. A rod is a portion of the previous summer's cane possessing from 10 to 16 buds. It must be remembered that rods on strong vines often do not have 10 buds. If it were practicable, it would be simpler to prune all vines into spurs, but the habit of bearing peculiar to each variety must be taken into account. Observations show that on some vines the buds upon the lower ends of the annual canes are the ones which produce flowers, while in others it is the buds situated well out along the cane—these are usually the vines displaying great vigor. Others again produce bunches more or less all over the ripened canes. These observations have led vinegrowers to classify varieties into spur-pruned or rod-pruned types. In practice a vigorous vine of the spur-pruned section can retain a greater number of spurs, and may also carry the full number of buds. But a weak vine of the same variety should have its spurs reduced in numbers, and also each spur may be reduced to one or two buds. If a greater number of spurs are retained than should have been left, a crop of numerous but inferior fruit will be obtained. If the pruning is too severe, dormant buds grow into water shoots or suckers. Generally speaking, for table grapes or raisins, it is desirable to prune hard in order to keep up the quality of the fruit, although water shoots occur with moderate frequency. In the case of grapes for wine making leading authorities affirm that in good strong soils where the vines are vigorous rod pruning is applicable to most of the varieties usually classed among those spur pruned.

Systems of Training.—Grape vines are naturally climbing plants, but under cultivation for economic reasons they are trained either as low bushes or as climbers on trellises. Spalier is the term applied to a trellised vine on which a permanent arm is trained out from the stem at the same height on each side and in the same plane. If more than one pair is retained each are on the same level. Some forms of Spaliers have several pairs of such arms, but such a form is not to be recommended for use excepting to such persons who may desire to follow the work of trellising purely as a hobby. The best and most simple type is to permit one vertical stem only and one pair

of horizontal arms to each vine. The newly planted vine is pruned back to a single spur of one or two buds with a view to inducing at least one strong shoot to arise during the ensuing summer. This shoot should be secured to a stake or upright support as it ascends. The Bordelais Spalier type has been recommended by Professor A. J. Perkins as suitable for the wine grape (certain varieties) when grown in comparatively poor soils. This form is suited to a cheap trellis of two wires with the lower one about 12in. to 15in. above the soil. The upper wire is placed about 20in. above the lower one. The type consists of a stem about 10in. high, and on each side of the stem is a short main branch bearing either one rod and a spur or two rods and a spur according to the strength of the vine. The vine is trained by pruning to one spur at the second winter season, at the same time seeing that the two topmost buds are on opposite sides of the spur and face the wires. The following summer these two buds are encouraged to make good shoots. Next winter both of these are pruned as spurs with from three to six buds each, thus forming the main arms; the resulting growth should give at least two good canes from each arm. In the following winter one of these is pruned to a spur for wood production purposes, and the remaining two are made into canes for fruit bearing during the coming summer. The vine is now formed, and the annual pruning consists of suppressing the previous year's rods, removing all water shoots and suckers, and converting two shoots of the previous summer's growth to a spur and rod respectively on each arm. Strong vines may carry two rods and two spurs. The spur, being reserved for wood production, naturally regulates the framework of the tree, and is in part comparatively permanent in character. The rod is more temporary—fruit bearing. To prevent undue extension the spur should be taken from the cane situated lowest upon the main arm in the direction of the main arm. In the course of time the main arms become impoverished with old scars or become too long, and should be replaced by means of suitably placed watershoots as described previously. (Secretary, V. Schwarz.)

MOUNT HOPE.

August 8th.—Attendance, 8.

DAIRYING VERSUS RAISING BABY BEEF ON EYRE'S PENINSULA.—The following paper was contributed by Mr. J. H. Vigar:—"Owing to its geographical position Eyre's Peninsula is somewhat at a disadvantage from a dairying point of view. Port Lincoln—the only outlet where creameries are operating—is at the extreme end of the rail and road transport service. Apart from the closer districts the greater portion of the agricultural areas is outside the 30-mile radius from Port Lincoln, and transit charges make the butterfat returns so low that it does not pay the producer. Taking the South Australian butterfat average at 150lbs., at the present time butterfat returns for Eyre's Peninsula would not exceed 6d. a pound clear, therefore the return per cow would be £3 15s., and no dairying can be made to made on that return per cow. *Baby Beef.*—I have had experience with this means of deriving returns from my dairy cows. I have never sold baby beef under 18 months old for less than £6 per head on trucks, and have received as high as £9 for a 10 months old heifer. The former value was realised when prices were at about to-day's level; the latter about five years ago, when prices for butter and beef exceeded those of to-day. The baby beef I have raised has been the Jersey cross, and they would not be better in quality or weight than the average beast on the Peninsula. The experience I have had of both methods convinces me that the raising of baby beef pays best, and the work is not the same tie and drudgery. Where only a few cows are kept—say, two to four—a certain amount of the milk is needed for domestic purposes. It is an advantage to control the calves by having a securely fenced paddock adjacent to the cowyard and seldom allowing the calves to run with the cows. The cows are quieter, always come home to be milked night and morning, and do not develop sore teats as is sometimes the case when calves run with the cows. It is then an easy matter to secure sufficient milk for the house. I have a chain and a strap attached to the calf's neck, and hook the calf back to be able to get the richest of the milk. Some members may raise the question of pig and poddy values, but they can be cut right out of the reckoning. Under my management a couple of pigs may be kept, and with most small dairies, after the calves are reared with skim milk, no more than two or three pigs can be kept through to baconers. The poddy may be worth 30s. at 12 months old but even this does not equal up the returns, to say nothing of the extra work involved. To secure the same value for the poddy as from the baby beef off the mother the poddy would have to be fed for an extra 18 months or two years, and probably many of these beasts are sold as stores by the men who bred them, and only realise half their value. If conditions are such that the breeder decides to hold the baby beef beast to exceed two years it will be found that that beast will keep its condition and will, in most cases be easy to turn off in prime condition owing to its strong constitution and better start in life." (Secretary, A. Myers.)

YADNARIE (Average annual rainfall, 14.09in.).

August 15th.—Attendance, 9.

RABBIT DESTRUCTION.—Mr. M. Way, who read a paper on this subject, spoke in favor of poisoning as the best method of keeping the pest under control. He suggested the following procedure:—For the first few days distribute wheat that has been soaked in water, but not poisoned, along the fences and around the burrows and warrens. When it is noticed that the rabbits are cleaning up the grain, poisoned wheat—by soaking it in water and then sprinkling brown sugar and strychnine over it—should be substituted. Mr. Way used as much strychnine as would twice cover the small blade of a pocket knife to treat 1gall. of wheat, and had found this a most effective method. Mr. W. Brown condemned the use of poisoned grain, because it was responsible for the destruction of many valuable native birds. (Secretary, E. Spriggs.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Mount Hope....	29/8/33	6	Formal	A. Myers

EASTERN DISTRICT.**(EAST OF MOUNT LOFTY RANGES.)****LONE GUM AND MONASH.**

August 22nd.—Attendance, 12.

GRAFTING VINES.—In the course of an address on this subject Mr. F. R. Arndt (District Horticultural Instructor) said that little had been done to investigate the grafting of European vines on European stocks, though the disastrous visitation of phylloxera in France and later in Victoria caused great investigations into the best stock of resisting quality from America for different varieties of European vines. However, some work had been done on the River, and it was definitely known that sultanas and currants did well on Doradillo stock, and bore crops of good quality and quantity up to at least 10 years. Also it had been found that Shiraz was not to be recommended on a Doradillo stock. Currants as a stock for sultanas gave good but small fruit. In the actual grafting it was advisable to have the cuttings for the scions prepared in ordinary lengths and buried in moist but not wet soil before they commenced to burst their caps on the vines. The scions should be a little drier than the stock, and it was not advisable to graft while a great rush of sap was coming from the stock. If the vine used as a stock was cut down just below the wire before grafting day it would allow the excess sap to drain away. The sap must be rising, but not in flood. A split was made in the top of the sawn-off stump, which should be just below ground level. Then the scion containing at least two buds was pared wedge-shaped and inserted in the split, one on each side, great care being taken that the cambian layer beneath the barks of both stock and scion were placed adjacent—actually touching—each other. The more that was touching and the firmer the wedge in the stock the more chance there was of a “take.” One point to remember was that the scion should be pared slightly thicker on the side intended to touch the bark of the stock. After that had been done damp, loose earth should be heaped up all over the stock and scions to keep the latter alive and green. It was advisable to keep the heap over the stock all the first season to enable the scions to make a strong growth of their own roots. (Secretary, R. Telfer.)

MOORLANDS (Average annual rainfall, 14.76in.)

August 16th.—Attendance, 10.

WORKING A LIMESTONE BLOCK.—Paper read by Mr. J. Herbert:—“A limestone farm is one of the hardest to work, especially where there is a wide variation of the types of soil. The best method—from the start of clearing—is to give the ground three crops—two of wheat and one of oats. With good burns this should practically kill all shoots. Any ground too rough for wheat should be ploughed dry occasionally, to loosen the soil. It will also encourage the growth of grass. A dressing of super when ploughing will also help in this direction. Fallowing is suggested for the wheat-growing land, but care must be exercised, otherwise the soil will drift on the sandy loam and leave bare rock. For this class of soil the best method is to plough in July and leave in the rough state. Later in the season turn sheep on this ground to keep weeds from seeding

which have been missed by the plough. Another method is to fallow early, then cultivate and drill in oats at the same time to check drift. This crop can be fed down late in spring. Work with the first rain after harvest and the land will be nearly as good as bare fallow. Where sheep are not available the best way is to plough the ground to be cropped dry to bury all weed seeds and give a good germination with the first rains. This will obviate a lot of working later in the seeding. The grey and red ground should be fallowed in July and worked over late in September or early in October with a cultivator, using wide shares to leave ridges that will help to check drift. Another essential practice in this district is to get the crops in early; finish seeding by the first week in June. Crops sown after that date rarely yield as good as those sown earlier. Keep the stones picked; if this is not done the ground is hard to work, is rough on man, horse, and implements. In the early stages of development, cropping with oats cannot be overdone. Portion of the oats can always be sold, and the rest fed to stock." (Secretary, R. Wilmshurst.)

RAMCO.

July 31.—Attendance, 8.

IRRIGATION.—The following extracts are taken from an address delivered by Mr. A. Seary, who considered that the question of water used and seepage on blocks was one needing consideration. He had taken a block on which seepage was bad with the water table close to the surface. He put down trial holes in an apricot block, which showed no roots of any value below 3ft., consequently the quantity of water needed was enough to fill that 3ft. Further quantities would be of little use. The water table was rising, and it was necessary to reduce it. In winter the table fell a little, and in summer the land was irrigated and filled up the loss and added an inch or two. In his opinion if they applied only sufficient to fill up the 3ft. it would be the end of their troubles. Different soils required different amounts of water to soak it. He had experimented, and found that with an average stream using 30 to 36 2in. outlets he could water an acre in 1½ hours. That was for average soil. For sultanas with a heavy crop with peas ploughed more water would be necessary. How to spread the water between rows was a problem. Some suggested the alteration of the layout of the block, but that was expensive. He had rows of currants 9 chains long with a very shallow water level. At the first irrigation he put a very deep furrow and banked between the rows and turned two full outlets in the one furrow, and broke in between the trellis. At the second irrigation one furrow watered them. At the third irrigation he could use four furrows, and he had got rid of underground water. On the centre of the block he had a drain 4ft. 6in. deep. Last season the drain remained dry, therefore he had no water going down, and had lowered the level. A lucerne block, where water had been turned in at night and left until morning, had a very high water level. He kept the water off one year, and fenced and turned horses in. He put down holes, and found that the water had gone down to 8ft. from the surface. Sultanas around the lucerne plot improved 99 per cent. by weight of dried fruit, because there was no water lying around. Another patch had 2 chains of stony ground, then a type of soil that would not take water—the first part would wash but the other run over. With a quick slope of 18in. to the chain for the first irrigation he used two furrows, and at every trellis post and once between he banked across and turned in the water, making a pool, say, every 6ft. It was costly, but next time the water had soaked away. Now he could water normally. As a general principle in irrigating as many furrows as possible should be used. At the beginning of the season it was advisable to get underneath the vines, because later on that could not be done. To put that plan into practice it was necessary to keep at it night and day. He did the night watering and another man the day work. The object was to get the water over the waterlogged patches, and then let them dry a little. It took a lot of work to get the ground into its present condition, but he was getting some result. A good discussion followed. Mr. F. Lewis said the speaker had done a tremendous amount of work. At Ramco the problem was different, for they had a steep slope and very deep sandy soil. He had one patch where 2in. outlets took four days to get through, yet that patch was first to show need of water. (Secretary, J. Odgers.)

INSECT AND FUNGUS PESTS AND THEIR CONTROL.

(Notes from an Address delivered by E. Leishman, District Horticultural Instructor, at the August meeting of the Murray Bridge Branch of the Agricultural Bureau.)

The most common diseases of plants are those caused by the depredations of insects and mites, or by minute parasitic plants, called fungi. To combat satisfactorily any fungus disease or insect pest, it is necessary to have some knowledge of its life history. Fungus diseases are divided into:—(1) Those that are external, and are known as

Ectophytic fungi, such as Powdery Mildew. (2) Fungi which live in the internal structures of the plants, which are called *Endophytic*, such as Peach Leaf Curl, Shothole of Apricot, Fusicladium, &c.

External fungi, such as Oidium or Powdery Mildew of the grape vine, can be treated after infection. This fungus sends its root-like growths through the stomatas of the leaves, tender shoots and developing fruits to the internal cells, and drains upon the food supply of the plant. The control measure adopted for this disease is to dust the vines with flowers of sulphur. The heat of the sun causes some of the sulphur to vaporise, and the fumes passing through the vines destroy the fungus.

Internal Fungi are kept in check by the same spray washes, with the exception of Anthracnose of the vine, for which winter treatment with acid-iron solution is essential. Applications of fungicides for the internal fungus are purely preventive, for once the disease enters the tissues of the plant it cannot be destroyed without destroying the affected part. This being the case, one must study the conditions and times under which the spores are most likely to germinate, and coat the plant with a fungicide before the spores germinate. The chief fungus diseases which concern growers on the River Murray are Peach Curl Leaf, Shothole of Apricot and Almond, and Anthracnose of the Vine. Peach Leaf Curl Fungus can be controlled by spraying with copper mixtures such as Bordeaux and Burgundy, when the pink of the blossoms is just showing through the bud scales. Spraying in autumn just before the leaves drop is a good control for Shothole, and spraying again at the pink stage in spring successfully checks this disease. For Black Spot on apples and pears, a fungicide such as Bordeaux or Burgundy mixture, and lime sulphur should be sprayed at the pink stage and after flowering. Autumn spraying has proved successful. Anthracnose, or Black Spot of the Vine, is controlled by swabbing the vines in mid-winter, with a mixture made by pouring 3lbs. to 5lbs. of sulphuric acid over 35lbs. to 50lbs. of iron sulphate, then dissolving this in 11galls. of boiling water. Spraying with a 10 per cent. solution of sulphuric acid is often used instead of swabbing. Spraying with Bordeaux mixture when the shoots are 4in. or 5in. long will check the disease.

Insect Pests.

Insect pests are divided into two sections:—(1) Mandibulate, or chewing insects; (2) *Haushtile*, or sucking insects. Chewing insects—for example, codlin moth, curculio beetle, cut-worms, &c.—are controlled by coating their food with poison—usually an arsenical compound—which kills the pest. Sucking insects, for example, scale insects, aphides, mites, &c., are controlled by spraying the insect itself with liquids, such as nicotine, oil sprays, &c., which burn the tender skin of the insects or suffocate by poisonous gasses, such as hydrocyanic acid gas, carbon di-sulphide, &c. The Codlin Moth has quite recently spread to the River. The eggs are laid on the plant, and when they hatch the grubs progress towards the centre of the plant. Spraying should therefore be done when the petals have fallen, and before the calyx of the apple closes up. The hatching period depends on weather conditions. Four or five sprays of arsenate of lead are necessary during the growing period. Some experimental work has been carried out in the Hills on control by means of traps, which take the form of molasses in water hung in a vessel in the tree. Bandages have also been used, and the latest kind are made of corrugated cardboard saturated with poison. Unfortunately the poison loses a good deal of its power towards the end of the season. Curculio Beetles should be treated with arsenate of lead, 1/10.

Aphis.—For Black Aphis the controlling principle is to spray with a contact spray of nicotine on alternate days, with 3 sprays at least. This pest makes its first appearance in spring, when the small leaves are coming out. The green aphid is larger than the black, and lays its eggs throughout the winter. Tar distillate spray has been tried at Mypolonga, with very good results.

Scale.—Black and Brown Scale of the orange are not regarded as serious, and are fairly easy to control. Thin out the trees and spray with white oil or kerosene emulsion in October or February. Red Scale is the worst scale on citrus trees, and is a most prolific breeder, producing living young. The scale really feeds on the most succulent part of the tree, and is seldom found on the harder growths. The most efficient control is by fumigating with hydrocyanic acid gas, by enclosing the tree in an air-proof tent. This is the most practical method, although white oil will give a 70 per cent. control. Fumigating gives a 98 per cent. kill, and gives freedom for about 3 years if all the orchard has been heated.

Cut Worms.—Arsenate of lead is a control, although baits consisting of Paris green mixed with bran are very satisfactory.

Numerous questions were asked *re* control of various pests. Biological control for Woolly Aphis and Red Scale were described.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Overland Corner	1/11/33	18	Address—J. Jones	H. Loffler
Kulkawirra	14/11/33	8	Paper from <i>Journal</i>	H. Elliot
Ramco	4/11/33	7	Paper—J. J. Odgers	J. J. Odgers

SOUTH AND HILLS DISTRICT.

BLACKWOOD (Average annual rainfall, 27in. to 29in.).

August 14th.—Attendance, 21.

MANURING FRUIT TREES.—The following notes are taken from an address delivered by Mr. W. J. Spafford (Deputy Director of Agriculture):—"General reviews in America show that fruit trees give little response to commercial fertilisers. Modern research is now aiming at finding out the effects of a deficiency of foods rather than the effect of a surplus of foods. The main factor is the health of the trees, and often cultivation will do what manures cannot, and it is to be remembered that nitrogen can be supplied by correct cultivation just as well as by manures. Plant food deficiencies—when they occur—are usually nitrogen, phosphoric acid, and/or potash. The only plant food that gives results with any degree of certainty is nitrogen, which has the effect of encouraging healthy growth. In the Government Orchard nitrogen makes the trees grow better, although crops may not show much increase. These trees, however, will probably carry good crops longer than trees not receiving nitrogenous manures. In our climate, soil bacteria collect large amounts of nitrogen from the air. It has been found at the Waite Research Institute that the bacteria in fallowed land collect nitrogen from the air at the rate of the equivalent of a dressing of 600lbs. of sulphate of ammonia per acre per year, so it can be seen that good cultivation can help a lot by keeping the soil in a condition which will enable the bacteria to flourish. Potash deficiency is shown in Europe and Great Britain by leaf scorch, and is corrected readily by applications of potassic fertilisers. This condition is not found here, but this may be due to climatic conditions. Sunshine enables plants to absorb potash, but cold and cloudy climates tend to retard absorption. In this district applications of potash have no beneficial effects. The addition of sulphate of iron seems to keep the trees healthy and tends to make them crop evenly. Phosphoric acid is not plentiful in Australian soils, but trees show no special need for more, and the addition of phosphoric acid gives no economic increases in most cases. Soil texture is very important. Bacterial life is enormous in the surface layers of soils, and their full activity depends largely on soil texture. Wet and sticky soils, as well as dry and powdery, are bad habitats for bacteria. Some bacteria collect nitrogen from the air, and in doing it liberate plant foods from the soil particles. Sourness in our hills soils is not very detrimental to the fruits grown, and so an application of gypsum to the soil might be more profitable than an application of lime, as it improves the texture, although slightly increasing the acidity of the soils. Humus is to be imagined as a sort of colloidal jelly which, surrounds soil particles and holds plant foods. Extra humus is needed in our hills, as it will improve soil texture and bacterial action. In this respect gypsum might give more economic results than green manuring in some soils, by improving soil texture and thus increasing bacterial activity. If trees are not healthy, the first thing to do is to try to improve them by better methods of cultivation. If this does not succeed, then apply nitrogen, the cheapest form of which is sulphate of ammonia. Nitrate of soda is slightly quicker in action. The application should be between 3lbs. and 7lbs. per tree. As nitrogenous manures are very soluble, they quickly reach root level. Oranges require nitrogen, especially in sandy soils. If green manures are used to increase the nitrogen content of the soil, it is necessary to apply phosphoric acid to get a good growth of greenstuff.

"If gypsum is used to improve soil texture it should be applied at the rate of 1 ton per acre. Lack of growth in natural weeds in an orchard is most likely due to compacted soil and continued working, and not to lack of soil fertility. It may be necessary to green manure to keep organic matter in the soil for the bacterial activity. Gypsum may lighten the soil for some years, but occasionally green manuring must be practised to add organic matter. It is essential to have green crops early, and peas and rye are about the only quick growers that are suitable and which can be depended upon to do well. Rye should be planted at the rate of 40lbs. per acre. It is better to use more than less, because a heavy seeding gives rapid and luxuriant growth. All annuals planted should be drilled in with super to give them a good start, because they receive most of the phosphoric acid while very young." (Secretary, H. Goldsack.)

CHERRY GARDENS (Average annual rainfall, 35.03in.).

Attendance, 16.

An afternoon was spent with other residents at a Working Bee in the local Soldiers' Memorial Park, digging and cleaning around ornamental trees, shrubs, &c. Afternoon tea was provided by the ladies. The evening meeting was held at Mr. H. Jacob's residence, when the ordinary Bureau business was carried out. Reports of Congress were received, and items of local interest discussed. (Secretary, A. Stone.)

LANGHORNE'S CREEK (Average annual rainfall, 14.76in.).

August 30th.—Attendance, 7.

Mr. J. B. Natt addressed the meeting on "Breeding up a dairy herd." The speaker outlined how a few years ago he began with a few cheap cows of no particular breed, mostly bought in the sale ring, and by continuing to use the Shorthorn bull had at the present time quite a good herd of grade Shorthorns. He had obtained high prices for heifers and bred some high producers, one or two outstanding individuals reaching as high as 8galls. of milk per day and 17lbs. of butter per week. Mr. Natt preferred shelter rather than rugging and that heifers should not calve until 2½ to 3 years of age. A good discussion followed. (Secretary, P. Nurse.)



Cow Judging Competition, Mypolonga Agricultural Bureau.

LENSWOOD AND FOREST RANGE (Annual average rainfall, 35in. to 36in.).

July 27th.—Attendance, 15.

FORESTRY.—Mr. H. N. Wicks, in the course of an address, stressed the value of trees to mankind. How that they renewed the oxygen supply so necessary for life, made living conditions cooler, and promoted rain. They also kept conditions warmer in winter and, most important, provided timber for the many uses it was put to to-day. Pines were most useful trees, the timber of which was utilised for many industries. America was in a serious position in regard to timber as her consumption was far in excess of her growth. He stated that *Pinus* made better flooring than the imported Baltic, having less knots. Also sleepers for railways treated with cresol outlasted jarrah and red gum. Newspapers consumed annually 15½ million tons of timber. For planting pines the ground should be fairly clear, and the trees planted from 6ft., 8ft., 10ft., or 12ft. apart, depending on the nature of the ground. They should receive attention the first year; a little drop of water sometimes to help them through the summer. The trees grew up until they reached the mature height, and would then develop the trunk. It was highly important to have good firebreaks as a precaution against fires. At the conclusion of his address Mr. Wicks exhibited specimens of turned woodwork made from various woods of South Australia.

Mr. Max Vickers then gave a talk on "Flowers and Ornamental Shrubs." He exhibited many specimens of ericas, grevilleas, fuchsias, wax-plants, acacias, gums, wattles, conifers, and firs, describing each and giving their names. Supper was served by ladies at conclusion of meeting. (Secretary, B. Lawrance.)

MACGILLIVRAY (Average annual rainfall, 19in. to 20in.).

August 24th.—Attendance, 7.

CROP ROTATION.—Mr. B. Wheaton presented the following paper:—"No crop can be grown successfully and economically on the same ground year after year indefinitely. The land sooner or later becomes infested with weeds and disease, or deficient in plant foods. In every district a system of working the land must be developed if agriculture is to be permanent. This system may be a succession of different crops with intervals of rest running over a period of years, or one crop, alternating with a period of fallow or grazing. The state of agricultural development of a country or district is largely indicated by the complexity of its standard rotation. Thus, in the Prairie country a few years ago there was no attempt at a rotation system at all, and the north-west of New South Wales the same practice still applies, while in Great Britain and Europe numerous rotations covering from four to nine years are rigorously observed in different types of soil. In the lower north of South Australia and Yorke Peninsula rotations of three, four, and even five years are in force. Reasons for and objects and advantages of a rotation: Different crops require plant foods in variable quantities and obtain them from different depths. Thus, a variety of crops utilises the sole resources thoroughly; pasture grasses and barley are shallow, while wheat is deep rooted. Each crop has more or less specific diseases which infest the soil if the same crop is grown repeatedly. One way of combating these diseases is to keep the host plant from the soil for a period of years, of which a typical example is take-all and flag smut in wheat, which can be starved out by growing oats, because they are not attacked by these diseases. Each crop is infested, more or less, by a particular weed or class of weeds and the land can be more thoroughly cleaned by growing crops which occupy the land at different seasons of the year. In growing cereals it is essential to have a legume in the rotation, and this can be supplied by burr and other natural clovers, which add considerably to the nitrogen content of the soil. In designing a rotation, no ground should carry the same crop twice in succession, and a leguminous crop should be included every three or four years. In order to maintain the humus supply, one crop in a rotation and all stubble should be grazed off, except in so far as wheat stubbles are burnt, to kill weed seeds and disease spores, and clean the ground ready for early ploughing or cultivating, which should be done immediately after burning to retain the ash. A rotation of fallow, wheat, oats, or barley and pasture has proved suitable for the district. Fallow conserves moisture and makes nitrogen available for the wheat crop, as well as affording an opportunity to free the ground from weeds. If there is suitable rain in summer and the fallow is well worked down, a crop of turnips may be grown if the soil is not too heavy. In addition to providing good sheep feed and saving the natural pastures just when they are beginning to grow, a considerable amount of organic matter is added to the soil. Such a crop does not affect the wheat yield to any appreciable extent, providing it is fed off in time to get the ground in good order for the cereal. Wheat stubble should be burnt off as soon as the sheep have finished grazing on it and the land prepared for barley or oats. The second crop should be sown with a heavy dressing of super, which will ensure a prolific growth of clovers and subsequent heavy grazing in the final course of the rotation. Some of the advantages of this system are that seeding will allow oats, wheat, and barley to be sown at the best time with a substantial addition of organic matter to the soil. The changing of crops is the most effective method of preventing disease, work is more evenly distributed throughout the year, and fertility of the soil is maintained. The inclusion of pease in a rotation—either as a forage crop or for grain—will greatly benefit the soil, and a rotation of fallow, wheat, pease, wheat or oats, grazing, has been used to advantage in parts of the lower north, and could no doubt be used to advantage on the island." (Secretary, J. Wood.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Balhannah	20/10/33	—	Annual Social	C. Grasby
Balhannah	24/11/33	21	Conference Report	C. Grasby
Macleodfield	16/11/33	9	Paper—Mr. Bowen	H. Ross
Mount Pleasant ..	13/10/33	6	Congress Report	W. Smith
Inman Valley ...	18/11/33	31	Address—H. B. Barlow ..	W. Mayfield
McLaren Flat ...	26/10/33	21	Field Day	P. Wait
McLaren Flat ..	27/11/33	—	Visit to R. A. C.	P. Wait

WOMEN'S BRANCHES.

BELALIE (Average annual rainfall, 17.71in.).

September 5th.—Attendance, 21.

A paper, "Making the Best Use of the Sheep," was read by Mrs. F. Cummings. The following were read as answers to questions taken from "Question Box":—"A remedy for sore teats in cows?" *Answer*: Fresh, unsalted butter mixed with sulphur, or vaseline mixed with boracic and lard. A little lard mixed with boracic powder rubbed on after milking will keep the teats from cracking during cold, frosty weather. "How to remove oil spot from a light marocain frock?" *Answer*: Make a paste of benzine and block magnesia, place over the oil spot, and allow it to become quite dry, then brush off. Repeat if necessary. "How to make a good floor polish?" *Answer*: 1 pint turpentine, 2 pints water, $\frac{1}{2}$ lb. beeswax, 1½ ozs bicarbonate of potash. Boil water, potash, and wax until creamy. Take off fire and add turpentine. "To remove inkstains from linoleum?" *Answer*: Oxalic acid rubbed on with a cloth is the quickest and easiest way of removing inkstains from linoleum without injuring the surface. The following is a list of authors sent in reply to a request for a list of "Good Books":—*More Serious Literature* (authors)—J. Galsworthy, Warwick Deeping, Stephen McKenna, and Compton McKenzie. *Lighter Reading* (authors)—D. K. Broster, Guy Fletcher, Georgette Heyer, Peter Kyne, Mary Roberts Reinhardt. *Humorous Works* (authors)—Jacobs, Ben Travers, E. J. Rath. *Stories of Cattle Ranches and Mining Camps* (authors)—Jackson Gregory, A. M. Bower, Zane Grey, William Macleod Raine, Henry Oyen. *Detective Stories* (authors)—Edgar Wallace, J. T. Fletcher, Frank Packard, J. Austin Freeman, T. T. Van Dine. *Adventure* (authors)—P. C. Wren, Dornford Yates, Louis Tracy. (Secretary, Mrs. A. Cummings.)

CLARE (Average annual rainfall, 24.53in.).

September 5th.—Attendance, 12.

CHICKEN AND TURKEY RAISING.—Mrs. A. Blight contributed the following paper:—"This is a very interesting and profitable hobby. For incubator chickens hatching for heavy breeds extends from June to September. The light breeds are later, on account of the cold weather. For successful hatching of chickens, selected stock, a good incubator, and plenty of patience are essential. See that the incubator is perfectly clean, properly regulated, and set in a well-ventilated room free from draughts. An incubator of 60-egg capacity is large enough for a beginner; later on a larger one can be purchased. Choose the best eggs and mark each side with colored pencil, so that there will be no trouble when turning begins. Set the incubator at 103° first week, 104° second week, 105° third week. Start to turn the eggs on the fifth day and test eggs on the seventh day. In testing a small figure, similar to a spider, will be seen in the centre of the egg. This is the embryo, and any egg that does not show this is infertile and must be removed. The third week fill up trays with water and sprinkle eggs night and morning. For this a barber's spray is recommended. On the twentieth day the eggs should start pipping. Do not open drawer until after the hatch is over. When the chickens have dried, remove to the top of the incubator. Do not feed for 24 hours. The feeding of chickens is very important. The first meal should be of sand; later a little warm milk can be given, also No. 1 chick food. Bread is not good for incubator chicks. As they get older, lettuce and raw meats cut very finely, bran mash and chick food No. 2 are recommended. Do not give chickens water; they thrive better on milk. Care must be taken that they do not catch a chill. A home-made brooder is quite satisfactory for small hatchings. Keep the chickens in coops and chick pens until they are big enough to mix with fowls in the yard. *Feeding Turkeys*.—Keep the mother and young turkeys in a coop, cover up at night to prevent chills, and feed as follow:—Hard-boiled eggs with plenty of pepper for the morning meal, onions, lettuce, and scraps of meat chopped finely at midday, and eggs and bran mash at night. Give very little water; I do not give bread." (Secretary, Mrs. McKendrick.)

COONAWARRA.

September 20th.—Attendance, 21.

SWEET MAKING.—Miss D. Stafford read the following paper:—"For cooking, an aluminium or enamel saucepan to hold about two quarts is required. Have a stove that gives a good even heat. Great care must be exercised with the heat in order not to scorch the syrup before the proper degree of boiling has been registered. Sugar boiling is an important item in sweet making; especially does the success of fondants, nougats, caramels, &c., depend upon it. For cooling syrups, a large china meat plate, slightly dampened, is used. It should be perfectly smooth, otherwise it is

likely to grain the syrup sugar. Be careful not to over-color or over-flavor the sweets. See all nuts are quite good; a rancid nut will spoil a whole batch of toffee or fondant, because sugar absorbs flavors rapidly; cream of tar is used with sugar to prevent granulation. Lemon juice is also used for the same purpose. If too much is used, the fondant becomes soft; if not enough it is hard and sugary. *Fondant*.—Place 1½ lbs. of sugar, scant ½ teaspoon cream of tartar, and about ½ pint of water in a perfectly clean saucepan. Set on stove and stir with a hardwood paddle until sugar is thoroughly dissolved. When the batch comes to the boil, skim off all foreign substance carefully, place a lid over the saucepan, and allow to boil 2 or 3 minutes. Then remove the cover, wash down sides of the saucepan thoroughly and boil for 15-20 minutes. Remove from fire and pour syrup on dampened platter and allow it to become lukewarm, then it is ready for the creaming process. With a wooden paddle stir and work the syrup vigorously, turning it over at each stroke to fold the outside edges into the batch. Almost immediately the batch will appear cloudy, and by continuing to stir and beat it, it will finally set into a firm lump of pure white cream, which can be kneaded with the hands. Cover it with a damp cloth. Keep in a cool dry place. Cream centres made from fondant a few days old will be superior to those made from fresh fondant because it has time to mellow. To test without thermometer: Drop a little of the syrup from time to time in a little cold water, and when it forms a firm ball between the fingers it is cooked. *Snowballs* (Misses E. Skinner and F. Jackson).—Soak 1oz. gelatine in 1½ gills water 20 minutes; boil together 1lb. sugar, 1 gill water, boil until sugar is dissolved. Add gelatine and water, boil 10 minutes longer; turn mixture into large bowl. Beat until cool and stiff. Pour mixture into eggcups, marmite jars, small glasses, &c., to set. Turn out, dip into chocolate coating, then roll in cocoanut. *Chocolate Squares* (Mrs. Jackson).—1 pint sugar, ½ cup butter, ½ cup water, 1 cup grated chocolate, 1 tablespoon vinegar. Put all on to boil, stirring all the time. When it thickens pour into buttered dish. Cut into squares. *Clear Toffee* (Mrs. W. L. Redman).—1 cup sugar, ½ cup water, butter size of egg, pinch cream of tartar; boil (without stirring) until it sets when tested in water. *Creamy Toffee* (Miss E. Skinner).—1 cup each cream and sugar, flavoring; boil until sets—about 1 hour. *Caramel* (Mrs. W. L. Redman).—1 large cup sugar, 1 level tablespoon flour mixed well together; add butter size of egg, 2 tablespoons golden syrup or treacle, and ½ cup milk. Stir all the time—about ½ hour. Test in water. Pour on to buttered dish, cut in squares. Chocolate may be added if desired. (Secretary, Mrs. F. Skinner.)

November 16th.—Attendance, 28.

CHRISTMAS GIFTS.—Miss M. Reschke exhibited and explained the making of many gifts suitable for Christmas. These included:—*Pin Cushion*.—Take an empty Alpine Snow jar, line with material, fill with sawdust, sew a frill of ribbon and lace around top, and finish off with a kewpie. *Tie Holder*.—Paint three large cotton reels, and thread on ¾yd. ribbon, making a bow at top. *Work Box*.—Secure a wooden box, hinge the lid, stick a pattern of halved walnut shells around sides and on lid, paint the box and varnish the walnuts, line the inside—the top of this may be padded. *Picture Frame*.—A wooden frame, e.g., three-ply, with a pattern of gum nuts and halved walnut shells stuck on, and all painted. *Shoe Trees*.—Buy the plain trees and 2yds. of two different width ribbons, gather, and put on the shoe trees; paint or varnish the ends. *Handkerchiefs*.—Buy plain handkerchiefs, crochet around, and a spray may be worked in one corner. To make crocheting easier, unthread the machine, and sew around edge of handkerchiefs—this ensures even stitches as well as making it easier to push hook through. *Safety pin holder*; powder puff in crocheted bag; shoe bag for travelling (made from cretonne); knitted socks for father; milk jug covers; crocheted sauce bottle covers; teapot and egg cosies (knitted in wool); duchess set (pen painted); worked tea towels; doyleys (crocheted and worked). Gifts exhibited by other members were:—Mrs. J. Skinner: Fluffy woollen ball (covered tennis ball in colored wools; novel table mat made from different colored wools; a doll made from old stocking and dressed; peg apron; and milk jug covers. Mrs. Hoffmann: A cord to place around neck when sewing with a bag at intervals to hold the thimble, a pin cushion, needle holder, and a scissors holder. Mrs. L. Redman: Mending Bag.—Cretonne with lining and pockets to hold wool, scissors, needles, &c. Mrs. Jackson: Vases. Enamel black a pickle jar or bottle; stick pieces of paper all over—the one exhibited had pictures off jam tin covers cut out and pasted on—they need not be in a pattern; varnish with clear varnish over all. Mrs. O. Skinner: Set of Covers.—Out white net (double) into four different-sized squares, crotchet edges or turn hem and herringbone, thread about 1doz. beads on thread, and secure at each corner; handy in summer time. Miss C. Skinner: Calendars.—Cut black velvet into shapes, e.g., a cat or Dutch windmill; paste on cardboard; paint sky and wall for cat, or scenery for windmill; paste on back loop of ribbon for hanging, and another at bottom to paste calendar on; cover back with brown paper.

CAKES AND BISCUITS.—*Light Pound Cake* (Mrs. Modistach).—½lb. each butter, sugar, sultanas, currants; ½lb. mixed peel; 7 eggs; 1 tablespoon brandy; 1 dessertspoon treacle; ½lb. plain flour; ½lb. S.R. flour. *Christmas Biscuits* (Mrs. Hinton).—6 eggs, ½ pint warm water, ½lb. butter, 1oz. rock ammonia, 2 tablespoons peppermint, 2lbs. sugar, 3lbs. plain flour. Beat butter and sugar; add well-beaten eggs; add flour gradually, and ammonia dissolved in water; keep few weeks before using.

CHRISTMAS COOKING.—Paper read by Mrs. Reschke: "I usually make Christmas cakes and puddings a month or six weeks beforehand so that they have the full flavor of the fruit, &c., that have been mixed in them. Clean the currants, raisins, and sultanas a few days before making the cakes and puddings so that they are then thoroughly dry—wet fruit often sinks to the bottom of the cake. Have fairly solid tins in which to bake the cake. Aluminium saucepans the right size are excellent; they are much thicker than tin, and do not burn. I always use tin cake dishes. Grease them well, and line with clean brown paper. I generally use about four thicknesses, or 2ozs. of brown paper and 2ozs. of white. Christmas cakes need from 3½ to 4 hours' baking. Puddings should also be made a month or so before Christmas. The fruit must be washed, cleaned, and dried beforehand. The length of time the pudding needs to boil depends on the size. Where there is a large family, and a large pudding is required, it will take 4 hours. When sufficiently boiled take straight from the saucepan and hang in a cool, airy place until required for use. Biscuits and sweetmeats are also very nice dainties to make up a week or two before Christmas. Plainer cakes can also be made, and are most useful; friends often come in at Christmas, and plenty of cakes for afternoon teas and suppers, as well as the Christmas cake, are always handy. *Christmas Dinner.*—If a ham is to be used cook it the day before. If it has been cured some time and it is a little dry soak it in clean water overnight, and then boil next day, the length of time being according to the size of the ham. If rather salty allow it to come slowly to the boil and boil steadily for half an hour, and then pour off the water and replace at once with boiling water from the kettle. When boiled sufficiently remove the saucepan or boiler from the fire, and allow the ham to remain in the water until nearly cool. Then remove from the water, peel off the rind, sprinkle with fine bread crumbs, and place in the oven for a few moments to brown them. Prepare the poultry for Christmas dinner the day before, and hang in a cool place overnight. Make a good stuffing with fine bread crumbs, salt, pepper, and mixed herbs, and stuff the bird. Place it in the roaster, sprinkle with salt and pepper, and enough good dripping, and a little water, and roast according to the size of the bird. If a large turkey roast steadily for 4 hours, most of the time with the lid on roaster. Take off the lid to allow it to brown before taking it up. A goose usually takes 3 hours, ducks 2½ hours, and a fowl about the same time. Make a good brown gravy, and serve hot. For dessert serve the pudding hot with sauce. For Christmas tea cold poultry over from dinner, cold ham, and salads. Lettuce salads and jellied beetroot are very nice, or tomatoes and cucumbers. For dessert, jellied fruits and cream, sweetmeats, Christmas cakes, biscuits, and fresh fruits. Cool drinks are also much favored by most people at Christmas, and are very refreshing on a hot day, and some good home-made ones can be made; they are inexpensive and wholesome. *Christmas Cake.*—½lb. each butter and brown sugar; ¼lbs. flour; ½ teaspoon salt; 1lb. each currants, sultanas, seeded raisins; 1 dessertspoon spice; ½ grated nutmeg; 2 teaspoons baking powder; ½lb. each candied peel, almonds, crystallised cherries, figs; 8 eggs; 1 glass brandy; 1 glass cinnamon. Method:—Prepare the cake tins as already described; have fruit ready; chop almonds; wash and dry cherries; sift flour, spices, and baking powder; cream butter and sugar well until sugar is thoroughly dissolved; beat eggs well; add them gradually to the butter and sugar; then add flour and some fruits, more flour and fruit, until they are all used up; lastly the brandy. Do not have it too moist. Bake in moderate oven 4 hours. A few days before Christmas ice and decorate with royal icing. *Plum Pudding.*—½lb. each butter, brown sugar, currants, raisins or dates, sultanas; ½lb. mixed peel; 6ozs. each bread crumbs and flour; little salt; ½ teaspoon mixed spice; 4 eggs; a little brandy. Boil 4 or 5 hours. *Mince-meat for Mince Pies and Tarts.*—½lb. each raisins, sultanas, currants; ¼lbs. apples; 1oz. mixed spice; ½lb. candied peel; ½lb. brown sugar; 1 cup wine or 4 tablespoons brandy; 1 teaspoon nutmeg; ½lb. good beef suet; 1 teaspoon cinnamon. Put all through a mincer, and pack tightly in jars, and tie down. When wanted for pies or tarts use short crust. *Christmas Plum Pudding.*—3 dessertspoons gelatine; 3 cups milk; 1½ squares chocolate or 3 tablespoons cocoa; ½ teaspoon vanilla; ½lb. each chopped nuts and lemon peel; ½ cup each raisins, dates or figs, currants; little preserved ginger; ½ cup sugar; little salt. Method:—Place milk and chocolate (or cocoa) in saucepan; bring to boiling point; add all ingredients except gelatine, and boil 5 minutes. Let cool; dissolve gelatine in ½ cup hot water; add to the mixture, stirring all well. Pour into a wet mould; turn out when cold and set; decorate with holly, and serve with cream or custard. (Secretary, Mrs. Skinner.)

KANGARILLA.

August 17th.—Attendance, 10.

BISCUIT RECIPES.—*Date Biscuits*—Three cups flour, 1 teaspoon cream tartar, $\frac{1}{2}$ teaspoon soda, $\frac{1}{2}$ cup sugar, 1 cup butter, 3 eggs. Add a little milk if required. Roll out, spread half with dates, cover with other half, cut into squares, and bake. Ice the top and sprinkle with cocoanut. Jam can be used instead of dates. *Sunbeam Biscuits*—Two cups flour (S.R.), $\frac{1}{2}$ cup sugar, $\frac{1}{2}$ cup butter, 1 egg, and very little milk. Mix flour, sugar, and butter well together with the egg and milk. Roll out very thinly and spread with raspberry jam and roll up as for roly-poly. Cut in narrow strips and bake in a moderate oven. *Biscuit Making* (Mrs. Turner)—Biscuits can be made to look very attractive by different icings and fillings and by having a number of fancy cutters. For most biscuits the butter and sugar are rubbed into the flour, the eggs well beaten, and mixed into a soft dough, rolled very thin, and cut into shapes and cooked in a quick oven. Most biscuits will keep for weeks crisp and nice if kept in airtight tins. (Secretary, Mrs. M. Steer.)

LAUBA BAY.

August 8th.—Attendance, 11.

HOME CLEANING AND POLISHING.—Mrs. Burk read the following paper:—"Choose a bright sunny morning when intending to give a room a thorough cleaning, then commence by opening doors and windows. Take down the curtains and hang on the line in a shady place if possible. Cover any furniture—after dusting it—with an old patched sheet, then sweep the walls. Sweep under the linoleum, being careful to lift evenly to avoid damaging it in any way. After the floor has been well swept, dust again carefully, not forgetting to pull out all drawers and dust all the ledges on which they rest. Scrub inside all drawers with warm, soapy water and sanoper, then stand them in the sun to dry. Wash all the furniture with hot, soapy water. When dry, apply floor polish with a soft cloth. To ensure a good polish, apply polish thinly and evenly, then rub briskly and lightly with a soft cloth. Scrub the floor, using sanoper on any marks that are obstinate. Use sanoper sparingly as it will remove pattern if used too much. After the floor dries, polish. When using the mop after sweeping a polished floor, place a soft piece of cloth under the mop. This prevents the mop from soiling easily. Dip an old piece of fuji silk in a vessel in which a

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dessertspoon of plate powder has been dissolved in a cup of methylated spirits. When dry, this makes an excellent cloth for polishing stainless cutlery. Wipe the front of the stove with a piece of cloth that has been dipped in kerosene, let it dry before using the polish. The kerosene removes any grease spots that may be there. If linoleum that looks dusty after being swept is rubbed over with a cloth dipped in kerosene the pattern will appear quite bright again."

ONION PICKLES.—Recipe supplied by Mrs. Edson.—Four pounds of large white onions, 3 tablespoons mustard (heaped), 2 tablespoons flour (heaped), 2 teaspoons tumeric, 1 cup sugar, enough vinegar to cover. *Method*—Cut onions in slices, put in saucepan with vinegar (enough to cover), boil for 15 minutes. Mix flour, mustard, and tumeric with a little cold vinegar. Add this and cup of sugar to boiling pickles and stir. Cauliflower or cucumber may be added if liked. (Secretary, Mrs. D. Morrison.)

MILLICENT (Average annual rainfall, 29.76in.).

August 18th.—Attendance, 11.

Various questions were brought forward and discussed. The following recipe for Peanut Biscuits was tabled:—One small cup of sugar, 1 cup butter, $\frac{1}{2}$ cup treacle, 2 eggs, enough flour to make a soft dough. Take brown skin off a cup of peanuts and mix in dough. Cut into rounds and bake in a moderate oven till a nice brown color. (Secretary, Mrs. M. Hutcheson.)

PINNAROO (Average annual rainfall, 14.54in.).

September 1st.—Attendance, 14.

HOME-MADE DRINKS AND CORDIALS.—Mrs. H. Ahrens gave the following recipes:—

Sugar Beer.—2galls. water, 1 cup each hops and wheat, 1oz. bruised ginger, 1 $\frac{1}{2}$ lbs. sugar. Place hops, wheat, and ginger in fine muslin bag. Boil for 1 $\frac{1}{2}$ hours. Bottle when cold, placing one raisin in each bottle, and cork well. Make early in the morning, and bottle same day. Ready for use in 3 or 4 days. *Ginger Beer.*—1 cup each hops, whole ginger. Cut up raisins and wheat. Boil 1 hour or more. Strain on to 3lbs. sugar, add 3galls. water, and bottle beer from the last lot brewed, or to start beer first a bottle of lager or bitter beer will do. Bottle and cork tightly. Ready for use in 3 days (sooner than that after bottles are seasoned). *Stone Jar Ginger Beer.*—Pour 2galls. boiling water over 2 $\frac{1}{2}$ lbs. sugar and 2ozs. crushed ginger, peel and juice of 2 lemons, $\frac{1}{2}$ oz. cream of tartar. Cover pan, and leave until nearly cold. Add 2 tablespoons yeast, and leave to ferment for 2 days. Then strain and bottle in small bottles, with corks securely tied down. *Hop Beer.*— $\frac{1}{2}$ lb. hops, 4ozs. raisins, $\frac{1}{2}$ lb. ginger, 4ozs. wheat, 4lbs. sugar, 4galls. water. Boil all together for about 1 hour. Strain, and add beaten whites of 2 eggs. Stand for 12 hours; bottle and cork well. *Lemon Syrup.*—2lbs. sugar, 2ozs. citric acid, 1 quart boiling water, 2 teaspoons essence lemon. Mix acid, sugar, and essence in a bowl, and pour on boiling water. Bottle when cold. *Raspberry Balm.*—2 cups sugar, 4 cups boiled water. Remove from fire, and add acids to taste. When cold, add essence of raspberry, cochineal coloring, and a little vinegar. *Lime Juice.*—3lbs. sugar, $\frac{1}{2}$ gall. water. Boil 10 minutes. Let cool, then add 60 drops essence of lemon, 2ozs. acid, $\frac{1}{2}$ teaspoon carbonate soda. *Cordial.*—Cut 1 stick rhubarb into small dice. Place in jug, with 1 tablespoon of sugar. Pour $\frac{1}{2}$ pint boiling water over, and stand until cold. *Ginger Beer.*—Put on in a saucepan 2 cups of sugar, 2 dessertspoons cream of tartar, 1 teaspoon tartaric or citric acid, with enough water to dissolve it. Put in a gallon jar, and fill with water, or just add a gallon of water, and bottle. *Chili Wine.*—2 small cups white sugar, 1 heaped teaspoon citric acid, 14 chilies, 1 dessertspoon essence lemon. Put in a large bowl, and pour on 2 quarts boiling water. Add a little burnt sugar to color. Essence of lemon and burnt sugar to be added when nearly cold. *O.T.*—49 chilies, 12 cloves, 4 cups sugar, 2qts. water, and 1 teaspoon tartaric acid. Boil $\frac{1}{2}$ hour, strain, and when cold, add 1 teaspoon essence of lemon. *A Nice Drink.*—1 gall. water, 3 lemons cut in halves. Boil lemons in water, and while boiling add 1lb. sugar, and stir till dissolved. Pour over 2 teaspoons cream of tartar, and stir well. When cool, bottle and cork tightly. Keep two weeks; then ready for drinking. *Lemon Beer.*—1gall. boiling water, 1 sliced lemon, 1oz. bruised ginger, 1 teacup yeast, 1lb. sugar. Stand for 12 hours, and it is then ready to bottle. *Ginger Ale Syrup.*—4lbs. sugar, 2ozs. white ginger, 1 tablespoon each cream of tartar and citric acid, about 36 chilies, and 2 quarts water. Boil all together for 20 minutes, and color with burnt sugar. *Boston Cream.*—2 cups sugar, 4 cups water, 1oz. tartaric acid, 1 teaspoon essence lemon, and white of 1 egg. Dissolve sugar in hot water, and when cold add acid, essence of lemon, and white of egg beaten stiffly. Put small quantity in glass, add cold water, and stir in $\frac{1}{2}$ teaspoon carbonate soda. *Hop Beer.*—3oz. hops, 2ozs. bruised ginger, 2lbs. sugar, 3galls. water. Put on to boil for 1 hour. Then strain, bottle, and cork when cool. (Secretary, Mrs. F. Atze.)

RENDELSHAM.

August 30th.—Attendance, 15.

SPRING CLEANING.—Mrs. Todd read the following paper:—"Blankets, &c., should be washed while plenty of rainwater is available. Turn out drawers, wardrobes, cupboards, boxes, &c. Drawers can be covered with towels or paper to keep out the dust. This will bring to light old garments that can be used for dusters, rubbers, &c., which, when dirty, can be burnt. Small ornaments and pictures can be cleaned and packed into bath tubs. A fine day should be chosen for emptying and wasling bed ticks. An unbleached cover slipped over the bed and removed for washing twice or so a year helps to keep the bed clean, and also saves loss of feathers and kapoc, &c. Pillows can be done in the same way. New blankets and curtains should be placed in cold water a few hours or overnight. Very smoky curtains must be put through several waters to remove as much of the smoke as possible before actually washing. Put the lace and muslin curtains through the wringer or squeeze them by hand. Wringing breaks the mesh and ruins the curtains. When clean shake the curtain and hang them lengthwise on lines to dry. Afterwards pull into shape before ironing, for which only thin starch is needed. Cloudy ammonia and Lux are good for blankets and woollens. Wash and rinse in several waters until clean, then shake and dry. Clear out of the rooms all movable articles, and cover those left with dustsheets and paper. Open doors and windows, and sweep walls and ceiling with a soft broom. Chimneys should be swept by pulling up and down a pine branch, and the soot placed in the garden. Sweep floor well, and burn all fluff and dust. Window frames, doors, and skirtings should be washed with soapy water and flannel. Wash varnished walls and doors with warm water and vinegar, and polish with window leather or furniture cream. Window blinds are best laid on a table and cleaned, because they never hang so well when washed in the usual way. Wallpapers can be cleaned with a dough made from flour and cold water. All loose whitewash, kalsomine, or wallpaper should be removed by washing with an old whitewash brush. Before using kalsomine suitable colors should be chosen for each room. Wire mattresses can be rubbed well with kerosene and flannel, the woodwork polished with furniture cream, and carpets hung on a clothesline and beaten. Cold tea is useful for renovating a carpet. Put beds, blankets, curtains, hangings, &c., out to freshen whilst cleaning the room. Always wash floors as soon as possible after using kalsomine. Strong soda and hot water is good for removing smoke from the ceiling and walls. Wash around the stove with a whitewash brush. See that floors are thoroughly dry before putting down the coverings. Place plenty of papers under linoleum. A sprinkle of borax is good to keep away silverfish and moths in spare rooms. When sweeping a carpet take off the dirt then go over it again. A carpet sweeper is very good for taking up crumbs, &c., after each meal. Glassware should be cleaned with a nail brush. Red paint is very good for finishing off hallways, fireplaces, hearths, and flowerpots. Silverfros is very good in many ways, but black-lead is best for hard wear for stoves where there is a family and continual cooking. A little kerosene or methylated spirits is good in the water for cleaning windows, and helps to keep away the flies. A color scheme can be worked out in the kitchen by painting chairs, dressers, tables, frames of pictures, with curtains and cushions to match. The kitchen or living room is the place where a good many hours of one's life are spent, and should be made bright and cheerful. Coconut matting and grass mats are cleaned by placing on verandah and washing with soap and water. A window leather is good for a final rub over all paint work. Do not forget to examine picture cords or wires. Rub over leather furniture with a little oil and vinegar. After removing dirt from all rooms go over all with a final polish. A polish at Christmas keeps things in good order." (Secretary, Mrs. E. Andrews.)

SADDLEWORTH (Average annual rainfall, 19.55in.).

September 8th.—Attendance, 8.

SUMMER FLOWERS.—The following paper was read by Miss Frost:—"It is advisable to wait until October to sow flower seeds, because they germinate more quickly during warmer weather. Sometimes when sown in September, and the plants come up well, they are checked by a cold spell, and once this happens they seldom thrive afterwards. Summer seedlings should come up quickly and keep on growing to make healthy plants. The best method is to sow the seeds in open seedbeds, dividing them into sections, but petunia seeds should be in boxes. All fine seeds should be mixed with sand when sown. The soil of seed-beds should be composed of light sandy loam. The surface should be pressed down evenly and firm, and after a good watering the seed should be sown and covered with light sandy soil. Dry stable manure should be dusted over the surface to keep it from being washed about when the bed is watered. It will also permit the young plants to come through easily. It is advisable to have a watering-can with a

very fine rose. The petunia, on account of its hardiness and free flowering habit, is very popular for the summer garden. It requires very little water, and flowers freely during the hottest weather, continuing to flower right up to winter. A mixed bed of phlox gives the most satisfaction, although very beautiful effects can be secured by growing separate colors. October is the best month to plant asters. Zinnias should be planted in beds during November or December and transplanted. Salpiglossis should be sown where it is to be grown, because the plants do not appreciate transplanting. They should be thinned out to 9ins. apart. Delightful effects can be secured with antirrhinums by growing different colors. Delphiniums should be sown in September and will then germinate very quickly. Dwarf varieties commence to flower in January. Iceland poppies, pansies, violas, and stocks sown in January give good winter results. If the plants are forced with sulphate of ammonia at the rate of 2ozs. to a kerosene bucket of water during winter, success will be assured." (Secretary, Miss G. Frost.)

WARCOWIE (Average annual rainfall, 11.42in.).

August 29.—Attendance, 15.

REARING TURKEYS.—The following paper was read by Miss D. Sanders:—"When setting turkey eggs be sure that they are fertile. The hen should sit on the eggs for four weeks, but if they are not all hatched by then leave them a few days to make sure there are no chicks left to perish in the eggs. About a day or two before they hatch sprinkle the eggs with warm water, and continue doing so until the eggs are chipped. Be careful not to have the water too hot or it will injure the chicks. Young turkeys need careful feeding—hard-boiled eggs and green onion tops or curds and pepper make an excellent feed for them. After a week or so they may be fed on bran mash; pollard is sometimes used, but that is not to be recommended. Turkeys must be kept in a warm spot. They are very sensitive to cold, and even after they reach the age of three months a very cold change will often kill them. October is a very good time to start to rear turkeys when the greenfeed is about and the weather is getting a little warmer. Turkeys begin to lay when they are about 12 months old. They lay between 20 and 30 eggs before they go on the brood. Older hens are preferable for setting purposes, because young hens are likely to leave their eggs before they are ready to hatch." (Secretary, Mrs. A. Crossman.)

WARRAMBOO.

July 21st.—Attendance, 14.

HOME REMEDIES.—Paper read by Mrs. J. Sampson:—"The following simple home remedies have proved most effective. When a child is 'out of sorts' give an opening dose of one large dessertspoon of castor oil and repeat if necessary. When a cold settles on a child's chest the best thing to do is to rub the chest and between the shoulders with warm camphorated oil night and morning, and if the cough is troublesome at night, a dessertspoon of olive oil will stop the tickling of the throat and allow the child to go to sleep. *Croup.*—The throat should be kept warm with flannels wrung out in very hot water. Give 1 dessertspoon of half olive oil and half honey. Repeat every hour if necessary. If croup is taken in its early stages this will work an entire cure. *Burns and Scalds.*—Carbonate of soda or cornflour gives instant relief. It may be applied either wet or dry to the burned part and will draw out the heat and pain. The white of an egg smeared on the burn or scald kept moist and exposed will also give relief. Iodine is valuable for cuts and wounds. To prevent spread of an infectious disease, cut an onion in four parts and put in the sick room."

Paper read by Mrs. L. Adams:—"Prevention is better than cure. When going out into the cold after being in a warm room or going out after a warm bath, a dose of spirits of camphor will prevent one catching a cold. If one feels a cold coming on it is also good to take, as also is a dose of ammoniated quinine. Colds should be taken great care of from the start. Eucalyptus is useless to take after a cold has a good hold, but in its early stage it will often break a cold, as camphor and quinine do. When the colds are tight on the chest or symptoms of bronchitis, a few doses of bryonia will work wonders to loosen the cough, taken alternately with aconite if very feverish, or belladonna if there is a headache. A mustard poultice is a great help for bronchial colds. For children, a good plan is to cut a piece of flannel—like a front that is worn under boys' blouses—saturate or make it moist with olive oil, and rub as much dry mustard into it as it will absorb, warm it and place on the child's chest. Leave on until the cold or cough loosens. Give the child plenty of olive oil and sugar and a dose of castor oil, liquorice powder, or fruit salts. *Bowel Complaints.*—For diarrhoea, rest the bowels from 12 to 30 hours; mix together equal quantities of brandy and castor oil, and give 1 teaspoon about every 4 to 6 hours. Give only boiled water to drink, then



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rice water or barley water, then light food as the child improves. For sickness, 1 teaspoon to 1 dessertspoon of lime water in the food will often stop sickness; sometimes a little fluid magnesia will stop it also. For burns, keep a tin of picric acid powder in the house. In the case of a burn, sprinkle the powder on the injured part. Saturate a piece of clean white rag and place on the burn and cover the part to exclude the air from it. If picric acid is not at hand, olive oil placed on the burn at once and covered with bicarbonate of soda is good, and if done at once the burn rarely ever blisters. Carron oil is another useful remedy. This consists of equal quantities of olive oil and limewater. To make limewater, place a piece of unslaked lime about the size of an egg in a bowl and pour a quart of water on and stir before using; when settled use only the clean lye. *For Sore Throats*.—A little powdered alum, sulphur, or borax placed on the back of the tongue will often give relief. It is very handy to have a gargle in the house that is always ready to use. It is made as follows:—1 teaspoon each of carbonate of soda, powdered borax, sugar, and salt. Pour over these a cup of boilnig water; when cold bottle and gargle the throat frequently. This gargle is also good for tonsillitis. *For Cuts*.—If there is dirt in the wound wash thoroughly with boracic—1 teaspoon to 1 pint of water, or water with a few grains of Condy's crystals added to it. To stop bleeding, pour eucalyptus or Friar's Balsam on the cut. If these fail use a little flour, pepper, or chewed parsley. When the wound is cleansed and the bleeding stopped, take a clean piece of rag and apply vaseline or boracic powder. The following recipe for an ointment:—Render 1lb. of mutton suet, add 1 large pot of vaseline, 2ozs. boracic powder, 1 tablespoon of sulphur, $\frac{1}{4}$ bottle of eucalyptus. Mix all thoroughly together into the rendered fat; place in jars and tie down with butter paper. *For Bad Eyes*.—If poultices are needed, camomile flowers are very good, as also are tealeaves. A little vaseline smeared on the eyelids of children at night will keep the lids from sticking together. *For Earache*.—A few drops of warmed olive oil will often give relief. Warm it over a candle in a spoon and pour it in the ear. A little piece of onion toasted and placed in the ear while warm is another good remedy, as also is a bit of wadding with a little bit of pepper on it. Syringe the ear with a little carbonate of soda water; this will give relief or stop it immediately. Toothache is often due to decayed teeth. A piece of wadding with a drop of eucalyptus, Friar's Balsam, oil of cloves, or essence of lemon can be used. If an abscess is the cause of the trouble, a bag of hot salt or the hot water bag seems to be the only way to get ease. However, a visit to the dentist is strongly recommended. *For Bruises*.—A tube of capsolin is a very good thing to keep in the house. A piece of raw beef or treacle on brown paper will also draw out the bruise." (Secretary, Mrs. A. Steer.)

October 13th.—Attendance, 11.

PREPARING A CHRISTMAS DINNER.—Paper read by Mrs. A. Hampel:—"I prefer a cold dinner for Christmas. *Meats*.—Roast seasoned turkey, boiled ham, and a choice piece of corned beef—all these meats to be cooked the day before, so that they will be firm and cold to carve. *Salads*.—Tomato, cucumber, and red beet salads are usually what I prepare. Tomatoes are cut in rings, sprinkled with a little salt, and a little vinegar added. Cut cucumbers in thin slices, cover with fresh separated cream, and add sugar. The red beet is done in the same way as the tomato salad, only sugar is added. Mashed potatoes are also served. *Dessert*.—A boiled plum pudding and baked apple pie and vanilla custard are also served. The pudding is cooked three to four weeks before and hung to dry, then it only needs two hours boiling before being ready for use. Usually after all these have been partaken of a little bread and butter, and fresh fruit and nuts and sweets are all that is needed."

PREPARING A CHRISTMAS TEA.—Miss J. Patterson read the following paper:—"In preparing a Christmas tea the Christmas cake is the most important item. Make the cakes about a fortnight before Christmas, and put them away in an airtight tin until about a couple of days before Christmas, then ice and decorate them. Turkey and ham is usually served. There are always so many fruits, sweets, and different kinds of nuts to eat on Christmas Day, that by the time tea is ready it is difficult to enjoy the good things that have been prepared."

CHRISTMAS GIFTS.—Mrs. A. Collins read the following paper:—"A handkerchief satchel makes a very useful gift, especially when on holidays. Make a scarf or dress hanger, knitted with scraps of wool, underline with colored silk to tone with the wool, and put a stocking hanger on to the dress, or another hanger at the bottom hanging on ribbons from the top; this is very handy for hanging the evening dresses. Traced worked aprons also make nice presents, but are hardly serviceable for the farmer's wife who has so much washing to do."

CHRISTMAS GIFTS.—Paper read by Mrs. P. Daniel:—"It is not always the most expensive gifts that give the most pleasure. Often quite a small article made by the giver is most acceptable. There are dozens of things that can be made in a very

short time out of scraps of material. What is nicer than a patchwork cushion stuffed with feathers or wool? The trouble is usually to find time to sit on it. A pair of feather pillows is a very useful present, especially for a girl getting her box ready. A pair of tea towels with the initials of the recipient worked on is also very useful. For a person who is fond of gardening a few packets of seeds that have been gathered and put neatly in packets inside a square tobacco tin which has been lacquered some bright color and a photograph of your garden stuck on the top makes an attractive present. A pot plant or two will be acceptable, the tin painted or covered with a piece of cretonne or wall paper. A needle case is a most useful article, the outer leaves of which can be made from pieces of an old felt hat and embroidered with gay scraps of wool; the inner leaves being made of flannel in which to keep pins and needles. Half a dozen kettle holders bound with contrasting material and put in a neat bag to hang up, and some pieces of sugar bag with the edges bound for oven cloths will be most acceptable to a woman who spends most of her time in the kitchen." (Secretary, Mrs. A. Steer.)

WASLEYS.

August 3rd.—Attendance, 29.

APPLES AND THEIR USES.—Miss L. Hewlett read the following paper:—"Apples, like all other fruit, must be fresh and clean if the best results are to be obtained. They must be kept in a cool place and handled carefully, because they bruise very easily. Apples are one of the best fruits for health, and especially for children. There are numerous ways of using them; baked apples with a few cloves are delicious with cream or custard, stewed apples and custard, apple pie and cream, stewed apples put in a piedish and Empire crackers placed on top and baked a golden brown and served with cream; apples with rhubarb make a very tasty dish—it takes the sharpness off the rhubarb. Recipes for using apples:—*Apple and Lemon Tart.*—Six medium sized apples, 1 lemon, small cup sugar, piece butter, 1 egg. Melt butter in a saucepan, add half the lemon rind grated, then the juice. Add apples cut finely and cook until tender. Add beaten egg and cook a few minutes longer. Put on pastry and bake. *Baked Apple Dumplings.*—Make a crust of short pastry; $\frac{1}{2}$ lb. dripping, lard, or margarine to $\frac{1}{2}$ lb. flour, also baking powder. Mix pastry rather dry. Peel apples finely and core them. Roll out pastry thinly and cut into circles large enough to cover apples. Place each apple on a piece of pastry and fill the centre with currants or brown sugar. Close up the pastry around them and pinch the edges together on top. Place the dumplings on a slightly greased tin and bake in a moderate oven for half to three-quarters of an hour. Just before cooked put a little brown sugar on top of each. This makes a sweet coating but be careful that it does not burn. *Boiled Apple Dumplings.*—Make a suet crust with $\frac{1}{2}$ lb. chopped suet, $\frac{1}{2}$ lb. S.R. flour, pinch salt, $\frac{1}{2}$ pint cold water. Put the flour, suet, and salt in a bowl, stir all together, add water and mix to a paste. Roll out to about $\frac{1}{4}$ in. thick, then cut into rounds—depending on the size of the apples. Put an apple previously peeled on each piece and completely cover. Have ready a large pot of boiling water. If preferred they can be tied in a sponge cloth instead of an ordinary pudding cloth. Plunge them in, boil 30 minutes, and garnish with sugar and cream. *Steamed Apple Pudding.*—Make suet crust with 2 cups flour, 1 teaspoon baking powder, 1 cup chopped suet. Mix to a stiff dough with water. Roll out and line a basin. Peel and core apples and cut into thin slices until the basin is full. Cover with pastry and put in a saucepan of boiling water and steam two hours. Take up, cut out the top and put in 1 cup of sugar and a little nutmeg. Stir until sugar is dissolved. Put on top crust and serve with cream or cornflour sauce. *Apple Hedgehogs.*—Choose good, large cooking apples as near the same size as possible. Pare and core them, being careful not to break them. Roll up the apple parings into piles and place one in the centre of each apple; brush over with white of egg and put aside until quite dry, then brush over again with white of egg and sprinkle with castor sugar. Put apples neatly into a piedish, cover with greased paper, and bake in a slow oven until tender but not in the least broken. When done, remove the apple paring and fill the cavity with blackberry, black currant, or red currant jelly and let it set. Have ready some blanched almonds, cut into thin spikes, and stick the apples over with these. Serve cold with apple syrup. *Apple Syrup.*—Cook a large apple in well sweetened water, flavored with lemon juice and cloves. Strain before serving with apple hedgehogs. *Apple Sauce.*—About $\frac{1}{2}$ lb. of apples, 2 cloves, 2 tablespoons each water and sugar, 1 teaspoon butter. Peel, core and slice apples, put on with cloves, sugar, and cold water. Simmer gently until tender. Remove cloves, mash with a fork, add butter, and re-heat. If apples are not juicy, a little more water may be added. *Apple Chutney.*—3 lbs. each apples, onions, and sugar, 1 $\frac{1}{2}$ ozs. cloves (bruised in bag), 2 lumps garlic, 1 teaspoon cayenne, 3 teaspoons salt, 1 teaspoon ground allspice, 1 bottle vinegar (large), $\frac{1}{2}$ lb. sultanas. Boil 3 hours slowly. If apples are ripe use $\frac{1}{2}$ lb. less sugar. Mince the apples and onions." (Secretary, Miss G. George.)

SIDELINES.

(Paper read by Miss B. Day at the August meeting of the Wasleys Branch.)

DAIRYING.

Although Wasleys is a purely agricultural district, times of adversity have led us to adopt mixed farming rather than petty cash sidelines. The sidelines usually left in the hands of the housewife are the dairy, poultry, and garden. The average farm of this district is 500 acres, and will thus easily allow for the pasturing of 6 or 8 cows. If there are no daughters in the home then it is essential that help be procured. Six or eight cows will pay for the help, and enable us to still further expand our interests. The cows will show a net profit of 10s. per week after allowing for all milk, cream, and butter used in the home even with the very low price of 9d. per pound for butterfat. Although the fodder is grown on the farm, hay cannot be produced for less than £2 a ton and show a profit over working expenses. Bran is undoubtedly the best concentrate, it produces more butter of the best flavor, but at present prices something cheaper must be fed. Oats are the best substitute, and when well crushed will be a close second to bran. Salt and bonemeal are two essential articles in a cow's ration; thus the expenses show:—17 tons of hay, £34; 3 tons of bran, £16; 1½ bags of salt, 7s. 6d.; bonemeal, 14s. 6d.; total, £51 2s. 6d. It is advisable to have five cows in fresh milk during the first six months of the year, one during January, four spread over the months of March, April, and May, and one in September. This will provide good returns when the market is at its peak. One or two selected heifer calves should be reared each year if possible, so that the herd is always young and at full profit.

POULTRY.

Poultry plays an important part in assisting to balance the farm budget. South Australia is one of the largest exporters of eggs in the Commonwealth, and a wide avenue is open for increased revenue in this direction. Although much extra handling is necessary in selling eggs direct to any one of the export companies, the increased return shows a considerable profit over and above the expense. Two hundred fowls will return more than £100 against expenses of £33 for 70 bags of wheat at 8s. 6d., £29 15s.; bran and meal, &c., £3 5s.; total, £33. Shell grit can be obtained when visiting the local beach. Green feed is most important, and fowls should have large quantities of chaffed lucerne, &c., all the year round, whether they are on free range or penned. The best hatching periods are from the end of January to April, and July to October. Chickens hatched in January and early February grow rapidly, and lay when eggs are dear. I prefer the White Leghorn and Black Orpington or Minorca cross. They always sell well as table birds when the laying period is spent, and the young cockerels find a ready market either live weight or dressed and sold privately. Turkeys show a good return if hatched early in August and September so that they will grow quickly on the green grass. Turkeys which do not fatten when very young are hard to get to prime table birds at the right age. They need scrub shelter and distant neighbors. They are inclined to wander to the adjoining crop when one is engaged in home duties. Ducks and geese show a good return during the festive season.

SHEEP.

One hundred sheep can be carried on a farm of 500 acres—40 ewes and lambs and 20 sheep for the farm mutton supply. Any ill luck the farmer may experience in losing the ewe, or the mother refusing to care for the lamb, is the good fortune of the housewife, for she is able to rear the orphan on cow's milk with a little trouble and then collect the cash. Sugar should be given in the milk—fresh milk for a week, and this gradually diluted until the skimmed milk is used. The tallow from the mutton supply can be used for candle or soap making, or sold to the merchant with the skins.

GARDENING AND NEEDLEWORK.

The home garden is a sideline which is often not used to any appreciable extent. With a little help from the men in the way of carting manure and digging a number of fruit trees and vegetables can be grown for most of the home requirements, and one is able to have better preserves and jams because of the quality of the fruits.

Needlecraft is an outlet for the finer art of the housewife. Many useful and attractive gifts can be fashioned, and if not sought near at home there is always the open opportunity of becoming a member of the Women's Work Depot in Adelaide, which undertakes to sell any article of woman's work on a commission basis.

WEPOWIE.

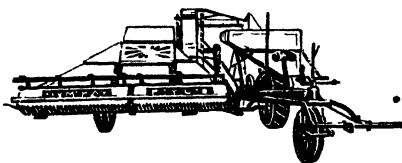
* August 1st.—Attendance, 14.

CAKE MAKING.—Paper read by Mrs. J. Burns: "Success in cake making is an acquired art gained through a careful attention to detail and experience. Annoying though it may be to admit it, recipes are very seldom wrong. Failures can generally be traced to a fault on the part of the cook. Beating is very important. Heavy cakes can generally be attributed to insufficient beating. With sponge cakes the whites of the eggs should be beaten stiff, then the yolks and sugar added and beaten; and with butter cakes the butter and sugar, then eggs, must be beaten until light, creamy, and full of air bubbles. A well beaten cake can hardly fail to be light. Flour should not be beaten in, but stirred or folded in lightly, and the cake should go into the oven as soon as possible after mixing. Home made self-raising flour is always reliable, and by mixing $\frac{1}{2}$ lb. cream tartar, $\frac{1}{2}$ lb. carb. soda, a little salt with 16 lbs. of flour a good supply of self-raising flour is always on hand. Quite a variety of cakes can be made from the following foundation mixture:—*The Mixture.*—Beat $\frac{1}{2}$ cup of sugar to a cream with 2 tablespoons butter, add 2 eggs, 1 cup milk, 2 cups S.R. flour. Drop some of the mixture into hot gem irons, and cook. When cold, ice with vanilla-flavored icing, roll in cocoanut, and snowballs will be the result. Ice with chocolate icing, cut off top, fill with whipped cream, replace the cut piece, and chocolate creams are made. Another way is to cook the mixture in paper patties—dates, nuts, or currants or any flavoring added—and by using different colored icings and decorations a variety of small cakes can be made. A set of icing tubes is helpful, using cream instead of icing to make roses and scrolls. Lamingtons can also be made from this mixture, and for variety dip the cubes in melted jelly then in cocoanut, or use lemon-flavored white icing and call them lemon snows. This mixture also makes a nice plain cake if cooked in a moderate oven for $\frac{1}{2}$ of an hour. *Recipes for Party Occasions.*—Eclairs: Eclairs are usually iced or decorated with chocolate glaze or icing, and filled with whipped cream coffee icing, and a coffee flavored custard make yet another variety. Put 1 cup water and 1 tablespoon butter into a saucepan. When boiling take off fire and stir in 1 cup S.R. flour, beat well, then beat in 3 eggs, each one separately. Put into a forcing bag or biscuit forceer, and force out on to a greased baking sheet in lengths of 3 in. Cook them for $\frac{1}{2}$ an hour. Have the oven hot at first until they rise, then reduce the heat to moderate to set them. *Merengues.*—Whites of 3 eggs, $1\frac{1}{2}$ cups granulated sugar, $\frac{1}{2}$ teaspoon vanilla. Beat egg whites until

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stiff, add slowly sugar, and continue beating until mixture holds shape. Drop by spoonful on unglazed paper, and bake in a very slow oven for 30 minutes. Then increase heat a little, and bake 30 minutes longer. Remove from oven, push the underneath portion in to form a cavity, fill with whipped cream, over which sprinkle a little cocoa, and decorate with a blanched almond. Do not fill meringues until just before serving. Peaches: 2 cups S.R. flour, 1 cup sugar, $\frac{1}{2}$ cup milk, 1 tablespoon butter, 2 eggs. Beat sugar, butter, and eggs together, add milk and flour, bake in hot gem irons for 8 minutes. When cold, cut off tops, and press 2 together to form a peach with whipped cream or raspberry jam. Paint outside with carmine which has been diluted in water, and when nearly dry roll in castor sugar. Decorate with a piece of angelica for stem." (Miss E. Roocke.)

WILLIAMSTOWN (Average annual rainfall, 27.7in.).

September 6.—Attendance, 5.

HOW TO DRY FRUIT.—Mrs. W. Patterson read the following paper:—Have the water boiling in the copper, and to each 12galls. add 1lb. of greenbank lye. The water must be kept as close to boiling point as possible through the dipping process. Plums should be immersed for 6 seconds in the lye; then withdrawn, and plunged again into clean water. The second dip should be only of short duration. The fruit is now placed on trays, and is ready to go out on the drying green. If the dip has been successful the fruit will show a roughened skin, covered with numerous small cracks. If the fruit cracks or splits, then perhaps the lye has been too strong. If the weather is favorable the fruit will dry in a week. On dewy, damp, or rainy nights stack the trays to keep the fruit dry. A pan of sulphur put in a sulphuring box improves the color of light fruit. Recipe for dried apricots:—1lb. of dried apricots, 1 dipper of water, 6lbs. of sugar. Soak apricots for 2 days before boiling; then boil until a nice clear color. (Secretary, Mrs. A. Cundy.)

PAPERS READ AT PINNAROO LINE CONFERENCE.

[Parulla, September 26th, 1932.]

JAM AND JELLY MAKING.

[By Mrs. BONNIN, Pinnaroo.]

For the successful making of good jam, good quality ripe (but not over-ripe) fruit is necessary. All defective parts should be cut out. One must not expect good results from inferior or fermented fruits.

The fruit is prepared in different ways for the various jams. Some prefer to cut it in small pieces, while others favor half or whole fruit. The former method is more economical, but the latter is always used for a conserve. With some fruits, it is necessary to add sugar, or a portion of it, overnight; this hardens the fruit and the pieces almost retain their original shape. Another way to make a good conserve is to boil the sugar and water and then add the fruit pieces and cook gently until done, stirring as little as possible in order not to break the fruit. With some fruits it is unwise to add the sugar overnight, namely, some varieties of plums, quinces, &c. The sugar hardens the outsides of the fruit, and, when cooking, it is impossible to cook the centres of the pieces; particularly is this so with melons. Such fruit as quinces, apples, melons, and pears require a long slow cooking to obtain a good color. The berry fruits, raspberries, &c., require quick boiling to ensure good color and flavor.

The amount of sugar also varies with different varieties of fruits. The general rule is 1lb. sugar to 1lb. fruit, but with some jams 1lb. sugar to 1lb. fruit is essential. With the extra weight of sugar one obtains a greater weight of jam, so that the added expense is not all extra. Also the jam is of better appearance, and the additional sugar improves its keeping qualities. If too sweet, lemon juice or tartaric acid may be added to taste, the latter being preferable because it has no flavor. Crystal sugar is usually recommended for jam making, but the ordinary A1 white is quite good.

Always use an enamel or aluminium vessel, and watch carefully, stirring at intervals to prevent burning. This is particularly necessary where a vessel has been previously burnt.

The usual method with most jam making is to boil the fruit, or fruit and water. When boiling, the sugar is added after being previously warmed in the oven. Skim frequently or the jam will not be clear. Some fruits (plums, apples, and melons) which contain pectin, will jell when sufficiently cooked, and these should be tested by putting a little in a saucer and if the jam sets it is ready for bottling. Other fruits, such as apricots, peaches, figs, pears, &c., should be boiled until a nice color and consistency are obtained. One needs experience to know just when the jams are sufficiently cooked, and when cooked the pan of jam should be removed from the fire and bottled as soon as possible. By doing so all air bubbles (which spoil the appearance of the jam) will be excluded. The bottles should be thoroughly dry and heated in the oven while the jam is cooking, otherwise, when the hot jam is poured into cold jars, there will be risk of breakage.

I prefer jam sealed whilst hot, although if one has had enough stickiness for one day it can be quite securely sealed the following day. There are various methods of sealing. For the screw-top jar paraffin wax is quite good. Melt the wax in a clean tin by standing in a saucepan of water and heating it, then pour a little in the jar, tilting it so that the wax clings to the sides of the jar. Then add the screw lid. Good stout tissue paper—two rounds for each jar—makes a good seal. Dip one round in either milk or whipped white of egg and cover with the second round. Paste made from flour and water is a popular method of sealing jam, and there is a purchaseable cold water paste which is also successful. When sealed, the jars should be washed, labelled, and stored in a dry, cool place—a damp storage causes mould, a hot one starts fermentation, and too strong a light will fade the bright colored jams. If apricot or fig is wanted for exhibition purposes, a better color will result if the fruit is peeled. Another good hint is to polish the jars with Bon Ami, which makes the jam look much clearer.

JELLIES.

The special feature of jellies is their attractive appearance. Good jelly, when ready for use, should be firm enough to hold its shape when turned from its jar.

Fruit for jelly is at its best early in the season and slightly underripe. At this stage the fruit contains pectin, the substance which causes the jelly to set. In ripe fruit this substance changes to a fruit sugar and will not jell. Some fruits, such as cherries pears, peaches, &c., contain no pectin of their own, and if a jelly is wanted from these fruits other fruits which are rich in pectin should be added. Apples are to be preferred as they have no distinct flavor of their own. As in jam some fruits require water, while others must be cooked in their own juice. All jellies are made in practically the same way, that is, cut up fruit roughly with skins and seeds included and first cover with water. Berry fruits are crushed a little to draw the juice, and no water is needed. Boil very gently until quite soft and stir as little as possible.

Leave overnight, as more goodness is extracted in this way. Next day strain through a colander then through a jelly bag (first rung out in hot water). On no account squeeze the mixture. Then measure the liquid and to every cup add one cup of sugar. Bring liquid to the boil and then add the sugar which has been previously warmed in oven. As in jams, it is necessary to be sure the sugar is all dissolved before the mixture boils. If this is not done the jelly may crystallise after standing a time. Sometimes it is advisable at this point to restrain the jelly, because the sugar often contains black specks, &c. A piece of muslin or fine cheese cloth is useful at this stage. Boil rapidly and skim frequently. Test from 20 minutes on, as some jellies set quickly, while others require a long cooking. Experience is necessary to tell when the jelly is finished, but the usual methods are to test a little in a saucer, and if, when cool, it can be cleanly cut through with a knife it is done. Another way is to suspend the spoon (with which you are stirring the jelly) above the pan, and if the mixture falls in heavy drops or flakes it is done. Avoid overcooking, which causes crystallisation and little bubbles, spoiling the appearance of the jelly. As with jam, bottle and seal while hot, and store in a cool dark cupboard.

RECIPES.

Raspberry Jam.—Six pounds raspberries, 6lbs. sugar, bring berries to the boil, boil hard three minutes, add warmed sugar, and gallop for five minutes.

Loganberry Jam.—Same as raspberry but boil 10 minutes after sugar has been added.

Red Currant.—Same as raspberry, but straining before adding sugar to remove seeds is an improvement.

Mulberry and Apple.—Five pounds mulberries, 1lb. apples, 4½lbs. sugar, half cup water. Put fruit through mincer, boil 20 minutes, then add sugar and boil an hour or little longer.

Blackberry and Plum.—Five pounds blackberries, 1lb. plums (or apples), 4½lbs. sugar. Bring fruit to boil, boil 20 minutes, then add sugar and boil rapidly until finished.

Gooseberry and Cherry.—Six pounds ripe gooseberries, 6lbs. dark cherries. Place fruit in pan, add two cups water, boil for half an hour, then add sugar, and boil until it jells.

Strawberry.—Four pounds strawberries, 6lbs. sugar. Boil sugar and fruit for five minutes, then add two teaspoons tartaric acid, boil eight minutes, bottle when cold.

Apricot Jam.—Six pounds firm yellow apricots, 6lbs. sugar, one teaspoon tartaric acid, add a very little water to prevent apricots scorching on bottom of pan. Bring fruit to the boil add sugar, and boil rapidly from 10 to 20 minutes. Add acid about five minutes before removing from fire.

Fig Jam.—Six pounds sugar figs, 4½lbs. sugar, the grated rind of one lemon, the juice of two lemons, a little preserved ginger cut fine (6d. for 12lbs. figs), and some blanched almond kernels at the last. Bring fruit to the boil (a little water will be necessary if fruit is very firm), add sugar, rind, and ginger and boil until cooked.

Plum Jam.—Three-quarters of a pound sugar to each 1lb. fruit, fleshy varieties will need a little water. Bring fruit to boil, add sugar, and cook until it jells.

Quince Jam.—Six pounds quinces, 4½ pints water. Boil together until the fruit turns slightly pink, then weigh, and to each pound of pulp add ½lb. sugar. Boil until it jells. If not a pretty red, add a little cochineal.

Gooseberry Jam.—Same as quince recipe, but allow 1lb. of sugar to each 1lb. of pulp.

Dried Apricot and Pineapple Jam.—One pound dried apricots, two quarts of water, 4lbs. sugar, one pineapple, or a tin of crushed pineapple. Cover apricots with water, in which one teaspoon of carb. soda has been dissolved. Soak about half an hour and then rub off skins. Rinse and add two quarts of water, soak 24 hours, then boil gently with the pineapple until the fruit is cooked. Add sugar and boil until a good consistency.

Dried Peach Jam.—One pound dried peaches, two quarts of water, 4½lbs. of sugar, two lemons. Same method as dried apricots.

Melon Jam.—Two pounds melon, 7lbs. sugar, seven cups water, six lemons, two small oranges, cut lemons and oranges, cover with water, and boil until chips are tender, then add to melon and water and bring to boil. Add sugar and boil one and a quarter hours.

THE CULTIVATION OF DAHLIAS.

[By Miss COLWILL, Parilla.]

Every year increased interest is being shown in improvements around the homestead in the way of gardening. To anyone fond of flowers this is an untiring pastime as well as an improvement. There are many kinds of beautiful flowers—roses, sweet peas, carnations, daffodils, dahlias, &c.—but growing dahlias has gradually increased until they have become the most popular.

Dahlias excel most other flowers in their beautiful colorings, and the size of the bloom is much in advance of any other, but this is mainly due to cultivation. They are as easily grown as any other plants and grow well in all parts of this State, provided sufficient water can be given them during the growing period, and especially during the time of flowering. It is a plant that absorbs much moisture, and unless it is kept growing vigorously the whole time, buds may form, but never fully develop.

They can be planted out any time during November and December. In very hot districts the later planting is preferable. A shorter growth is made and flower buds do not form too early, maturing when the hottest of the weather is over. They should not flower until the end of March or in April. The blooms will then be larger, last longer, and retain their color. Without a robust leaf growth, it is impossible to produce large, well-formed blooms. Dahlias make large clusters of tubers to each plant every year. To secure the best results these tubers should be divided and cut with an eye left in each piece. The clusters of tubers should be started into growth before attempting to cut up, and if planted at once the growth continues, and the plant is through the ground in a few days.

It is a good plan when planting the tubers to place in the soil a strong stake at the same time, as if staking is left until the plant is several inches high, there is danger of injuring the roots. Large tubers are not necessary; a small one with a small, prominent eye will make as strong a growth and as good a plant as a large one.

Shade is not necessary, the best flowers being obtained in the open and in rather a sunny position. Too much shade means tall plants with few blooms and insipid colors. It is most necessary to protect them against hot winds. If planted near a hedge, a high fence, or a wall acting as a breakwind, the best results will be obtained.

Although the dahlia will grow in almost any soil, a rather heavy, well-manured loam is best. If the soil is too stiff the addition of well-decayed stable manure well worked in will loosen it. Light sandy soil will be improved by the addition of clay and cow manure. Deep holes can be dug, placing a good layer of manure at the bottom, and filling in with good soil, heavily manured. They like plenty of rich food, ashes and bonedust may be added to each plant. When first planted, water sparingly, increasing the quantity as the shoots make growth, flooding heavily when the first buds form. Do not overcrowd the plants. Plant about 3ft. apart if possible, so that when fully grown the plants get plenty of air and sunlight circulating around and through the foliage.

There are many kinds of dahlias. The Cactus is much admired by some people, others prefer the Decorative or the Collarette. Many pretty shades are seen in the Pom-poms. Recently many beautiful blooms and equally as large in the size of flower, the colors being perfect, have been grown from seeds, which should be sown in September and will flower the first year. Those in the Botanic Garden last April, which were seedlings, were equally as beautiful as those grown from tubers.

THE VEGETABLE GARDEN.

[By Mrs. ATZE, Pinnaroo.]

The best aspect for a vegetable garden is a gentle slope towards the north-east, with a break of trees, shelter hedge, or wooden paling fence as a breakwind on the south, north, and west boundaries; even a good broombush fence will act as a very good break. These conditions are not always obtainable, but shelter from the cold and dry hot winds should always be provided. It is very bad policy to have fruit trees in the vegetable garden, for the continued deep cultivation and heavy cropping does not suit the trees, and on the other hand the shade and the want of moisture caused by them are, as a rule, fatal to the growth of vegetables.

The best soil is a deep, light friable loam, but any ordinary soil can be made into a good garden with ordinary care and attention. Very heavy clay land should be dressed with air slaked lime, about 1lb. to the square yard; a good dressing of ashes and sand may also be applied with advantage. Continued dressings of stable manure tend to lighten clay land and to make it more easily workable. Care should be taken not to work this kind of soil in a wet condition, and whenever any portion of the garden is likely to remain vacant for any length of time, it is a good plan to dig it roughly and leave it in lumps exposed to the wind and sun. This will soon mellow the clay and make the soil friable and easy to work, more especially if it has had a liberal dressing each year of horse or cow dung. There is no better manure than these; horse dung is best for soil on the heavy side. Very light soils are best manured with cow dung and should if possible have a good application of strong loam. Where the soil is poor, there is nothing better than a good dressing of fresh soil taken from the top spit of an old pasture or wood heap. Worked out soil will also be greatly benefited by having green manure crops dug in. Peas are as good as anything, but even green grass will do.

Well-grown vegetables cannot be grown without using plenty of manure. In the ordinary way there is nothing to equal well-rotted stable manure, but where this is not obtainable artificial fertilisers form a very good substitute. The best way to use the artificial manure is in conjunction with rotten weeds, animal refuse, and the like rotted into compost. Many of the artificial manures are too strong to be used with advantage alone, but when well mixed with a compost as suggested leave nothing to be desired. All stable and cow manure should be well rotted before it is applied to the land. Blood and bone manures are excellent, long-lasting manures, but must be used in conjunction with wood ashes and well-rotted stable manure. They contain little or no potash, and a dressing of some other manure containing potash is advisable, especially with such crops as tomatoes, potatoes, and peas. This is, however, not so necessary where good supplies of stable manure or wood ashes are available. Never lime and manure the soil at the same time.

WATER AND IRRIGATION.

It does more harm than good to be always sprinkling the surface. When watering, it is most important that the ground should be thoroughly soaked. If this is done every one or two weeks, it is far preferable to a lighter and more frequent application. The roots will then be encouraged to go down deep into the soil, and will be out of the way of the hot sun and drying winds. At the same time the ground should not be made sodden and boggy, especially if not well drained. It is much the best plan, where available, to have a hose sprinkler. This can be kept going for hours at a time, and it is almost as good as rain.

Another method is to run the water in prepared trenches, letting it soak in gradually. When land is regularly watered, I strongly recommend the practice of mulching, or continually working the surface, otherwise the surface is baked hard, evaporation is encouraged, and the plants are injured instead of being benefited.

RAISING SEED.

The most important thing is to get good seeds. I strongly advise anyone to avoid cheap seeds. The best vegetable seeds are got from good, reliable firms. Small seeds, excepting root crops, are generally best raised in nursery beds, and for this purpose a small portion of the garden should be reserved and sheltered from winds, and with a light sandy and well-drained soil. During very hot, sunny weather it is advisable to shade the beds; some branches of scrub will answer very well. In judging the depth to sow, the size of the seed should be considered, very small seeds being merely covered; large seeds, 1in. to 2in. A good guide is to double the diameter of the seed.

After sowing, it is advisable to give a thorough soaking of water, which in most cases will be sufficient to bring up the seeds. In watering seedlings a fine spray should always be used, or there will be the risk of the plants being washed out. To prevent the surface from caking, a light mulching of well-rotted stable manure or leaf mould scattered over the surface after sowing will keep the surface open and moist. Such seeds as peas, beans, cucumber, melon, trombones, &c., and all root vegetables are best put in rows in their permanent bed, as they are then so much more easily weeded and cultivated.

TRANSPLANTING.

This should always be done in moist, cloudy weather. Give the seed bed a good soaking; then lift the plants with as much soil as possible, taking care not to break the fibrous roots. They should then be carefully planted in rows, the same depth as they grew in the seed bed. They should then be well watered, and if the weather is hot, should be shaded. A few green branches stuck in the ground make a suitable shade. Care should be taken not to plant too closely—the further apart the larger the vegetable. Cabbages and cauliflowers should be at least 2ft. to 3ft. apart.

ROTATION OF CROPS.

To get the best results in the vegetable garden, it is most necessary that different kinds of crops follow each other. Under no circumstances should cabbage follow cauliflower, or carrots succeed parsnips. Each crop should be as dissimilar as possible from its predecessor. A spindle-rooted crop should succeed a fibrous-rooted crop, or *vice versa*. Peas, beans, carrots, parsnips may follow after cauliflowers or cabbage, and would not require any more manure. Carrots, parsnips, or beet should never be sown on freshly manured land, or they will grow mis-shapen and forked. Cauliflower, cabbage, or others of the same family will follow well after peas or root crops, but may have with benefit an extra dressing of well-rotted stable manure. They are gross feeders, and the more manure the better the crop. If the garden is systematically worked in the rotation suggested and regularly fertilised and watered good results should be obtained.

All land under vegetables should be "fallowed" or kept vacant for a few months periodically, as continuous cropping exhausts the soil. A period of rest and exposure to the air has a very beneficial effect in sweetening the soil. To get the most benefit from these the soil should be dug as deeply as possible, leaving all lumps unbroken, and presenting as much surface to the air as possible. In a well-kept vegetable garden, the ground should never be idle. As soon as a crop is off it should either be planted again, or roughly dug and fallowed as directed. Both the condition of the soil and its fertility will be greatly improved, and vegetables can be grown all the year round. In this part of the country, where there is plenty of water, it is not necessary for anyone to buy vegetables.

PUFF PASTRY.

[By Mrs. G. HOLMES, Parilla Well.]

For puff pastry, take 1lb. each plain flour and hard butter, pinch of salt, 1 teaspoon lemon juice, yolk of 1 egg, and 1 cup cold water. Sift flour and salt, make a well in centre, put in yolk of egg and lemon juice, mix with a pliable knife in right hand and a cup of cold water in left. Mix to a fairly soft, workable dough. Knead the dough on a lightly-floured board until it is pliable and smooth.

Then roll it into a strip twice as long as the pat of butter you intend using. Roll the butter in a floured cloth to the same consistency of dough of a flat cake. Then place on one half of paste, keeping it in 1in. from edges; fold over the strip of paste, and seal the edges, to completely enclose the butter.

Let it remain in a cool place for about 15 minutes; then roll out to about three times the original length, but keeping the width the same, and fold exactly in three.

Give the pastry a turn, so that the open ends lie towards you, and roll it out into a long narrow strip, with the same short, quick forward strokes, giving an even pressure with both hands. Again fold the long strip in three, envelope fashion, and then give it another turn to the right.

Continue the rolling, folding, and turning process, repeating six times. The seventh will be ready for baking, taking great care to prevent butter breaking through the paste. Roll to the desired thickness—from $\frac{1}{4}$ in. to $\frac{1}{2}$ in. Brush over with white of egg and a little milk. Heat the oven thoroughly some time before baking, and cook the pastry in a hot oven for 15 to 20 minutes, according to thickness.

If making a fruit pie, hot fruit can be used, but it is necessary to brush the white of an egg under pastry before covering dish. Have an egg cup in dish, and cut a hole in pastry; put into a hot oven. The white of an egg prevents pastry from getting sodden.

The object of cooling between the rolls is to keep the butter and flour in distinct and separate layers.

PASTRY MAKING.

[By Mrs. C. NAPPER, Parilla Well.]

One of the most important qualities in pastry-making is to keep all contents very cool and firm. Dry, and handle as little as possible with naked hands.

When making butter for pastry, I do not salt the butter, as salt brings moisture. Just wash the butter well, and squeeze or roll on boards until quite free from water; then weigh the required amount, and set aside in a cool place to get firm.

The paste should be the same consistency as the butter, *i.e.*, if the butter is nice and firm, so should the prepared paste be firm. To give all pastry a nice finish, glaze with egg.

For meat pies or pasties, glaze with yolk of egg; and for fruit pies, tarts, &c., use the white of the egg.

Rolling.—When rolling pastry, take care not to let any more air than possible escape. This is most important, as the air helps to rise the pastry, and so make the flakes and lightness. Only roll the paste the one way—roll away from you, and do not roll sideways.

Folding.—Fold the pastry carefully after each rolling, and take care to fold the same way each time. Fold No. 1 left side over; No. 2 right side over, the left having three thicknesses of paste; No. 3, take the end of the paste you have been rolling away all the time, and fold towards you; No. 4, the last part, take and fold underneath. You then have a neat square of paste. Press all ends tightly, allowing no air to escape.

RECIPES.

Flaky Pastry.—1lb. plain flour, $\frac{1}{2}$ lb. butter, juice of $\frac{1}{2}$ lemon, little cold water.

Method.—Take the flour and a piece of the butter, the size of a walnut. Rub butter into flour lightly but thoroughly. Scoop out a hole in the flour, and squeeze in the juice of half a lemon, and add enough cold water to mix to a firm paste.

Take out of basin on a lightly-floured board, and roll very thinly. Cut butter in three, and take one-third, and put in little dabs all over paste; fold as explained previously. Repeat this until the 3 pieces of butter are used, making 3 rollings. Fold again. Allow to stand 1 to 2 hours, or all night for preference. Roll required thickness in the morning, and bake in a nice hot oven, but not scorching, or scone-hot.

I use this recipe with a very slight alteration. If butter is very firm I leave the last lot of dabs in paste all night, and bake after the third rolling, and this also makes beautiful, light pastry.

If lemons are not available, use the yolk of an egg, or a sprinkling of cream of tartar. Take $\frac{1}{2}$ teaspoon of cream tartar, and sprinkle over the dabs of butter the first rolling only, and roll as usual. Use as little flour on board and rolling pin as possible, as too much flour roughens.

Lard is a wonderful substitute for butter in pastry making; use half butter and half lard, or all lard makes a very light, every-day pastry for pies, or plate tarts.

FRUIT DRYING AT HOME.

[By Mrs. FOALE, Parilla).]

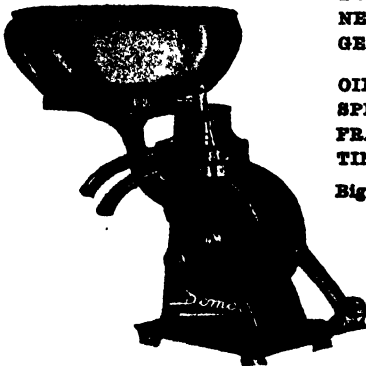
Drying one's own fruit will prove a pleasing and profitable task if the fruit is purchased at a reasonable cost. Although the profit may not be very great, still it is a consideration in times like these, when every housewife is striving to be as economical as possible. Then again, it is very pleasing to see a nice stock of wholesome, home-dried fruits, such as raisins, sultanas, currants, prunes, lemon peel, &c., stored away to carry on for 12 months. Where the fruit is grown on the farm, such as grapes, it is a wonderful save to be able to dry all the cake and pudding fruits, and it is rather surprising that vines are not more extensively grown in the mallee, where there is a good supply of water. They can be grown with little trouble.

As to the actual costs of dipping and drying when the fruit has to be purchased, last year's grapes could be bought for 6s. per case (approximately 40lbs.), and from this quantity I always get from 10lbs. to 12lbs. of sultanas or raisins. This may seem very little from 40lbs. of fruit after the moisture has dried out, but it pays all the same.

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Sultanas are selling at 10d. per lb. in the mallee, and 11lbs. at 10d. per lb. would cost 9s. 2d. So on the 11lbs. there is a save of 3s. 2d. As I only use the simple caustic dip—no olive oil or potash, as is used in the standard regulation dip for fruit for export—the cost of ingredients is only a matter of a couple of pence. The plain caustic-dipped sun-dried fruit is darker in color than the shade-dried fruit used for export, but there is a distinct difference in the flavor of the two, the sun-rayed fruit having a nice, rich flavor of its own.

For dipping, I use a petrol tin with a wire handle, and well-perforated sides and bottom. Care must be taken not to overcrowd the tin, so that the fruit may be properly dipped. All large tight bunches should be cut into smaller ones. The dip is as follows:—

To Dip Raisins.—12galls. water to 1lb. caustic soda. At 200 degrees dip the fruit just $1\frac{1}{2}$ seconds, or just in and out.

To Dip Sultanas.—30galls. water to 1lb. caustic soda. At 196 degrees drain and spread on wire netting racks or trays. Wooden trays dry them well also, but, if used, turn them about the third day, and they will soon dry. The length of time depends greatly on the weather. You can easily test them by squeezing one, and if moisture is there, they are not ready.

The quantity of the dip may be halved, or quartered, according to quantity of grapes dipped. I generally dip two to three cases, and use a quarter quantity of the dip, which is about half of a 16-gallon copper full.

Currents.—I just hang up to dry. If a glazed finish is liked, it can be obtained by dipping the bunches into the following mixture:— $\frac{1}{2}$ cup sugar, 1 cup water boiled for $\frac{1}{2}$ hour, but they take much longer to dry this way.

Dipping Prunes and Plums.—A stronger and boiling lye is needed. Dissolve caustic at the rate of 1lb. to 8galls. to 12galls. of water. The fruit is dipped for a period varying with the strength of the dip. If the stronger is used (1-8) the fruit should be submerged from 5 to 10 seconds; (1-12) the weaker should be submerged from 15 to 20 seconds. If the lye is too hot or too strong, or the fruits subjected to too long a submergence, they will burst when turned out on the trays. If perfectly dipped, the skins turn brown, and do not split after the lye has dried off them. During the drying process I do not bring the fruit indoors, unless it is wet weather. I just cover them well to keep off the night moisture, and uncover first thing in the morning. The fruit should never be allowed to become damp.

A FEW RECIPES FOR USING COLD MEAT.

(By Mrs. A. W. WELDEN, Parilla.)

Babotie.—1 onion, 1 cupful milk, 1 thick slice of bread, 2 eggs, any sort of minced meat, 1 small teaspoonful of curry powder, small piece of butter, pepper and salt. Soak the bread in some of the milk, fry the onion after cutting it up small, beat the eggs, and add the remainder of the milk. Mix these ingredients well together, and add minced meat, curry powder, butter, salt and pepper. Rub a pie-dish with the lemon or some vinegar, put in the mixture, and bake for 1 hour in a hot oven.

Lamb Souffle.— $\frac{1}{2}$ lb. cold cooked mutton or lamb, 1oz. butter, 1oz. flour, $\frac{1}{2}$ pint stock, 1 teaspoon chopped parsley, 1 tablespoon of tomato sauce, 2 eggs. Trim away all skin and fat, and pass meat through sieve twice, to make very fine. Melt butter in a saucepan. Stir in the flour smoothly, add stock, and stir until it boils. Put in the meat, parsley, tomato sauce, and season to taste. Take off fire, and let it cool a little. Stir thoroughly in the yolks of eggs, and lightly fold in the stiffly whipped white of eggs through the mixture. Put into a buttered pie-dish, shake a few bread crumbs over the top, and bake 10 to 15 minutes.

Macaroni Pie.—Take about $\frac{1}{2}$ lb. of any kind of cooked meat (minced), add pepper, salt, a little Worcester sauce, an onion cup up small, and 1 teacup of stock; place this mixture in well-buttered piedish, fill up with well-cooked macaroni, strew the top with grated cheese and dabs of butter, and bake for an hour.

Minced Meat Mould.—Mince very finely about 1 lb. of cooked meat, add pepper, salt, and grated nutmeg to taste. Beat 2 eggs well, and add $\frac{1}{2}$ pint milk. Mix all well together, put into basin, and steam about $\frac{1}{2}$ hour.

EYRE'S PENINSULA (CENTRAL).

[Minnipa, October 6th, 1933.]

WOOL AND ITS USES.

(By Mrs. CHILMAN, Warramboo.)

During the past 3 or 4 years prices of wool and sheepskins have been so low that it has been a golden opportunity for anyone who feels inclined to collect and clean wool for home use that would otherwise be wasted. At the present time prospects are a little brighter as regards the wool market, but even in normal times, when prices are fairly good and first-class sheepskins are considered too valuable to be used at home, there is often a certain amount of wool that can be collected without loss. For instance, if weevils get into a skin, which sometimes happens, in spite of all precautions, that skin is not worth sending to market, although quite good for home use. Sometimes after a sheep has been attacked by flies, the wool breaks and falls off; the whole fleece can be pulled off carefully, and this wool has no market value at all, yet some of the nicest and most easily cleaned wool I have handled was procured in this way. Then, at shearing time there are many odd pieces that are sold for so little that it is really more profitable to clean them and use for filling mattresses, pillows, cushions, &c.

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SEPTEMBER							OCTOBER							NOVEMBER							DECEMBER						
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Wool can be scoured and cleaned either on the skin or it may be shorn off first and washed loose. In either case, the first essential is an abundance of good soapsuds. In cleaning a complete skin it is best to divide it first into convenient sized pieces. The water should not be too hot, just right for the hands, and changed frequently. Six or eight waters are necessary to get it really clean, the last two being clear water. It is necessary to remove all traces of soap before drying. The pieces can be pegged on the line to dry, afterwards shorn with sheep shears. Washing the loose wool is a little more tedious, and I have found an old stretcher the best means of drying loose wool. Spread out on the wire mattress, and cover with wire netting to prevent blowing away.

Then there is the question of utilising the skin as well as the wool. This is a little more difficult. For this purpose it is better to use skins with very short staple; a lamb's skin, about 8 months, is ideal, or a recently-shorn sheep. Miss Campbell's method, which she procured from a Rundle Street furrier, began by soaking the skin 2 or 3 days in bran water to loosen the dirt, afterwards soaking again in a brine solution of salt, saltpetre, and alum; but fairly good results may be had by first washing the skin in the ordinary way, and partly drying, but before it becomes quite dry and stiff, nail out flat on a large box or board, and rub well with equal parts of salt, saltpetre, and alum. Rub thoroughly with a brick or stone, and repeat every day, if possible, for a week or more. The more it is rubbed and worked the more pliable and soft it will be. Skins treated in this way may be joined together to form a large mat for the floor, and can be successfully dyed any desired color. Smaller pieces can be used up in quite a number of useful ways.

Mrs. Chilman exhibited many specimens illustrating the uses of wool.

AGRICULTURAL BUREAU CONFERENCES.

Members of Women's Branches in the Pinnaroo District held a Conference at Parilla on September 26th, when Miss Colwill presided over a good attendance of local members and visitors. Papers were read as follows:—"Cultivation of Dahlias" (Miss Colwill, Parilla); "Cold Meat Recipes" (Mrs. A. W. Welden, Parilla); "Fruit Drying in the Home" (Mrs. Foale, Parilla); "Jam and Jelly Making" (Mrs. Bonnin, Pinnaroo); "The Vegetable Garden" (Mrs. Atze, Pinnaroo); "Pastry Making" (Mrs. C. Napper, Parilla Well); "Puff Pastry" (Mrs. C. Holmes, Parilla Well); "Home Nursing" (Mrs. Fisk, Pinnaroo); "Wholemeal" (Miss O'Loughlin, Pinnaroo).

In the evening Miss E. Campbell (Inspector Domestic Arts, Education Department) gave an address and demonstration on "Dressmaking."

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Warramboe	29/9/33	15	Congress Reports	Mrs. A. Steer
Penola	1/11/33	29	"Christmas Presents," Mrs. R. Milway	Mrs. E. Kidman
Tantanoola	8/11/33	11	Congress Reports	Mrs. E. Telfer
Tantanoola	18/11/33	—	Discussion	Mrs. E. Telfer
Belalie	14/11/33	46	Address—Miss C. Dixon .	Mrs. A. Cummings
Mundalla	24/11/33	All members	Annual Social	Miss Kemp
Williamstown...	11/11/33	15	Homestead Meeting	Mrs. A. Cundy
Rendelham ...	1/11/33	15	Discussion	Mrs. E. Andrews
Glastope	21/11/33	30	Address—Mr. S. Thompson	Miss M. Sargent
Saddleworth ...	7/11/33	20	Homestead Meeting	Miss G. Frost
Auburn	24/11/33	14	"Hooked Rugs," Miss Dennison	Miss Dennison

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All communications to be addressed:

“The Editor, Journal of Agriculture, Education Building, Adelaide.”

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A. P. BLESING,
Minister of Agriculture.

AGRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Agricultural Bureau Conferences.

District Conferences will be held as follows:—

River Murray Swamp Areas, at Murray Bridge, Thursday, February 15th, F. S. Burr (Secretary).

Lower North, at Riverton, Thursday, February 22nd, O. E. Longbottom (Secretary).

Yorke Peninsula, at Port Victoria (Wauraltee Branch), Wednesday, March 7th, M. Newbold (Secretary).

South-East (Upper), at Wolseley, Wednesday, March 21st, E. W. Sharrad (Secretary).

South-East (Lower), at Tantanoola, Wednesday, April 11th, H. M. Kennedy (Secretary).

Dawyang, at Milang, Wednesday, May 9th, L. E. Yelland (Secretary).

Eyre's Peninsula (West), at Ceduna, Wednesday, July 4th, A. R. Maguire, Mudamuckla (Secretary).

Upper North, at Wilmington, Wednesday, July 18th, Chas. Cole (Secretary).

In each case the Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda.

Seed Wheat from Turretfield.

Mr. R. C. Scott (Supervisor of Experimental Work) reports very satisfactory sales of seed wheat from the Turretfield Farm. Ample stocks of Sultan, Gallipoli, and Federation, and limited supplies of Nabawa, Waratah, Sword, and Ranees are still on hand. Price 3s. 4d. per bushel on trucks Sandy Creek. Intending purchasers should lodge their orders early, with the Manager, Turretfield Farm, Roredale.

Crossbred v. Pure-Bred Dairy Cattle.

At the December meeting of the Sutherlands Branch of the Agricultural Bureau one of the members read a paper, "Dairying in the Sutherlands District," in the course of which the writer expressed the opinion that a cross between the Friesian and Holstein or any other two milking breeds would be of advantage over the pure-bred animal under conditions bordering on "Goyder's Rainfall Line." During the discussion that followed a member stated that the crossing of two strains within a breed would, in some instances, be a dangerous course, and expressed the definite opinion that better results would be obtained from the pure-bred animal. Many of the members present questioned the hardiness of the pure-bred, and held the view that these cows would not do well under such rigorous conditions. It was thought that a cross would be hardier, and therefore give better results in the long run.

The Chief Dairy Instructor (Mr. H. B. Barlow), who was asked to express an opinion on this subject said:—

Since the Friesian and Holstein are to all intents and purposes identically the same cattle—previously known as Holstein Friesian in Australia—this suggested "cross" would really result in breeding pure animals, provided both the male and female were registered. There are now no Holstein Friesians in Australia, as they are all registered in the Friesian Herd Book.

The suggestion that crossbred animals are more hardy than pure breeds is explained by what is known as *hybrid vigor*. It has long been recognised that crosses between different strains and varieties of races of animals produce very vigorous progeny. A very familiar, though extreme example, is the mule.

Although the hybrid vigor is often noticeable in crossbred dairy stock, it is usually only indicated by an ability to live under severe conditions, and not by any

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greater ability to produce milk in excess of the quantity you would expect a pure-bred animal of the same size and age to produce under the same conditions. Probably there would be a tendency for the crossbred to produce less milk if possible, but appear more robust. It is suggested that since it is a fact that cows can only produce milk in proportion to the amount and kind of food they obtain, the question of semi-starvation should not be a consideration. If conditions such as this must pertain, then it would probably be more profitable to keep goats, which can notoriously exist under very harsh conditions.

If the conditions are as harsh as is suggested it is doubtful whether any cows, pure or crossbred, would give satisfactory results, but if sufficient food is made available, I am inclined to think that the average pure-bred animal will quite hold her own from a production point of view with the average crossbred. It is not always a sound argument to compare the production ability of a good crossbred animal, of which there are many, with the production of a mediocre pure-bred animal, which are more prevalent than they should be.

Egg-laying Competition at Parafield Poultry Station.

The Minister of Agriculture, Hon. A. P. Blesing, M.L.C., has authorised an Egg Laying Competition, commencing at Parafield Poultry Station on April 1st. Recognising the necessity for improving the standard of the poultry stock of the State the Government is increasing the accommodation at Parafield to 500 Single Test Pens. This test offers breeders an excellent opportunity of having their stock tested under official supervision. The weight of every egg laid during the currency of the test will be recorded and will be available at the conclusion of the test to competitors. With the progress of the export trade, which brings our producers into competition with practically every egg producing country in the world, the necessity for maintaining the standard of our stock is being very fully realised. The Single Test method gives an accurate record of the performances of the birds over a period of 12 months, and gives breeders an excellent foundation for the breeding stock.

Full particulars can be obtained from the Government Poultry Expert, Box 901E, Adelaide.

VETERINARY INQUIRIES.

[Replies supplied by Veterinary Officers, Stock and Brands Department.]

Mortana reports mare with occasional cough, good appetite, large hard swelling on chest.

Reply—Give the following treatment:—(1) Starve for 18 hours. (2) At the end of that time give the following drench:—Raw linseed oil, 1½ pints; oil of turpentine, 4 tablespoons; shake thoroughly before giving. (3) Subsequently feed on good quality chaff, bran, and crushed oats. (4) Give 1 tablespoon of Fowler's solution of arsenic in a small damped feed night and morning for 14 days. Report progress in 21 days.

Black Rock Agricultural Bureau asks—(1) Correct way to feed cocky chaff. (2) Sheep with sores on shoulders. (3) Correct method of branding sheep that already carry one brand.

Replies—(1) Cocky chaff has a low feeding value and is very deficient in mineral matter. It should therefore be used in conjunction with oats and a mineral mixture. If oats are used, there is no necessity to buy bran or pollard. Bran is higher in mineral matter than pollard. A mineral mixture as suggested below should be fed to the cows:—Dicalcic phosphate, 60 parts; coarse salt (35-37% P₂O₅), 40 parts. For the average milking cow mix 4ozs. of the mixture in the feed daily. (2) Clip wool away from wound, wash daily with salt solution (teaspoonful of salt to the pint of water), and subsequently swab on the following mixture:—Creosote, 1 part; oil of

turpentine, 6 parts; raw linseed oil, 20 parts. (3) A sheepowner obtaining sheep which are already branded on his position should not use his registered brand, as the resulting combination may produce the brand of another person; also, blotch branding might easily be caused. The alternative is to use a numeral. The figures 2 to 9 may be used as flock marks on any part of the sheep by the owner of a registered brand only: Provided that *only one* of such numerals be used on any one sheep, and the size not to exceed 4in. in height.

Greenock has 12-year-old draught gelding, eats ravenously, saliva flecked with blood. Raises the head and arches the neck.

Reply—Have the teeth examined and attended to if necessary (the quidding of half masticated food is a sign of defective teeth). Give the horse a *little long hay before each feed* of chaff. Further, feed the chaff damped. Two tablespoons of Fowler's solution of arsenic in a small damped feed should be given once daily for 14 days.

Wisanger, Kangaroo Island, reports horse 15 years old, frogs of both front feet deformed. Deep holes alongside of frog, which is festered.

Reply—The complaint is probably thrush, which is an inflammation in the tissues underlying the frog. Try the following treatment:—Cut away all ragged and overgrown frog, so that any matter (pus) and discharges can escape, but do not remove good sound frog tissues. Apply the following mixture:—Oil of creosote, 2 drams; methylated spirits, 2ozs.; shake well. Pour a little into crevices and cleft of frog, and then plug with cotton wool or tow. Repeat treatment daily until discharge ceases. It is essential that the mare be kept on a good dry bed or floor.

Pinnaroo has calves lost use of front legs; hind legs stiff; and frothing from nose.

Reply—The paralysis is very probably due to defective nutrition (mineral or vitamin). It is doubtful if it will pay to treat the calves as recovery is very slow, but should you wish to do so, they should be put on to fresh whole milk. A tablespoon of cod

FARMERS : 1934 ?

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liver oil should be given twice daily. To give this, put in bottom of bucket and gradually stir in the ration of milk. Should you wish to rear any further calves, a tablespoonful of cod liver oil should be given daily in the milk.

Warrambo reports epidemic of "pink-eye" in flock of sheep.

Reply—Some sheep men let the disease take its course, but the following treatment is advised:—(1) Affected cases should be separated from healthy sheep. (2) If possible, put them in a small paddock, where there is shade and water. Hand-feeding is advisable. (3) Put a few drops of a 4 per cent. solution of zinc sulphate in eyes daily. The disease is highly infectious; be careful not to spread infection by handling healthy sheep after affected ones. The hands should be disinfected. The disease is usually introduced with bought sheep, and is due to a germ.

Merghiny reports horses with cough and discharge from nostrils.

Reply—The condition may be influenza or a mild form of strangles. The following treatment is suggested:—(1) Isolate all affected horses. (2) Put on to good quality chaff, bran, and a little crushed oats. (3) Give each horse 1 teaspoon of powdered nux nomica night and morning for 14 days. To give, mix with treacle and smear well back on the tongue. (4) If any green lucerne is available, a daily ration would help them considerably. Horses with a cough and a discharge should have the head steamed daily with eucalyptus.

HORTICULTURAL INQUIRIES.

[Replies supplied by Mr. GEO. QUINN, Chief Horticultural Instructor.]

Defective Gordo Fruit Bunches.

A grower of large quantities of Muscat Gordo grapes in one of the irrigated areas sent three samples of bunches and berries of Gordo vines to Mr. G. Quinn (Chief Horticultural Instructor) with a request as to the cause of the non-setting of the berries of some bunches, and drying off of fruits on others, and the parboiled condition of others found lying on the sand in the sun under other vines.

He states his crop was much reduced each season by these defects, which he attributed to the Oidium fungus.

Mr. Quinn replied as follows:—

(1) I can detect no evidence of injury by the Oidium (Powdery Mildew) fungus on these berries or stalks. I know there is, amongst the older settlers on the Murray, a suspicion that this non-setting of the Gordo fruits is caused by an early attack of Oidium, but, if seeing is believing, I am an unbeliever, as I have never yet found visible evidences to that effect on similar specimens to those you submit. There is evidence on the inflorescence where the sprigs of red dried berries are located, of the presence of a caterpillar—I should say the active small green larva of the *Cacoecia postvittana*, or Light Brown Apple Moth, a native leaf rolling caterpillar which in the spring and early summer attacks all sorts of plants—roses, apples, and grapevines in particular, when these latter are just setting. It bites the stalks of the branchlets, eating the green outer bark, and webs up the embryo berries which, being thus cut off from nourishment, die early. This pest, as a rule, disappears with the advent of settled hot weather, but during a cool summer goes on breeding and feeding on the bark of the now growing bunches. In a vineyard little can be done, excepting it be possible to go over the vines and pull the newly set bunches free from leaves and tendrils which crowd them and give shelter to the pest. This, combined with sulphuring which may incommode the caterpillars, as well as prevent a possible attack of Oidium.

(2) These berries represent fruits which have been separated from the bunch and lying on the hot sand have been simply parboiled. As you know, prior to the stage of developing sugar, the Gordo berries are very readily reduced to this condition, and eventually, as they dry out, become hard and red. Similar berries were contained in No. 1 sample in both stages of desiccation.

(3) This wilting of the distal end of the bunch (inflorescence) would appear to be possibly caused by two factors:—(1) In the first place, as it hangs down it is in a subordinate position for receiving sap—i.e., sap does not flow down below a horizontal position equally well with its upward movement in more vertical parts of plants. If the vines are beginning to become sluggish through the soil drying out between irrigations the fruits are robbed by the leaves, and it may be assumed the lowest portion of the bunch most—owing to the above rule. (2) The heat reflected or radiated from the sand may cause this, more particularly if the lower point of the bunch is near to the ground surface. There is no evidence of insect injury on the stalk of this specimen.

PARAFIELD POULTRY STATION.

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Intending breeders should recognise the importance of establishing their flocks with only the very best of stock also, pay particular care to the size of the egg. The future of the poultry industry in South Australia is almost entirely dependent on the export trade; the size of the egg for export is of the greatest importance. The breeding stock at Parafield is carefully selected and every egg set or sold is of a minimum weight of 2ozs., and a large percentage considerably over.

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EARLY BOOKING IS ADVISABLE.

Further particulars can be obtained from the Manager, Parafield Poultry Station, Salisbury, or Poultry Expert, Department of Agriculture, Flinders Street, Adelaide.

C. F. ANDERSON, Poultry Expert.

The general proposition of the scattered or tardy setting of Gordo berries being so general would appear to indicate a lack of cross pollination, and an evidence of lack of potency in the pollen produced in the flowers of the Gordo. This characteristic is very marked in the closely allied variety, Muscat of Alexandria, which is regularly cross pollinated by hand in glasshouse-grown vineries. The paw or tail of a rabbit or hare is rubbed over the flower bunches of some other sort flowering at the same time, and then rubbed up and down the flowering bunches of the Muscat of Alexandria.

This cannot be done in the open field, but a good sulphuring at the time the caps are falling from the flowers is claimed by French vigneron to stimulate setting of those sorts of wine grapes which have similar characteristics.

The French vigneron call this failure to set "Coulure," and they definitely claim that sulphuring lessens it, but cannot say whether it is because it prevents the attacks of *Oidium* or perhaps other unrecognised fungi on the blossoms, or merely that the puffing of a current of sulphur-laden air through the inflorescence mechanically promotes distribution of the pollen produced by the Gordo blossoms.

Pruning Orange and Lemon Trees.

Replying to the Secretary of the Laura Bay Branch of the Agricultural Bureau who asked, "Is it necessary to prune citrus trees?" Mr. G. Quinn (Chief Horticultural Instructor) says:—These trees require attention when small, chiefly to make sure that the principal branches do not grow across each other or across the centre of the tree. This is to give balance to the framework. As they grow larger, some thinning may become necessary to prevent the inner parts of the framework being crowded. As a rule, this crowding results in much dead twiggy wood accumulating on the limbs inside of the tree.

It is not desirable to prune a citrus tree so as to form a hollow vase shape—as is done with most deciduous kinds of fruit trees—but to aim at maintaining a dome-like canopy of leaves right over the framework, almost as the fabric of an umbrella covers the framework of that useful article. The leaves are required to act as a shade to deflect the strongest sun heat, as well as to do their share in the metabolic processes necessary to the well-being and growth of the plant.

When the lower branches are, by the natural extension of those above them, forced to a pendulous position and touching the soil it is well to shorten back their extremities either wholly or in part. In practice this usually first takes the form of shortening them back to where a small growth turns upwards but subsequently it may be necessary to remove them so as to lift the fruit and leaves 1 ft. or more above the soil.

The object of this procedure is to gradually lengthen the main stem as the lower limbs are removed but generally this action is spread over several years, thus avoiding at all times unnecessarily exposing the bark of the trunk and main limbs to the direct rays of the summer sun.

When the citrus trees reach a fruitful and mature stature, the canopy of foliage becomes less dense on the top, and then small lateral shoots are allowed to develop on the inside framework of the tree where they often produce the most perfect fruits.

There is no set time for pruning citrus trees, excepting that any limbs or boughs which permit a direct entry of sunlight should be cut away in spring or early summer, when the sap is flowing freely and new growths may close over the gaps with protecting foliage before the sun exercises extreme power.

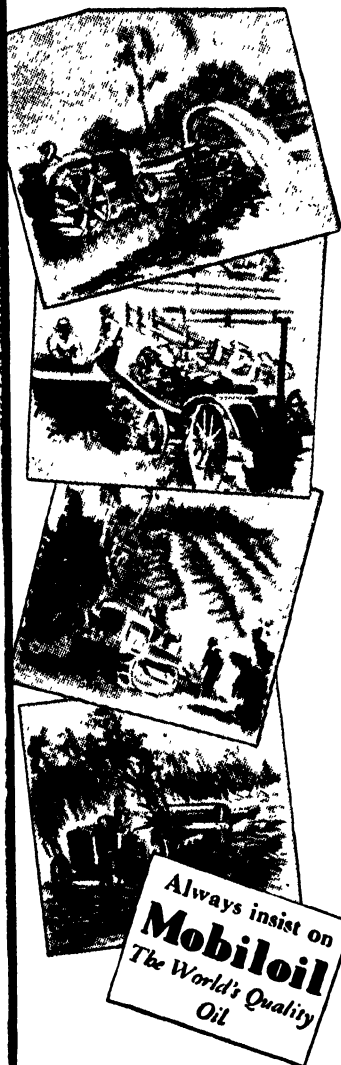
Dead brush wood may be cut out at any period when the owner can find time to do the work. Large cuts made in the removal of limbs should be smoothened with a knife, and painted over the exposed woody part with thick pasty lead paint to facilitate a safe and healthy growth of covering tissue.

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NATURAL AND FEDERAL DISABILITIES OF SOUTH AUSTRALIA, VIEWED AS AN ESSENTIALLY AGRARIAN STATE.

[By ARTHUR J. PERKINS, Director of Agriculture.]

EVIDENCE GIVEN AT ADELAIDE BEFORE THE COMMONWEALTH GRANTS COMMISSION, DECEMBER, 1933.

South Australia is without exploitable Coal deposits, and it follows that industries, social services involving the use of Power, Rail transport, and incidentally costs of rural production, are in some degree controlled by those from whom Coal is procured; nor has it permanent running waters from which Power might be economically derived. Again, apart from Copper deposits which at present are lying dormant, Gypsum, Salt, and limited Iron Ore deposits, it lacks mineral resources of any great importance. South Australia has no natural forests of appreciable commercial value, and its only permanent water-course is the lower reaches of the River Murray. The logical corollary to these natural disabilities is a present-day lack of population in proportion to territory effectively occupied, and it must be admitted that natural conditions, quite as much as the Federal tie, have compelled South Australia to develop, in the main, along agricultural and pastoral lines. But apart from these natural disadvantages, the cumulative pressure of 30 years' Federal fiscal policy upon rural production in South Australia has been very severe. The avowed aim of this policy has been industrial self-sufficiency of a handful of people, and it has operated very much to the disadvantage of South Australia, the solvency of which as a State is ultimately dependent upon its ability to export rural produce at a profit. I shall support this statement by the following considerations:—

In the first place, it must be fairly obvious that a community depending so largely upon rural output for home expenditure and commitments abroad must be economically able to face World competition and to accept World prices, coupled with corresponding parity for home consumption. In other words, without loss to itself it must be able to sell in the cheapest markets. In such circumstances, its solvency would appear to rest upon corresponding ability of its primary producers to buy in the cheapest markets; nor is this possible except under the incidence of a revenue or low tariff policy. Unfortunately, from the standpoint of South Australia, and that of other rural States, Federal Fiscal policy has, from its inception, been one of high Tariffs, the height of which has progressively risen from period to period, culminating in the all but prohibitive rates of 1930.

What have been the outstanding effects of this policy? It has assisted to build up two huge cities—Sydney and Melbourne—and in the process it has forced up costs of rural production to such an extent that it is becoming increasingly difficult to dispose of Australian rural produce at a profit to producers on the markets of the World.

Between 1901 and 1931 the population of Sydney rose from 478,900 to 1,256,230, and that of Melbourne from 494,129 to 1,030,750, that is to say, increases of 157 per cent. and 109 per cent. respectively over a period of 30 years.

Again, the value of the yearly output of the factories of New South Wales and Victoria rose between 1907 and 1929—a period of 22 years—from £66,924,646 to £313,196,038, representing an aggregate increase in value of £246,271,392, or 368 per cent. above 1907 values.

It would appear, therefore, that the factories of our two large cities have flourished exceedingly behind the High Tariff Wall of Federal Policy, but unfortunately, apart from articles of Primary Production, such as Butter, Cheese, Flour, &c., their enormous and costly output has not proved exportable, and has in the main been reserved for Australian Home consumption. And however much their own private interests may have been injured thereby, Australian consumers and users have been compelled to purchase these locally manufactured articles at prices considerably in excess of world parity, with crippling results upon general costs of production. In this connection, the following figures from the Commonwealth Year Book are illuminating. The total value of Commonwealth Exports for 1930-31 is given as £101,402,814, of which £99,139,484 represented Primary Produce and £2,263,330 manufactured articles other than primary products, or 2.2 per cent of the total only. Hence, the infinitesimal value of locally manufactured articles, other than primary produce, from the standpoint of our commitments abroad should be fairly obvious.

The immediate effects of high tariffs would seem, therefore, to be that those on the wrong side of the Tariff Wall are forced to pay considerably more than World parity for articles manufactured in their midst, and under a drag-net Tariff of the type we have recently experienced the cumulative result is an inevitable all-round increase in the cost of living, which in its turn leads sympathetically to progressive increases in the cost of wages. The latter then become responsible for further increases in the necessities of life and industry generally, and are ultimately reflected in progressively increasing costs of rural production, upon which rests precariously at the present time the whole superstructure of the State.

In the years that immediately succeeded the War, the insidious rise in costs of rural production was to some extent masked by a brief period of unusually high prices for rural produce. This period has now come to an abrupt end, and I hold firmly to the belief that an important, if not the main factor behind the crisis through which South Australia is passing, and indeed, to a less degree, the Commonwealth as a whole, is the fact that World prices for primary products no longer balance our artificially swollen costs of production. This unfortunate position is attributable both directly and indirectly to a relentless policy of prohibitive tariffs; and since as a State we have not the advantages of the accumulated wealth of locally protected manufactures, and have to pay toll to the industrialised States for the necessities of life and industry, the Federal Government cannot, in my opinion, escape the responsibility for a position very largely of its own creation.

The time at my disposal does not permit of a detailed examination into Costs of Production of the various phases of rural activity, and I shall have to content myself with a few typical examples with which I am familiar.

Wheat, because of its ready adaptability to our conditions of climate and soil—and, prior to Federation, it could have been added to our economic conditions as well—Wheat looms very large in the history of the State. Indeed, together with Wool, we may be said to owe to it whatever development we have hitherto attained to. It follows, therefore, that anything relating to its Costs of Production is of paramount importance to the State, and indeed to a less degree to the Commonwealth as a whole. Unfortunately the determination of a mean figure applicable to the State as a whole is an exceedingly difficult, if not impossible, proposition; these costs must necessarily vary from district to district, from farm to farm, and even from season to season on one and the same farm. Nevertheless, in existing circumstances, I do not believe that anyone could be found with any real knowledge of the question who would maintain that 2s. per bushel and less on the farm could possibly meet current costs of production. I have

been responsible for a Government Farm (Turretfield) which for 10 successive years had been run from its own revenues without the assistance of a Government grant, and during the course of which all expenditure was submitted to detailed analysis. I append as a contribution to the subject itemised statements of actual Costs of Production of Wheat (1) at Turretfield for the three-year period closing on June 30th, 1932, and (2) on a private Mallee Farm, the accounts of which were kept by the Department of Agriculture over the same period.

STATEMENT "A."—*From the Standpoint of Seasonal Field Operations.*

	Turretfield Farm. Mean Costs.			Private Mallee Farm. Mean Costs.		
	Per Acre.	Per Bushel.	Per- centage.	Per Acre.	Per Bushel.	Per- centage.
	£ s. d.	s. d.	%	£ s. d.	s. d.	%
Preparation of fallows	0 18 0	0 11	22·7	0 12 1	0 9	24·9
Seeding operations	0 17 3	0 11	21·8	0 11 5	0 8	23·1
Harvest operations	0 11 8	0 7	14·6	0 11 2	0 8	22·9
Balance of expenditure	1 12 6	1 8	40·9	0 14 2	0 10	29·1
Totals	3 19 5	4 1	100·0	2 8 8	2 11	100·0

STATEMENT "B."—*From the Standpoint of Main Costing Items.*

Labor (direct and indirect)	0 18 9	1 0	23·6	0 9 2	0 7	18·8
Use of Horses	0 12 6	0 8	15·8	0 3 11	0 3	8·1
Use of tractor	—	—	—	0 9 0	0 6	18·5
Use of Implements	0 3 9	0 2	4·7	0 3 10	0 3	8·0
Seed	0 6 9	0 4	8·5	0 3 2	0 2	6·4
Purchase of essential material ...	0 10 1	0 6	12·7	0 8 0	0 6	16·5
Balance of expenditure	1 7 7	1 5	34·7	0 11 7	0 8	23·7
Totals	3 19 5	4 1	100·0	2 8 8	2 11	100·0

STATEMENT "C."—*From the Standpoint of Interest and Depreciation.*

Depreciation on improvements and plant	0 8 2	0 5	10·3	0 10 7	0 8	21·8
Interest on land and improvements	0 15 9	0 10	19·9	0 5 6	0 4	11·3
Interest on floating capital	0 4 10	0 3	6·1	0 3 0	0 2	6·2
Interest on overdraft	0 2 2	0 1	2·7	0 0 7	—	1·2
Total interest and depreciation charges	1 10 11	1 7	39·0	0 19 8	1 2	40·5
Balance of expenditure	2 8 6	2 6	61·0	1 9 0	1 9	59·5
Totals	3 19 5	4 1	100·0	2 8 8	2 11	100·0
Mean yields per acre	19·20 Bushels.			16·92 Bushels.		

We have here two authentic examples of the Costs of Growing Wheat under existing South Australian conditions: one is representative of the older settled, heavy soil, Central and Lower North Divisions of the State, and the other of the more recently settled lighter soil Mallee Lands. As might have been expected, wheat can be grown at lower costs on the cheaper and lighter Mallee lands than in the older settled portions of the State. Attention is drawn to the fact, however, that even in the Mallee, costs on the farm are 2s. 11d. a bushel, which correspond to 3s. 6d. on truck Port Adelaide, as compared with 2s. 6d. on trucks only, which is at present being offered. Moreover, the mean yield of the Mallee Farm under consideration, namely, 16.92bush., is considerably higher than that.

of the Murray Mallee Division as a whole, namely, about 8bush. to the acre for crops sown on fallow land: if subject to correction for reduced harvest costs, we assumed similar expenditure per acre for the Murray Mallee Division as a whole, we would find that a mean yield of 8bush. per acre would involve costs in the neighborhood of 5s. per acre, that is to say, twice as much as is being offered at outports to-day.

Finally, and apart altogether from the direct influence of high cost of living upon the farmer himself, I shall add that most of the items included in the Costs of Production of Wheat admit of appreciable reductions under a policy of Low Tariffs. Indeed, I am prepared to go as far as to say that if Port Adelaide were a free port, even Wheat at 2s. a Bushel would not necessarily prove a losing proposition.

In 1913 I had occasion to put on record current values for farm machinery, essential farm material, tools, &c. These values have been summarised below in contrast with corresponding 1933 values:—

	1913.	1933.	Per- centages increases.
	£ s. d.	£ s. d.	%
Essential farm machinery	518 17 0	638 13 6	23·1
Farm harness	21 16 6	30 9 5	39·6
Miscellaneous tools.....	3 9 3	5 17 5	69·6
Other materials essential to wheat growing.....	91 13 0	100 13 1	9·8
Totals	£635 16 0	£775 13 5	22·0

In considering these figures we must not overlook the fact that the original 1913 Total, namely, £635 16s., representing current purchases of farmers, was already a protectionist total that no farmer should be called upon to bear: this total rose to £901 in 1925; fell to £826 19s. 4d. in 1930, and to £775 13s. 5d. in 1933, which is still 22 per cent. higher than the original 1913 protectionist total. Figures such as these involve heavy Interest and Depreciation charges, which tend to render the growing of Wheat exceedingly costly and unprofitable whenever climatic conditions reduce yields to low levels, or World Economic conditions have a corresponding effect upon prices.

How heavily interest and depreciation charges weigh upon the farmer, and more particularly upon the farmer handling relatively small areas, was made clear in a recent inquiry which I made into Capital invested in South Australian Wheat Farming. Figures given below summarise the position, apart from interest on land or rent.

Estimated Mean Interest and Depreciation on Improvements and Working Plant on Farms of Varying Dimensions.

	Mean Areas.	Assumed Mean Yield per acre.	Mean Interest and Depreciation per bushel.
	Acres.	Bushels.	s. d.
Very small farms	287	18·87	2 2
Small farms	633	17·78	2 0
Average farms	988	14·05	1 11
Large farms	1,651	11·86	1 10
Very large farms	3,077	10·00	1 9

The above figures are based upon an inquiry into the position of 129 South Australian Wheat Farms. It will be observed that interest and depreciation charges on improvements and working plant are practically equivalent to current prices of Wheat on the farm. The uneconomic height to which these charges have attained is one of the consequences of a high tariff policy.

In 1927 I had occasion to keep the accounts of a prominent Dairyman situated on the River Murray Reclaimed Swamp Lands, and notwithstanding the fact that for the year his Herd averaged more than 1,000 galls. of Milk for every cow in the herd, the inclusive costs of the milk produced were a shade under 9½d. per gallon.

The recent attitude of the Belgian Government towards exportable primary products in which many South Australian producers are vitally interested is surely a reminder that a policy of economic self-sufficiency, which has brought 130 million Americans to the brink of ruin is not likely to succeed in Australia; we cannot expect others to purchase our goods if we refuse to take theirs in exchange. Until the inevitable crash comes this particular aspect of the question may not interest our manufacturers of unexportable commodities, but what in the meanwhile are the primary-producing States of the Commonwealth to do?

Another consequence of our National policy, which hits primary producers heavily, is that so long as we refuse to balance exports of primary produce by corresponding imports, cargo vessels must reach Australia in ballast, and outward freights must be correspondingly higher. This means that our producers have been compelled to accept lower export parity for their goods than would have been the case had our National policy been more in keeping with the natural requirements of an Agrarian State.

I recognise freely that South Australia is not the only State dependent upon rural output for continued prosperity; and although this dependence may not be quite as great as our own, the Commonwealth might perhaps justly be described as a federation of rural States with two highly industrialised Cities. But unfortunately even in this matter of rural production we have special difficulties of our own which tend to place South Australia at a disadvantage relatively to the better endowed Sister States, and to these difficulties I propose now drawing attention.

It is well recognised that over the bulk of Australia, Rainfall and its seasonal distribution dominate Crop Production and the relative abundance of grass or Livestock-carrying capacity of the land. In this connection, out of territory 380,070 square miles in area, 310,660 square miles or 81.7 per cent. of South Australia receive less than 10in. of yearly rainfall, and lie therefore outside normal cropping areas. Corresponding percentages for land outside the 10in. rainfall line for Sister States are as follows:—Western Australia, 49.9 per cent.; New South Wales, 15.7 per cent.; Queensland, 12 per cent.; whilst in Victoria and Tasmania a rainfall in excess of 10in. is received by each State throughout their respective territories. It must be clear, therefore, that in South Australia the available cropping area is very much restricted by unfavorable rainfall conditions.

Again, of the country receiving in South Australia 10in. and more of rain, a limited proportion only is suitable for agricultural operations. In this connection it is estimated that not more than 15,000,000 acres can be described as arable land, that is to say, 33.8 per cent. only of the land receiving 10in. and more of rain, and 6.4 per cent. only of South Australia's total territory.

Moreover, of our arable area in the neighborhood of 10,000,000 acres, or two-thirds of the total is "Mallee Land," and as such of relatively low natural fertility. It is this fact that tends to keep our mean crop yields at a relatively low level, and to make it extremely difficult for at least 50 per cent. of our farmers to face artificially raised costs of production, and their personal straits are reflected in the financial difficulties of the State.

Another serious difficulty is the absence of good underground water supplies for Livestock and other purposes over the greater part of South Australia. This has rendered necessary the building up of costly reservoirs with attendant reticulation systems to meet the needs of an extremely scattered population, and the building and upkeep of these national works has been a heavy burden on State finances.

Our pastures and our hot dry summers do not lend themselves generally to dairying, except with the costly assistance of hand-feeding over six months of the year, and we have usually found ourselves compelled to import butter for home consumption over portion of the year. This disability has hitherto hampered our attempts at closer settlement. Apart from the very limited areas of Reclaimed Murray Swamps and portions of our Hills Districts, the only important tract of country likely to prove suitable for Dairying is situated in the South-Eastern Statistical Division of the State. Unfortunately, much of the latter country is usually under water in Winter, and has already involved the State in heavy expenditure for drainage, and is likely to cost a good deal more before the work can be completed.

It is true that we possess important tracts of country admirably adapted to fruit and vine-growing, whether under irrigation or conditions of natural rainfall. Unfortunately, the Federal high tariff policy has forced up Costs of Production to such an extent that to-day it is no longer possible to market fruit and fruit products overseas to any great advantage. The uneviable position of the canned and dried fruit industries is a case in point. To these might be added the stagnation of the Olive Oil industry, which is barely able to face foreign competition on the home market, although admirably adapted to local conditions of climate and soil, and which prior to federation appeared to be full of promise for the State. But with the cost of mere picking in the neighborhood of £5 a ton, it is little wonder that Olive growing is looked at askance by would-be growers. And it is analogous reasons that prevent us from developing a profitable overseas trade in Pig Products.

Finally, our high Railway rates which are partly one of the consequences of the scattered nature of our land settlement and partly one of the consequences of a high tariff policy, are very burdensome upon local rural production. These rates are relatively heavier than in neighboring States as the following examples will show:—

	Wheat.		Superphosphate.	
	First 50 Miles. per bushel.	First 100 Miles per bushel.	First 50 Miles. per ton.	First 100 Miles. per ton.
	d.	d.	s. d.	s. d.
South Australia*	2.95	4.39	5 5	9 8
New South Wales	2.44	3.86	5 0	6 9
Victoria	2.14	3.29	3 8	5 7
Western Australia	2.65	3.51	3 3	4 1

*NOTE.—Since the beginning of the present season and until the end of June, 1934, rates payable by South Australian Farmers for wheat and super have been reduced by 20 per cent., namely:—

First 50 miles for wheat	2.36d. per bush.
First 100 miles for wheat	3.51d. per bush.
First 50 miles for super	4s. 4d. per ton
First 100 miles for super	7s. 9d. per ton

But in so far as the State is concerned, the position remains the same, since the State Treasury must pay the 20 per cent. to the credit of the Railways.

I understand that the warrantableness of some of the developmental expenditure incurred by the State within recent years has been questioned, and in particular expenditure incurred in the gradual development of Eyre Peninsula.

In the latter connection it is necessary to draw attention to the fact that 60 per cent. of the area of the State lies to the West of Port Augusta, including Eyre Peninsula and its Northern hinterland, and 40 per cent. only to the east of the Port, including the earlier settled portions of the State.

It seems to me unthinkable that any State could afford to leave idle more than 50 per cent. of its effective area, when it was known that a large proportion of this area was suitable for Sheep or Wheat, upon which the Eastern portion of the State had been effectively settled. Attention should be drawn to the fact that the greater part of the Peninsula was covered with Mallee or low scrub, and that the actual cost of clearing and development had fallen not upon the State, but upon the individual settler, and frequently to his eventual loss. Nor should it be forgotten that however good the quality of the soil, Mallee Blocks, reclaimed by individual settlers, cannot as a rule be expected to reach normal farming conditions until at least 10 years, and frequently more, from date of original settlement. Unfortunately, Settlers have been faced by a series of unfavorable seasons since early settlement, and the State has been compelled to supply them with special assistance to enable them to keep on the land. The position has been further complicated by the settlement of Returned Soldiers on the only available Crown Lands of the State, and many of them have unfortunately proved unsuitable settlers.

The main State developmental works on the Peninsula are represented by a narrow-gauge railway line and an attempt to provide water to the central areas from its Southern end. The expenditure involved was inevitable if the Peninsula was to be settled, and in my opinion with the eyes of land-hungry neighbors upon our sparsely-settled areas no State could afford not to attempt the settlement of more than one-half of its available area. It is probably true that public works on the Peninsula do not at present pay interest and are, therefore, a burden upon taxpayers of the eastern half of the State. But with a complete knowledge of the Peninsula and its conditions I am prepared to maintain that, given a fiscal policy more in keeping with the rural requirements of the Commonwealth than we have hitherto experienced, Eyre Peninsula should, in the course of time, be able to meet interest on any expenditure that may have been incurred on its behalf. I stated in evidence before an earlier Commission that between 1935 and 1940 the Peninsula should carry in the neighborhood of 1,500,000 acres of Wheat, from which 15,000,000 bush. might be expected, and that its flocks should expand to from 1,600,000 to 1,800,000 sheep. To these opinions I still adhere, with the addition that the Dairying and Poultry Industries are also capable of important development over this area. As a contribution towards my anticipations in this direction, I shall point out that already in 1931-32 Eyre Peninsula had about 1,137,000 acres under wheat, and a production of over 10½ million bushels.

The costliness of the River Murray settlements has also been criticised, and in some directions perhaps not without reason. Mistakes have no doubt been made, but could it have been otherwise in a national undertaking of this magnitude? Two factors have added very considerably to the costs incurred, namely:—

1. The hurried settlement of numerous Returned Soldiers anxious to resume normal civil life, which for sentimental reasons could not have been avoided; and
2. Direct and indirect influence of a high tariff policy.

I am of the opinion that in its attempts at settlement of Eyre Peninsula, and at development of the River Murray Irrigation areas, particularly in relation to the settlement of Returned Soldiers, South Australia has undertaken national

work of major importance, and that considering that the policy that has led to the enrichment of the industrial States has led to corresponding impoverishment of South Australia, it seems reasonable that the Commonwealth as a whole should assist this State to carry a burden which unfortunately it is no longer able to bear without outside assistance.

It is often stated that the countryside benefited from economic association with large centres of population, and whilst from the general viewpoint this is undoubtedly true, it cannot be said to apply to the association of essentially rural communities, such as South and Western Australia, with distant urban centres, such as Sydney and Melbourne, the home territories of which were amply adequate for the supply of all requirements. Unfortunately, the collection of Interstate statistics on the subject has been abandoned since 1909, and it is no longer possible to set out the actual position on the basis of exact figures. From inquiries that I have made, however, it would appear that the value of our Interstate exports of Horticultural Produce for the 12 months ending on June 30th, 1930, did not exceed £170,000, and consisted chiefly of oranges and tomatoes consigned to the Melbourne Market. Our Wines and Brandies, on the other hand, have undoubtedly benefited from Federation, and now have an Interstate export trade of a yearly value varying from £500,000 to £750,000. But this is a very small set-off to the value of the manufactured articles we are compelled by High Tariffs to receive from the industrialised States.

The Federal disabilities under which South Australia appears to me to labor may be summarised as follows:—

1. Natural conditions have made of South Australia an essentially rural State, and unfortunately she has been unequally yoked in a federation with two large States which have gradually expanded upon industrial lines.

2. Federation has checked the development of local industries, and in some cases obliterated them. It has raised the cost of necessities of life and industry, with corresponding increase in costs of rural production, upon which our economic life is wholly dependent. Natural conditions compel us to sell in the cheapest markets and artificial ones to buy in the dearest.

3. And to-day South Australia finds it almost impossible to market surplus agricultural produce overseas at a profit to producers and to the State.

4. The practical disappearance of taxable industrial wealth from the State has thrown the burden of taxation upon rural production and impoverished the State and its main producers.

5. Even as a rural State, South Australia suffers in comparison with its better-endowed neighbors. Over 81 per cent. of its territory lies outside the 10in. rainfall line, and no more than 6.4 per cent. of its total territory is suitable for agricultural operations. Moreover, the major portion of the land in cultivation is "Mallee" land, and therefore of relatively low natural fertility.

6. The absence of good underground water supplies has rendered necessary costly artificial supplies for both town and country, and has helped to inflate costs of rural production, both directly and indirectly.

7. Closer settlement has been hampered by Federal Fiscal Policy, with the result that we have been thrown back upon extensive farming and the normally low returns per acre which characterise this type of farming.

8. Forty per cent. of the territory of South Australia is carrying the burden of three national undertakings of major importance, in which the Commonwealth is intimately concerned, namely:—

- (a) The development of Eyre Peninsula, which may eventually claim the position of a separate State;
- (b) The opening up of the River Murray Irrigation Areas; and
- (c) The settlement of Returned Soldiers.

9. The limits of local taxation appear to have been reached, if not over-stepped, and to remedy the position in which we find ourselves, I know of no alternative but—

- (a) A radical change in Federal Fiscal Policy towards low tariffs for revenue only;
- (b) Substantial Federal grants enabling the State Government gradually to reduce local taxation, which eventually would be reflected in lower cost of rural production;
- (c) Secession which would restore to us our liberty of action and enable us to work out our destinies on our own lines.

I recognise that in ordinary circumstances my statement of our disabilities should end here, and that any addendum would be in the nature of an anti-climax. Quite recently, however, I happened to come across an article in *Nineteenth Century Magazine* entitled "A Policy for Central Europe." The article, which is by a former Minister of Agriculture of Czechoslovakia, is a reply to the suggestion that Europe should adopt a Federal Tariff Union. The position as pictured by Doctor Milan Hodza is so similar to our own that I take the liberty of adding a few extracts as an appendix to my personal statement:—

"If we imagine Pan-Europe as a Confederation with the tariff barriers raised, as a unitary customs area, then it is clear that Pan-Europe is not possible, and, even were it possible, that it could not be advantageous, and therefore not permanent. Europe is not an economic unity. West-Europe, predominantly industrial, has other economic interests than the agrarian States of Central Europe. West-Europe has a surplus output of industrial products, we have a surplus output of agricultural products, and therefore we must make a distinction between what would benefit the international Capital invested in West-European industry and what the farmer in Central Europe urgently needs . . .

"If Pan-Europe were to arise suddenly, sweeping away all the Tariff barriers, including the agricultural, we should be overwhelmed by the economic and financial power of West-European Industry. We should have all the disadvantages of a great customs area dominated by industry, and we should have neither the strength to resist nor the guarantee of an economic safeguard for agriculture. That would mean the pauperisation of agrarian States of Central Europe and the pauperisation of agrarian democracy itself. If the farmers of these States cannot safeguard their products, and the State cannot safeguard its small peasant landholders, that would mean that agrarian democracy would be shaken to its foundations in Central Europe, since the agrarian represents the only stable element. It would mean that the ground was cut away from under the feet of cultural development in Central Europe. We should be threatened by the danger of chaos which is to-day in the neighborhood of Soviet Russia, altogether unthinkable.

"That would be the effect of Pan-Europe as it is at present conceived organised from the standpoint of West-European capitalism and industrialism. It is for this reason that we must approach the question of international 'reapprochement' by progressing from the smaller problems to the greater, and not *vice versa*. Only in this way can Pan-Europe be made a reality, resting not on public manifestations of international enthusiasm, but on a real abolition of the economic friction between the different States."

There, it seems to me, speaks a man of far greater vision than the South and West Australian protagonists of Federation in the last century. We accepted Federation and unified customs without taking thought of our special agricultural interests, and now we are suffering for the lack of thought of the Fathers of Federation and the "public manifestations" of Federal "enthusiasm." It is much to be hoped that in common fairness, future generations will not be permanently penalised for the hastiness and lack of foresight of their ancestors.

MALLEE FARM COSTING.—FARM No. 1.

[By ARTHUR J. PERKINS, Director of Agriculture.]

PART I.—GENERAL.

1. INTRODUCTORY.

The farm under consideration is a private farm situated in the Murray Mallee division of the State, concerning which a preliminary Report was published in the February, May, June and July (1932) numbers of the *Journal of Agriculture*. This farm has been managed and worked by its owner, but its accounts have been kept by the Department of Agriculture for three successive seasons, namely—1929-30, 1930-31, and 1931-32; and it is on the mean results of these three seasons that the costing accounts have been based.

At the beginning of the opening season the local District Instructor (Mr. R. L. Griffiths) reported on this Farm as follows:—

“This farm is in a district with a 16-in. rainfall and is typical of large areas in the southern portion of the Murray Mallee division.

The farm has two distinct types of soil; the better of which covers about four-fifths of the total area, and is a red loam of good quality seated on a good retentive clay. Soil of this type usually carries good crops of Wheat when well managed, and should develop into good pasture under the influence of successive phosphatic dressings of crops. The balance of the land consists of sandhills, running East and West, and dividing up the loam into several sections. This light sandy land overlies a good clay subsoil at depths of 1ft. to 2ft. In dry seasons this light sandy land has usually carried better Wheat crops than the loam; but in dry years it is apt to drift over the heavier flats.

Clearing operations were started 22 years ago and were completed 5 years ago.

Improvements and Subdivisions are above average. The Homestead is centrally situated and well equipped with labor-saving devices. Farm buildings are adequate, special features being an excellent barn, implement shed and sheep yards. A central roadway runs North and South, with division fences running East and West to the boundaries. Boundary Fences are wire-netted and all division fences are Sheep-proof. Water has been reticulated from a central bore to practically all paddocks.

The farming plant is complete and efficient; and all machinery is kept in good order. Within recent years horses have been displaced by a tractor with a view to reducing labor costs. Live Stock generally are high class, and Sheep are the main revenue earners. The latter consist for the most part of good strain Merino Ewes, bred to Merino Rams, Suffolks or Corriedale, according to circumstances. A breeding flock of Corriedale Ewes is gradually being built up.

Farming practices on this farm are among the best in the district; all Wheat is sown on carefully prepared fallow. A three-course rotation is usually followed, namely—

1. Bare Fallow,
2. Wheat, and
3. Oats, the bulk of which is grazed.

Superphosphate has been used at the rate of 1cwt. to 1½cwts. per acre; and prior to the recent drought period the mean Wheat yield has usually been about 20bush. per acre.

Finally, the general location, the permanent improvements and the farming methods followed make of this Farm a good example of a modern Mallee Farm."

2. DISTRIBUTION OF FARM AREA AND CROP RETURNS IN 1929-30, 1930-31, AND 1931-32.

Mallee Farm No. 1 is 1,685 acres in area, distributed as follows:—

Buildings and Grounds	9 acres.
Roadways	7 "
Uncleared Scrub	14 "
Available Arable Land	1,655 "
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Total Farm Area	1,685 acres.
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The manner in which the available Arable Land was used for farming purposes during this period of three years is summarised below:—

	1929-30.	1930-31.	1931-32.	1929-32 Means.
	Acres.	Acres.	Acres.	Acres.
Wheat on fallow	448	395	479	440·67
Wheat on grassland	—	23	—	7·67
Oats on fallow	27	—	33	20·00
Oats on grassland	120	61	—	60·33
Cereal hay on fallow	—	—	29	9·67
Grazing crops	539	492	—	343·67
Bare fallow	395	541	469	468·33
Area in cultivation	1,529	1,512	1,010	1,350·34

The Mean Yields per acre of harvested Crops were as follows:—

	1929-30.	1930-31.	1931-32.	1929-32 Means.
	Bush.	Bush.	Bush.	Bush.
Wheat on fallow	14·35	15·60	19·35	16·20
Wheat on grassland	—	16·78	—	16·78
Oats on fallow	19·65	—	17·24	18·03
Oats on grassland	6·63	21·17	—	11·54
Cereal hay on fallow	—	—	Tons. 1·04	Tons. 1·04

Finally, if we take into consideration Areas grazed by Live Stock in the course of each season, and reduce Area in Cultivation to its twelve-month equivalence, the total available area can be shown to have been utilised as follows on next page.—

Distribution of Arable Area on Basis of 12 Months' Availability.

	1929-30.	1930-31.	1931-32.	1929-32 Means.
	Acres.	Acres.	Acres.	Acres.
Harvested crops and fallow	732	757	758	749
Grazing crops	519	460	—	326
Total area in cultivation	1,251	1,217	758	1,075
Stubble grazing	140	120	135	132
Temporary natural pasture	264	318	762	448
Total available arable area	1,655	1,655	1,655	1,655

3. RAINFALL FOR 1929-32 IN COMPARISON WITH PRECEDING MEANS FOR THE DISTRICT.

In the matter of Crop yields, Rainfall dominates all other climatic factors in South Australia, and it follows that it is generally given special consideration in all discussions that concern Crops. In the data that follow, the distribution of the three years' rainfall has been contrasted with preceding means under special headings that concern normal crop development:—

	1929-30.	1930-31.	1931-32.	1929-32 Means.	Lameroo. 33 Years' Means.
	In.	In.	In.	In.	In.
Seeding rains (April-May)	1.91	2.26	2.36	2.18	2.89
Winter rains (June-July)	2.20	2.17	4.48	2.95	3.68
Spring rains (August-October) ...	2.64	7.36	3.26	4.42	5.47
Early summer rains (November) .	0.52	0.34	1.11	0.66	0.96
"Useful" rain (April-November)	7.27	12.13	11.21	10.21	13.00
Balance of season (Dec.-March) ..	4.09	1.97	3.70	3.25	3.10
Total 12-month fall	11.36	14.10	14.91	13.46	16.10

From the above it will be noted that both total and "useful" rainfall—April-November—were below normal in all three seasons; and it is in the main to this fact we must attribute a decline in crop yields relatively to those of earlier years. The 1929-30 season, in particular, must be considered as having been unfavorable.

PART II.—FINANCIAL.

1. CAPITAL ACCOUNT.

For the purpose of the analysis of these accounts, it has been assumed that the present owner had acquired the property on April 1st, 1929, on a walk-in walk-out basis, for £10,119 11s. 3d., and that the latter sum represented the original Capital upon which interest had been charged for distribution among the real accounts for the 1929-30 season. Actually, however, the property is a Crown Lease, subject to a covenant to purchase agreement extending over 65 years from 1921, and involving after the first five years 120 half-yearly payments of £86 10s. 9d. for Instalments of Principal and Interest.

A summarised statement of items included in the original Capital is given below; full details will be found in Table I. of the Appendix:—

	Values.		Percentage.
	Total.	Per Acre.	
	£ s. d.	£ s. d.	%
Land (1,685 acres)	3,832 0 0	2 5 6	37·87
Permanent improvements	2,843 0 0	1 13 9	28·09
Farming plant	1,355 10 0	0 16 1	13·40
Live stock (apart from horses)	827 0 0	0 9 10	8·17
Goods on hand	734 14 3	0 8 9	7·25
Field work and crops	527 7 0	0 6 2	5·22
Original capital, April 1st, 1929	£10,119 11 3	£6 0 1	100·00

It should be stated that, apart from the land, values shown in Table I. were determined by the owner and the District Agricultural Instructor (Mr. R. L. Griffiths) on the basis of early 1929 Values.

The value of the Land, on the other hand, has been determined by the Covenant to Purchase Agreement; and to this value has been added the estimated cost of clearing operations undertaken since the owner's occupancy of the property. It was recognised that the selling value of the land in 1929 was undoubtedly greater than £2 5s. 6d. per acre cleared; and that even at the present time its selling value is probably in excess of the latter figure. We did not, however, feel justified in accepting for the unimproved value of the land any more than the owner had actually paid or undertaken to pay; should the latter at a later date decide to sell the property he would then be in a position to benefit from any improvement in price that might obtain at the time; in such circumstances possible farming losses of the past would probably be made good.

During these three years Interest has been charged and debited against appropriate accounts at the following rates, namely, 5 per cent. against Land and Improvements and 6 per cent. against Floating Capital.

Attention is drawn to the fact that two-thirds of the value of the Capital invested is represented by Land and Improvements.

It has already been stated that the land is a Crown Lease held on a Covenant to Purchase Agreement; and it follows that the farmer does not own personally more than a proportion of the Capital value of the property; the outstanding Capital liability in 1929 was £3,257 5s. 9d. In addition, prior to 1929 the farmer had purchased Wire-netting from the District Council, re-payable in 16 yearly instalments; in the latter connection the sum outstanding in 1929 was £212 2s. 2d. Hence the farmer's personal interest in the property may be summarised as follows:—

	£ s. d.	£ s. d.
Land	574 14 3	
Improvements	2,630 17 10	
Farming plant	1,355 10 0	
Sheep	827 0 0	
Goods on hand	734 14 3	
Field operations and crops	527 7 0	
Owner's personal interest		6,650 3 4
Lands Department		3,257 5 9
District council		212 2 2
Original capital	£10,119 11 3	

The position of the Capital Account at the end of each of the three seasons with which we are concerned has been shown below in summarised form in comparison with the Original Capital; fuller details will be found in Table II. of the Appendix.

	Original Capital.	Capital, March 31, 1930.	Capital, March 31, 1931.	Capital, March 31, 1932.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Land (1,685 acres)	3,832 0 0	3,845 14 11	3,865 16 10	3,885 0 9
Improvements	2,843 0 0	2,818 8 9	2,719 6 9	2,753 15 1
Farming plant	1,355 10 0	1,666 8 0	1,376 5 0	1,128 0 0
Other live stock	827 0 0	345 17 6	258 13 0	297 10 0
Goods on hand	734 14 3	551 18 1	311 6 0	462 7 8
Field works and crops	527 7 0	324 1 11	328 17 11	324 7 2
Gross assets	10,119 11 3	9,552 9 2	8,860 5 6	8,851 0 8
Less Difference between sundry creditors and debtors	—	271 18 8	519 5 1	379 18 6
Net assets	£10,119 11 3	£9,280 10 6	£8,341 0 5	£8,471 2 2

The dwindling away of Net Assets in 1929-30 (£839 0s. 9d.) and in 1930-31 (£959 10s. 1d.) is clear indication of unsuccessful seasons; it was partly attributable to unfavorable weather conditions, but in the main to the calamitous fall in World prices for agricultural products. In 1931-32 World conditions were more favorable, the combined result of which led to an improvement in Net Assets from £8,341 0s. 5d. to £8,471 2s. 2d. These losses and gains will be examined in further detail under another heading.

2. INCLUSIVE YEARLY FARMING EXPENDITURE.

Inclusive Farming Expenditure incurred in any one year may be said to include items which can be separated out into two sections, namely:—

- Items of expenditure involving actual Cash Disbursements, or Loans; and
- Items of expenditure that are legitimate Bookkeeping Entries, but which do not involve actual Cash outgoings.

That items included in the first section form legitimate part of Costs of Production is, of course, obvious, but curiously enough there appear to be differences of opinion as to the validity of items included in the second section. This aspect of the position will be examined later on.

This Inclusive Farming Expenditure has been set out in detail for the three seasons under consideration in Table III. of the Appendix. The mean data for the three seasons may be summarised as follows:—

	Mean Annual Expenditure, 1929-32.		
	Total.	Per Acre.	Percentages.
I. Items involving cash disbursements—	£ s. d.	s. d.	%
1. Capital account	332 6 1	3 11	17.31
2. Wages	61 1 3	0 9	3.18
3. Services	49 4 8	0 7	2.56
4. Sundries	429 19 8	5 1	22.40
5. Interest on loans	203 4 0	2 5	10.58
6. Rates and taxes	29 18 5	0 4	1.66
Totals	1,105 14 1	18 1	57.59
II. Items not involving cash disbursements—			
1. Interest on owner's capital	314 12 1	3 9	16.39
2. Farm produce used on farm	190 10 6	2 3	9.92
3. Various	9 2 9	0 1	0.48
4. Value of owner's labor and management	300 0 0	3 7	15.62
Totals	814 5 4	9 8	42.41
Grand totals	£1,919 19 5	22 9	100.00

The above data show that over a period of three consecutive years the Inclusive Farming Expenditure of a 1,685 acre Mallee Farm has been at the mean rate of £1,919 19s. 5d. per annum, or 22s. 9d. per acre. Of this sum, £1,105 14s. 1d., or 13s. 1d. per acre, or, again, 57.59 per cent. of the total, represented actual Cash Outgoings, or corresponding Credit; and £814 5s. 4d., or 9s. 8d. per acre, or, again, 42.41 per cent. of the total, items of expenditure that did not involve direct cash payments.

It should be stated here that in the above data neither Depreciation on Permanent Improvements, nor on Live Stock and Plant have been taken into consideration. And yet the yearly wear and tear of working material, of which Permanent Improvements and Farming Plant form normal part in agricultural operations, tend progressively to reduce the value of the owner's assets, and as such can be considered as contributing legitimately to his yearly working Costs; and the same can be said of mortality and shrinkage in value of various forms of Revenue-earning Live Stock. Mean yearly Depreciation under the above three headings has been estimated for the three years under consideration at £570 10s. 3d.; the addition of the latter sum to other items of Expenditure would lead to the following results:—

	Total.	Per Acre.	Percentage.
	£ s. d.	s. d.	%
Items involving cash disbursements	1,105 14 1	13 1	44.40
Items not involving cash disbursements	1,384 15 7	16 5	55.60
Total expenditure	£2,490 9 8	29 6	100.00

3. FARM OUTPUT.

We shall now pass on to a consideration of the Farm Output realised during these three years and determine to what extent it proved adequate or inadequate to meet corresponding expenditure. Full details on the subject have been given in Table IV. of the Appendix.

In two out of the three seasons, namely, 1929-30 and 1930-31, Inclusive Expenditure was considerably greater than Net Farm Output, with resulting losses of £839 0s. 9d. and £939 10s. 1d. respectively. An examination of Table IV. will show that in very large measure these losses were attributable to the calamitous fall in the prices of rural products which was first felt in 1929-30. Thus, in the latter season Gross Flock Revenues of £533 19s. were reduced to Net Flock Revenue of £57 16s. 6d. only, because of a sudden fall of £476 2s. 6d. in the general value of the Flock. In the succeeding season (1930-31) losses were in the main attributable to the mean price of Wheat sinking to the lowest figure ever recorded in South Australia, and to continued decline in Flock values.

On the other hand, in the season 1931-32 Net Farm Output exceeded Inclusive Expenditure incurred by £130 1s. 9d.: this satisfactory improvement was attributable to improved weather conditions, an appreciable rise in the price of Wheat, and an upward tendency in Flock values.

The Mean Yearly Value of Farm Output during the three seasons may be summarised as follows:—

	Mean Gross Output Sold or Used.	Inventory Differences.	Mean Net Farm Output.		
			Total.	Per Acre.	Percent- age.
	£ s. d.	£ s. d.	£ s. d.	s. d.	%
Wheat	974 19 10	+ 6 11 11	981 11 9	11 8	71.62
Oats	83 17 1	+ 10 8 2	94 5 3	1 1	6.88
Cereal Hay	32 14 1	— 0 7 4	32 6 9	0 5	2.36
Straw	—	+ 1 1 5	1 1 5	—	0.08
Total farm crops ...	1,091 11 0	+ 17 14 2	1,109 5 2	13 2	80.94
Sheep	365 11 11	— 174 16 8	190 15 3	2 3	13.92
Miscellaneous	336 3 8	— 265 14 4	70 9 4	0 10	5.14
Grand totals	1,793 6 7	— 422 16 10	1,370 9 9	16 3	100.00
Add mean loss	—	—	549 9 8	6 6	
Mean Farming Expenditure			1,919 19 5	22 9	

We have here, therefore, an example of a Mallee Farm considerably above the average, which during these three years was worked at a mean Loss to the owner of £549 9s. 8d. per annum, or 6s. 6d. per acre. The price realised for Wheat on the farm during these years was as follows:—In 1929-30, 3s. 5d. per bushel; in 1930-31, 1s. 6d.; and in 1931-32, 2s. 5½d. (exclusive of 4½d. Federal Bounty). The position of the Farm during these three years is supported by a single Balance-sheet and Profit and Loss Account, shown as Tables V. and VI. in the Appendix.

4. MANAGEMENT AND LABOR INCOME.

The attempt will be made in the course of this Report to ascertain what have been during these three seasons the mean costs of rural undertakings under the conditions of this Mallee Farm; and as on the great majority of Mallee Farms, the owner is responsible not only for Management, but in addition for a major share in all manual operations, it has been necessary for our purposes to allot to the owner a fictitious sum for Management and Personal Labor. Towards this end a sum of £300 has been set aside and debited *pro rata* against accounts concerned; in this total is included £73 5s. 2d. (mean of 1929-32), representing actually the value of Interest and Depreciation on the Dwelling House, but which has been accepted as rent paid by the owner. In adopting this figure I do not think that we can be accused of extravagance for the provision that has been made for the management and much of the Labor of a 1,685 acre Farm.

But, from the data that have already been given it is possible to calculate the value of the Management and Labor Income of the owner, had no fictitious charge been made for his services as Manager and Farm Hand. Towards this end the Management and Labor Income can be taken to be the difference between the values of the Farm Output, on the one hand, and of Farm Expenditure (including Interest and Depreciation, but excluding any charge for the owner's services)

on the other. On this basis the Management and Labor Income in each year can be taken to have been represented by the Net Losses or Net Profits of each year, less or plus £300, that is to say:—

"True" Management and Labor Incomes.

	1929-30.	1930-31.	1931-32.	1929-32 Means.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Season's Loss (—) or Profit (+)	—839 0 9	—939 10 1	+130 1 9	—549 9 8
Less Owner's Salary	300 0 0	300 0 0	300 0 0	300 0 0
Management and Labor Incomes ...	—539 0 9	—639 10 1	+430 1 9	—249 9 8

Hence, on what must be looked upon as the most reasonable basis of determination, the 1929-30 and 1930-31 Seasons resulted in negative Management and Labor Incomes for the owner, namely, —£539 0s. 9d. and —£639 10s. 1d. respectively. This means that not only did the owner receive no payment for his services during these two seasons, but he lost in addition the sum of £1,178 10s. 10d.

Fortunately, matters improved in 1931-32, during which season the Owner's Management and Labor Income rose to £430 1s. 9d., that is to say, £130 1s. 9d. more than the Salary allotted to him in these accounts. The Mean Management and Labor Income for the three years continued nevertheless to be represented by a negative quantity, namely—£249 9s. 8d., that is to say, no salary to the owner during three years and an actual loss at the rate of £249 9s. 8d. per annum.

In the circumstances, it might well be asked how the latter managed during those unsuccessful seasons, not only to meet the normal demands of life, but in addition to keep his farm going; and more generally, how the majority of farmers is able to cling to the land despite a succession of unfavorable seasons or of low prices. In the latter connection it should be recalled that in Farm Expenditure as summarised in Table III. of the Appendix, provision was made not only for interest due to the Owner's Creditors, but also for interest on his Personal Capital invested in the Farm. But when circumstances are such that the difference between Revenue and Expenditure is represented by a negative Management and Labor Income, it is legitimate to argue that however much in normal times a farmer might be entitled to interest on Capital invested in the farm, in exceptional ones such Interest must necessarily give way to the claims of personal Management and Labor for adequate remuneration. If this view be accepted—and it is difficult to see how it can be denied—revised Management and Labor Incomes would be as follows:—

Management and Labor Incomes when no provision was made for Interest on Personal Capital invested in the Farm.

	1929-30.	1930-31.	1931-32.	1929-32 Means.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Interest on Owner's Capital	366 19 1	316 12 3	260 4 10	314 12 0
Normal management and Labor Income	—539 0 9	—639 10 1	+430 1 9	—249 9 8
	—172 1 8	—322 17 10	+690 6 7	+65 2 4

Thus, then, if no provision had been made for Interest on the owner's Capital, the Mean Management and Labor Income available during these three years would have been £65 2s. 4d. only; a sum which can hardly be accepted as adequate for the maintenance of a family and the working of a 1,685 acre farm.

Finally, it can be argued that the owner must be provided with the means of Livelihood before provision can be made for Depreciation on Improvements, Livestock, and Plant; in such circumstances available Management and Labor Incomes would have been as follows:—

	1929-30.	1930-31.	1931-32.	1929-32 Means.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Depreciation Charges	806 16 2	506 12 4	398 2 4	570 10 3
+ or—Management and Labor Incomes as above	—172 1 8	—322 17 10	+690 6 7	+65 2 4
	+634 14 6	+183 14 6	+1,088 8 11	+635 12 7

And thus eventually we are able to reach appreciable positive value for Management and Labor Incomes in each one of the Seasons under consideration, namely—

	£ s. d.
1929-30	634 14 6
1930-31	183 14 6
1931-32	1,088 8 11
1929-32—Means	635 12 7

All the above figures, with the exception of those of the 1930-31 Season, are in excess of the £300 stipulated as the owner's remuneration. We can say, however, of the mean of the three seasons that the owner could not have realised a Management and Labor Income of £300 per annum without foregoing all Interest on his Personal Capital and making provision for one-half only of normal Depreciation charges. It can be said, therefore, that during these unsuccessful years he has been living upon reserves built up in the past, or, in other words, upon his Capital. This view is supported by the general three-year Balance-sheet which is included in the Appendix as Table VI.

5. THREE-YEAR BALANCE-SHEET.

The general financial position of the Farm has been outlined in a single Balance-sheet, setting out the results of the transactions of three successive seasons.

Attention is drawn to the gradual reduction of the owner's Capital under the influence of unfavorable seasons and low prices. On the 1st April, 1929, this Capital had a value of £6,650 3s. 4d.; by the 31st March, 1930, it had been reduced to £5,811 2s. 7d., a decline of 12.62 per cent.; and by the 31st March, 1931, to £4,871 12s. 6d., representing a total decline of 26.74 per cent. relatively to the Original Capital. Fortunately, matters improved somewhat in 1931-32, and the value of the owner's Capital rose to £5,001 14s. 3d., an improvement of 2.67 per cent. on the 1930-31 value, but still 24.79 per cent. below the value of the original Capital.

The owner of this property can be accepted as a good example of a successful farmer, who until three years ago was able to consolidate his position and build up reserves, upon which he has been compelled latterly to draw. He has met bad seasons and low prices by reducing his expenditure, and in spite of losses is in a good position to take full advantage of the inevitable turn in the tide. Unfortunately, his case, without being unique, is very far from that of hundreds of farmers who have been unable to meet adverse conditions as successfully, and who, unless assisted in some manner or other, are in danger of losing their farms.

6. PROFIT AND LOSS ACCOUNT.

A single Profit and Loss Account has been prepared for the three seasons and placed in the Appendix as Table V.

It will be seen that, taken in the aggregate, all Real Accounts closed on a debit at the end of the three years, namely:—

	£	s.	d.
Sheep Account	902	2	7
Wheat Crop Account	405	5	7
Oat Crop Account	265	16	1
Hay Crop Account	54	4	0
Stores Account	21	0	10

Aggregate Three Years' Loss .. 1,648 9 1

Of the three main accounts, Sheep and Oats showed losses in each of the three years; Wheat showed losses of £171 7s. 3d. and £473 2s. 1d. respectively in 1929-30 and 1930-31; but a profit of £239 3s. 9d. in 1931-32.

It will be observed that in the aggregate the three Seasons closed on a Loss of £1,648 9s. 1d., but it should be added that during that period Interest on Owner's Capital was credited with £943 16s. 2d., and General Depreciation with £1,711 10s. 10d., making an aggregate of £2,655 7s.

APPENDIX.

TABLE I.—*Showing Details of Original Capital. April 1st, 1929.*

	VALUES.					
	Total.		Per Acre.		Percentage.	
	£ s. d.	£ s. d.	s. d.	£ s. d.	%	%
Land (1,685 acres)	—	3,832 0 0	—	2 5 6	—	37·87
Permanent improvements—						
Dwelling house	730 0 0		8 8		7·21	
Outhouses	660 0 0		7 10		6·52	
Water service	353 0 0		4 2		3·49	
Fences	913 0 0		10 10		9·02	
Plantations	187 0 0		2 3		1·85	
		2,843 0 0		1 13 9		28·09
Farming Plant—						
Implements and tools	766 10 0		9 1		7·57	
Farm vehicles	97 0 0		1 2		0·96	
Harness	85 0 0		1 0		0·84	
Stationary engine	10 0 0		0 1		0·10	
Working Horses	202 0 0		2 5		2·00	
Tractor	195 0 0		2 4		1·93	
		1,355 10 0		0 16 1		13·40
Other Live Stock —						
Sheep	822 0 0		9 9		8·12	
Kelpie	5 0 0		0 1		0·05	
		827 0 0		0 9 10		8·17
Goods on Hand—						
General stores	47 19 6		0 7		0·47	
Building material	67 2 0		0 10		0·66	
Fencing material	65 14 0		0 9		0·65	
Superphosphate	170 0 0		2 0		1·68	
Farm produce	383 18 9		4 7		3·79	
		734 14 3		0 8 9		7·25
Field Work and Crops—						
Prepared fallows	290 0 0		3 5		2·87	
Prepared stubble land	37 7 0		0 5		0·37	
Grazing crops	200 0 0		2 4		1·98	
		527 7 0		0 6 2		5·22
Original capital (1/4/29) ..		£10,119 11 3		£6 0 1		100·00

TABLE II.—*Showing Position of Capital Account on March 31st, 1930, March 31st, 1931, and March 31st, 1932, respectively, in comparison with Original Capital.*

	Original Capital.			Capital, 31/3/30.			Capital, 31/3/31.			Capital, 31/3/32.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Land (1,685 acres)	3,832	0	0	3,845	14	11	3,865	16	10	3,885	0	9
Permanent improvements—												
Dwelling house	730	0	0	695	7	6	665	6	1	1,109	17	9
Outhouses, sheds, &c... ..	660	0	0	729	5	10	702	4	0	345	19	4
Water service	353	0	0	336	6	0	328	6	7	311	18	3
Fences	913	0	0	870	9	5	835	11	3	798	0	11
Plantations	187	0	0	187	0	0	187	18	10	187	18	10
Totals	2,843	0	0	2,818	8	9	2,719	6	9	2,753	15	1
Farming plant—												
Implements, tools, &c.	766	10	0	703	0	0	587	5	0	497	10	0
Farm vehicles	97	0	0	91	0	0	82	0	0	74	10	0
Harness	85	0	0	37	10	0	30	0	0	25	0	0
Stationary engine	10	0	0	—			—			—		
Working horses	202	0	0	41	0	0	47	0	0	42	0	0
Tractor	195	0	0	793	18	0	630	0	0	489	0	0
Totals	1,355	10	0	1,666	8	0	1,376	5	0	1,128	0	0
Other live stock—												
Sheep	822	0	0	345	17	6	258	13	0	297	10	0
Kelpie	5	0	0	—			—			—		
Totals	827	0	0	345	17	6	258	13	0	297	10	0
Goods on hand—												
General stores	47	19	6	45	6	3	40	3	2	70	11	4
Building material	67	2	0	9	2	0	9	2	0	—		
Fencing material	65	14	0	64	13	4	59	11	0	50	16	6
Superphosphate	170	0	0	142	5	5	—			—		
Farm produce	383	18	9	290	11	1	202	9	10	340	19	10
Totals	734	14	3	551	18	1	311	6	0	462	7	8
Field work and crops—												
Bare fallows	290	0	0	260	4	5	327	5	6	297	18	3
Prepared stubble land .	37	7	0	63	17	6	1	12	5	—		
Grazing crops	200	0	0	—			—			26	8	11
Totals	527	7	0	324	1	11	328	17	11	324	7	2
Gross assets	10,119	11	3	9,552	9	2	8,860	5	6	8,851	0	8
Less difference between sundry creditors and debtors	—			271	18	8	519	5	1	379	18	6
Net assets	£10,119	11	3	£9,280	10	6	£8,341	0	5	£8,471	2	2

TABLE III.—Summarising 1929-30, 1930-31 and 1932 (inclusive) Farming Expenditure.

	1929-30.	1930-31.	1931-32.	Total.	1929-32 Mean Expenditure.	
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	Per Acre.	Percentage.
I. ITEMS INVOLVING CASH DISBURSEMENTS.						
<i>A. Capital Account.</i>						
1. Buildings and improvements	64 13 7	28 11 1	130 8 7	74 11 1	0 11	3-88
2. Implements and tools	724 13 4	7 4 6	17 13 5	249 17 1	2 11	13-02
3. Working Horses	—	9 4 4	—	3 1 5	0 0-44	0-16
4. Sheep	—	7 8 0	7 1 4	4 16 6	0 1	0-25
Totals	789 6 11	52 7 11	155 3 4	332 6 1	3 11	17-31
<i>B. Current Expenditure.</i>						
1. Wages (including part keep)	87 13 11	42 7 1	53 2 9	61 1 3	0 9	3-18
2. Services—						
(a) Contract cartage	32 2 2	43 2 11	27 6 9	34 3 11	0 5	1-78
(b) Various	28 10 5	7 3 0	9 8 9	15 0 9	0 2	0-78
3. Manures	146 7 3	—	78 15 10	75 1 0	0 11	3-91
4. Repairs to plant	26 7 6	20 7 2	25 0 11	23 18 6	0 3	1-25
5. Livestock foodstuffs	0 9 0	17 7 4	0 7 10	6 1 5	0 1	0-32
6. Sundries	221 3 3	360 17 7	392 15 5	324 18 9	3 10	16-92
7. Interest on land and improvements	176 6 4	175 1 4	173 10 8	174 19 5	2 1	9-11
8. Interest on overdraft	32 16 10	19 1 6	32 15 4	28 4 7	0 4	1-47
9. District council rates	15 2 0	15 2 6	15 2 0	15 2 2	0 2	0-79
10. Land tax	9 17 6	19 15 0	14 16 3	14 16 3	0 2	0-77
Totals	776 16 2	720 5 5	823 2 6	773 8 0	9 2	40-28
Total cash disbursements	1,566 3 1	772 13 4	978 5 10	1,105 14 1	13 1	57-59
II. ITEMS NOT INVOLVING CASH DISBURSEMENTS.						
1. Interest on owner's capital	366 19 1	316 12 3	260 4 10	314 12 1	3 9	16-39
2. Farm produce used by farm hands	8 5 9	10 1 3	22 12 3	13 13 1	0 2	0-71
3. Farm produce fed to livestock	91 7 11	39 5 0	6 19 9	45 17 7	0 6	2-39
4. Farm grain used as home seed	169 12 8	158 19 2	64 7 10	130 19 10	1 7	6-82
5. Various	19 7 6	6 5 10	1 15 0	9 2 9	0 1	0-48
6. Owner's salary (including rent)	300 0 0	300 0 0	300 0 0	300 0 0	3 7	15-62
Items not involving cash disbursements	955 12 11	831 3 6	655 19 8	814 5 4	9 8	42-41
Total Yearly Expenditure	£2,521 16 0	£1,603 16 10	£1,634 5 6	£1,919 19 5	22 9	100-00

TABLE IV.—*Summarising Farm Output during 1929-30, 1930-31, and 1931-32.*

	1929-30.				1930-31.				1931-32.			
	Sold or Used.		Inventory Differences.		Sold or Used.		Inventory Differences.		Sold or Used.		Inventory Differences.	
	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.	£	s. d.
Wheat	1,091	0 2	—	5 6 9	1,085	13 5	—	74 5 0	1,206	8 10	—	99 7 6
Oats	118	9 11	—	45 8 5	163	18 4	—	17 14 3	37	12 3	—	3 10 3
Cereal hay	62	2 10	—	50 0 0	12	2 10	—	16 10 0	10	14 4	—	32 7 11
Straw	—	—	—	—	—	—	—	—	—	—	—	3 4 4
Total farm crops ..	1,271	12 11	—	9 18 4	1,261	14 7	—	75 9 3	1,254	15 5	—	138 10 0
Sheep	533	19 0	—	476 2 6	57	16 6	—	87 4 6	253	14 0	—	38 17 0
*Miscellaneous	444	5 5	—	81 1 3	363	4 2	—	529 9 11	265	2 8	—	186 11 10
Total farm output	2,249	17 4	—	567 2 1	1,682	15 3	—	692 3 8	1,773	12 1	—	9 4 10
Add loss for the year	—	—	—	—	839	0 9	—	Add loss for the year ...	Less profit for the year	—	—	130 1 9
Inclusive farming expenditure	—	—	—	—	2,521	16 0	—	—	—	—	—	1,634 5 6

* NOTE.—Under "Miscellaneous" have been included the value of the fallows and grazing crops as assets, plus or minus inventory differences under "Improvements, Farming Plant, Stores," including superphosphate, &c.

TABLE V.—*Mallee Farm No. 1.—Profit and Loss Account for Three-year Period April 1st, 1929, to March 31st, 1932.*

	Ds.		Cs.	
	£	s. d.	£	s. d.
Sheep account	902	2 7	Net 3 years' loss	1,648 9 1
Wheat crop account	405	5 7		
Oat crop account	265	16 1		
Hay crop account	54	4 0		
Stores account	21	0 10		
	£1,648	9 1		£1,648 9 1

TABLE VI.—*Mallee Farm No. 1.—1929-32 Farm Balance-sheet as at March 31st, 1932.*

LIABILITIES.			ASSETS.		
	£	s. d.		£	s. d.
1/4/29 Owner's capital	6,650	3 4	Land and improvements	6,675	0 0
Less 1929-30 loss	839	0 9	Add additions	352	17 2
31/3/30 Owner's capital	5,811	2 7	Less depreciation	7,027	17 2
Less 1930-31 loss	939	10 1	Farming Plant—	389	1 4
31/3/31 Owner's capital	4,871	12 6	Implements and tools, etc.	1,153	10 0
Add 1931-32 profit	130	1 9	Add Purchases	752	13 3
31/3/32 Owner's capital	—	5,001 14 3	Less Sales	1,906	3 3
Creditors—				68	10 0
Lands Department	3,236	1 10	Less Depreciation	1,837	13 3
District Council	170	12 2		751	13 3
Bank overdraft	659	3 9	Working Horses	202	0 0
Sundry	529	4 5	Add Purchases	9	4 4
		4,595 2 2	Less Sales	211	4 4
				108	0 0
			Less depreciation	103	4 4
				61	4 4
			Sheep—	42	0 0
			1/4/29 On hand	822	0 0
			Add Purchases	14	9 4
			Add Natural Increase	836	9 4
			Less Sales	639	8 2
				1,475	17 6
			Less depreciation of flock	668	15 7
				807	1 11
				509	11 11
			Goods on hand	297	10 0
			Fallow for 1932-33	462	7 8
			Grazing crops for 1932-33	297	18 3
			Sundry debtors (chiefly wheat pool)	26	8 11
				745	15 9
				£9,596	16 5

FROST PREVENTION BY ORCHARD HEATING.

[By J. B. HARRIS, Dip. Hort., Horticultural Instructor.]

The necessity for any possible action which is economically practicable to prevent frost damage in orchards and vineyards has been drawn attention to in the Barossa and Clare districts by the devastating late spring frosts which have destroyed fruit and vine crops in parts of these districts during four of the past six years. The districts mentioned are probably no more, indeed they are possibly less, subject to late spring frosts than many other parts of South Australia, but being otherwise almost ideally suited for the growth of all temperate climate fruits, such as apricots, &c., and vines, these fruits have been extensively planted and their cultivation is now of great economic importance to the State. Although frosts of a few degrees intensity are of comparatively frequent occurrence during the winter months they do not occur with great frequency during the latter part of September, throughout October, and during early November, and indeed for many years prior to 1927 no crops were lost through the agency of spring frosts; a very severe late frost was experienced at Angaston about 1914, and old established growers still speak of a bad spring frost in 1900. It is probable that years of late spring frosts may recur in cycles and that in intervening years orchard and vineyard heating in these districts will not be necessary.

On account of the losses experienced by growers the question of frost prevention was placed on the agenda of the Non-irrigated Fruit Areas Bureau Conference held at Clare in November, 1931, and was there freely discussed, the consensus of opinion appearing to be that smudging, or, in other words, endeavoring to envelop the orchard or vineyard in smoke, was the only remedy, and most growers who had attempted this had not achieved great success.

The Chief Horticultural Instructor, Mr. Geo. Quinn, published a report (see *Journal of Agriculture*, June, 1932) dealing with the subject of smudging and orchard heating as carried out in other countries. The question of smudging was then taken up by a large number of fruit and vine growers in the Light's Pass area, who formed a body known as the Light's Pass Frost Fighting Committee. These growers to the number of about 30 made preparations for smudging on an extensive community basis; they also arranged for all members to be advised by urgent telephone message in the case of a damaging frost. When the first serious spring frost occurred in 1932 the smudging scheme was carried into effect, and though an extensive smoke was caused by this community effort it slowly but surely drifted to a slightly lower elevation, following the direction of the river to the other side of Nuriootpa township, and the crop on the low-lying parts of Light's Pass was almost entirely destroyed by frost. It may be of interest here to record that fruit and vine crops did not suffer that night in the locality where the smoke drifted, although growers in that area made no attempt to generate smoke. The following night they did not generate any smoke, nor did they receive any from Light's Pass and their crops were then destroyed by frost. This latter statement by no means proves that smoke saved the crops on the first night, observations having proved that these late spring frosts are exceedingly patchy in their occurrence.

Smudging should not, in the writer's opinion, be entirely condemned as useless, as, from observation in the northern districts, and from the literature of other countries, and discussion with persons who have had first hand experience of smudging as applied to continental vineyards, it would appear that where the topography of the country is suitable and the smudging can be held as a dense

pall of smoke in the low-lying areas, and also provided the smoke pall is created sufficiently early, the radiation of the earth's heat can be checked to such an extent as to prevent freezing, while the temperature on the unprotected areas has fallen to one, or in some cases, two degrees below freezing point. It is also worthy of note that the system of heating with which this article mainly deals resulted, in addition to the generation of heat, in a dense pall of very black smoke throughout the orchard, and appearing from a distance to be suspended among and above the tops of the trees at a height of about 8ft. from the ground.

A point which aroused considerable interest in January, 1933, was the chance observation that trees in the immediate vicinity of seven smudge fires lit in the middle of Mr. P. B. Boehm's orchard were carrying a good crop of fruit on the side of the trees nearest to the fires in the case of six of the fires and a much lesser crop around the seventh fire which had been allowed to go out on account of the difficulty of adequately tending a number of fires. The remainder of the trees, which received only the drifting smoke, bore no fruit, and those trees in the immediate vicinity of the fires bore fruit on the sides near the fire only; this latter point was most conspicuous and a count of the fruits on one tree showed on the side near the fire 615 fruits and on the side farthest from the fire 96 fruits. This observation stimulated the interest of those who saw it in further investigation of orchard heating under local conditions.

Throughout this time the matter was being discussed by members of the Light's Pass Agricultural Bureau with a view to having a test of orchard heating carried out by the Department of Agriculture. Messrs. S. and L. Plush, of Light's Pass, took a prominent part in the movement and Mr. S. Plush reported having saved a crop of apricots from frost on a small area at Light's Pass in 1900 by burning coal, wood, and kerosene in improvised heaters.

The matter was again discussed at the Non-irrigated Fruit Areas Bureau Conference, this time at Tanunda in November, 1932. The report by the Chief Horticultural Instructor was read and the writer of this article also spoke on the question of heating in its specific relation to occasional late spring frosts as they occur in this district. As an outcome of the discussion Mr. K. Robinson, Hon. Secretary of the Angaston Agricultural Bureau, was requested to organise a special meeting of Bureau members to consider the question. This meeting was convened at Nuriootpa on December 15th, 1932, the following Branches being represented:—Angaston, Light's Pass, Lone Pine, Lyndoch, Greenock, Springton, and Penwortham. This meeting formed the South Australian Frost Combating Committee, comprising two delegates from each of the Branches alluded to, with an executive committee consisting of Messrs. P. B. and F. W. Boehm, L. Plush, K. Robinson (secretary), and the writer. The executive committee later decided on a levy on all Branches represented, the sum raised being necessary for preliminary tests, and also requested that the writer's services as a departmental officer be placed freely at the disposal of the committee. This request was granted and consequently since then a considerable time has been devoted to investigation of frost prevention. The writer suggested to the committee that an experiment such as that carried out by the New Zealand Department of Agriculture in 1927 and along the lines of the simplest form of orchard heating as carried out in California should be undertaken here. A statement of estimated costs was submitted, and the scheme was approved by the executive.

Before recommending to the committee the scheme above referred to many inquiries were made, but little information was obtained, relative to tests of orchard or vineyard heating as distinct from smoking or "smudging" which had been carried out in South Australia or adjacent States. The only definite record of a test was received through the State Electricity Commission of Victoria who kindly supplied detailed information and temperature graphs, showing results

of heatings carried out by Mr. J. A. Egan, of Gonn Crossing, Victoria, who used kerosene tin heaters, and briquettes supplied by the State Electricity Commission in 1929, and thereby succeeded in profitably saving a crop of $3\frac{1}{2}$ acres of mandarins. The heaters used were constructed from one and a half kerosene tins, the tins costing at that time 3d. each, but these heaters ultimately proved unsatisfactory as the tins burned out after two or three firings. The present cost of kerosene or petrol tins in Adelaide is rather more than 1s. each. No record was obtained of tests conducted in Australia with oil fuel heaters of the type used in California and New Zealand.

At about this time Mr. W. Gilbert, of Wongalere, near Williamstown, made exhaustive inquiries from various sources on frost prevention in its application to vineyards, and eventually imported sample heaters from New Zealand, which, together with all information he had collected, he kindly made available to the South Australian Frost Combating Committee. Members of the committee also conferred with Mr. Kelly, of Lyndale Vineyards, near Lyndoch, on the subject of frost prevention, and inspected various frost alarm devices which were in use there.

The test recommended was to heat 1 acre of apricot trees with heaters of the "lard pail" type and use for purposes of comparison 1 acre of apricot trees unheated and growing under otherwise exactly similar conditions alongside. The 2 acres of trees selected as being most suitable for the test were finally found in the orchard of Mr. P. B. Boehm, at Light's Pass, who has whenever necessary given all possible assistance in carrying out the test.

Before proceeding to a discussion of the test it may be well to consider briefly the various frost conditions which occur and such as are known as "white frost," "black frost," and a "freeze." The condition, which is common to all these frosts, whatever may be the term by which they are locally described, is a lowering of the atmospheric temperature, within a few feet of ground level, or at that and greater altitudes, to 32° F. or lower. This condition is essential to a frost of any kind, and anything which will prevent such a condition will prevent a frost of any sort. This latter may seem to many persons an obvious statement of fact, but within the writer's experience there are many growers who contend that nothing can be done against a black frost, whereas the test herein described showed evidence that heating (such as from 2.45 a.m. to 6.30 a.m. on October 26th) is effective against a black frost as it is against a white or hoar frost. A white frost, so named from the particles or frozen moisture or dew, which are seen deposited on all objects in the frosted area differs only from a black frost inasmuch as in the case of black frost there is too little moisture in the atmosphere for the moisture to be frozen and deposited as in the case of a white frost. A black frost usually follows a white frost where two frosts occur on consecutive nights, the dew having been frozen on the first night, and the temperature not having risen sufficiently on the following day to vaporise the moisture and thus recharge the atmosphere with moisture to be deposited as white frost. Thus a black frost, by reason of the fact that it frequently follows a white frost, is often assumed to be more destructive in its effect, whereas what is really seen after a black frost is frequently the cumulative effect of two frosts. Such a condition as that just described occurred at Light's Pass during the early morning hours of October 25th and 26th. The frost on the 25th being a white frost and that on the 26th a black frost, although the minimum temperature reached on the 25th, i.e., 28.5° F. was one degree lower than the minimum reached on the 26th, i.e., 29.5° F.

In the case of local frosts, such as those just referred to, the lowering of temperature is caused by radiation of the earth's heat and consequent inversion of the strata of atmosphere near the earth's surface. This class of frost usually

occurs in the early hours of the morning, say, between 2 a.m. and 6 a.m. It is the usual cause of damage in this district and consequently the more expensive form of heating, as used in the case of a "freeze" lasting throughout the night, is not necessary.

A "freeze" is the term used on the Pacific Coast to describe the type of frost which follows a cold windy day with a cloudy sky, the day conditions being such that the earth and adjacent atmosphere receives little heat from the sun and consequently the earth has little heat to radiate and thus warm the atmosphere during the night. The result of this is that the little surplus heat of the earth is exhausted by radiation to the atmosphere late in the afternoon or early evening, the air adjacent to the earth then becomes cold by atmospheric inversion, and lack of radiation from the earth, and a frost results early in the night, which will probably last till sunrise or till the advent of a warm wind. The severe frost which destroyed the crops in the Murray Valley in 1927 was in the nature of a freeze.

It will also be well to consider what is meant by "radiation" and by "atmospheric inversion" or "air drainage."

All persons who have warmed themselves at a fire have in so doing absorbed heat rays which are radiated by the fire during the process of burning; the body which has absorbed the heat rays cannot, however, retain them indefinitely and thus in turn it radiates heat to the surrounding atmosphere. Similarly, the earth exposing itself to the sun's rays during the day time absorbs heat rays from the sun and becomes warm, the degree of warmth varying according to the kind of earth, and its moisture content, and the amount of sunshine. All substances thus exercise the power of absorbing heat from any warmer substance with which they come in contact, and *vice versa* they transmit heat to cooler articles with which they come into contact. In considering this matter in its relation to orchard and vineyard heating we find that the earth, and more particularly the surface earth, is absorbing heat from the sun from sunrise till sundown. Similarly, the atmosphere is absorbing heat from the sun, although the temperature of the atmosphere is not so great near the earth's surface as is the temperature of the earth itself because the atmosphere does not absorb heat so readily. Thus by about 3 p.m. on an October afternoon the earth's surface temperature is greater than that of the air with which it is in contact and consequently the earth proceeds to give out or "radiate" heat to the surrounding atmosphere until such time as the temperature of both is equalised.

Atmospheric inversion or "air drainage" results from the expansion of matter which takes place when the matter is heated, the result being that the density, or weight per given volume, decreases, *i.e.*, the substance becomes lighter per unit of bulk when heated. Thus, when the air in contact with the earth's surface is heated it expands and becomes lighter than other air not so directly heated and which lies above it; the natural result of this is that the heavier cold air falls to the the earth's surface, changing place with the warmer air, and thus we have atmospheric inversion, resulting in the air, say, 30ft. above the earth's surface being measurably warmer than air at the earth's surface. This tendency of the earth to radiate its heat in the late afternoon, evening, and during the night at a greater rate than it is receiving heat from the sun (in order to heat the air near its surface), and the tendency of the air thus heated to be displaced by the colder air immediately above it (so bringing cold air into conjunction with cold earth) is the cause of the frosts which we have to combat. Although all frosts are more or less due to radiation, the severe "freezes" have as a large contributing factor insufficient absorption of sun heat as a result of cloud and cold winds during the daytime. Evidence of air inversion or atmospheric drainage

or the tendency of cold heavy air to drift to lower levels is frequently seen in vineyards planted on sloping land or on a hillside which merges into level lower ground, where the vines on the low level are cut by frost and those above a certain clearly defined level on the higher ground escape. Many growers are also familiar with the phenomenon that vines on very recently cultivated land are more liable to frost injury than others on land not so cultivated; this would appear to be due to the recent cultivation affecting the rate of heat radiation.

Summarising the points of absorption and radiation of heat and temperature inversion we conclude that—

The earth and the atmosphere receive heat from the sun's rays during the day time.

The earth absorbs more heat and gets hotter than the air.

The earth gives heat to the air which is in contact with it.

The earth thus during the night time gives out more heat than it receives and thereby becomes cold.

The air which is heated by the earth is displaced upwards by the falling of the heavier, cooler air above it.

Thus cold air comes into contact with cold earth and where the action continues long enough a frost results.

Blanket of naturally warmed air here resulting from temperature inversion. This makes orchard heating possible.

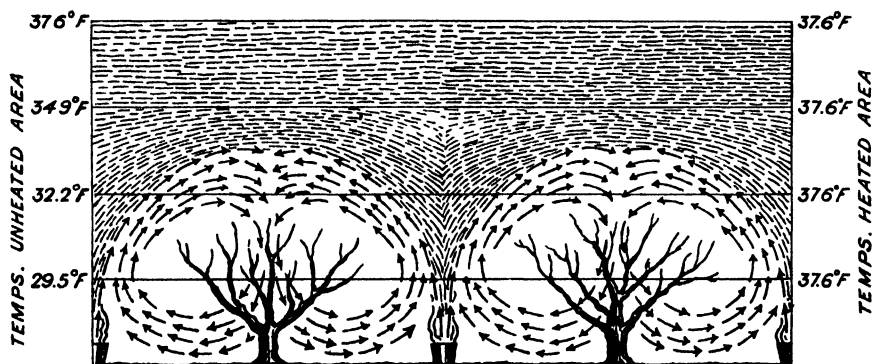


Fig. 1.—To illustrate the path of heated and gradually cooling air currents. (Adapted from U.S.D.A. Bulletin, 1588.)

It should be noted that the air warmed near the earth's surface will only rise through colder air; and will not rise, but will tend to mix when it meets with air of equal temperature until it becomes cool or displaces cooler air; this results in a mixing of the strata of air near the earth's surface, which is most easily illustrated when the heat is generated at given points as in orchard heating (see Fig. 1.)

Having visualised the possibilities of orchard heating, the executive committee ordered sample heaters from two Adelaide firms. The specifications for these heaters were taken from the *New Zealand Journal of Agriculture* for August, 1928, and were as follows:—Diameter at bottom 7½ in., at top 9½ in.; height, 8½ in.; bodies, 26 gauge black steel, top wired, bottom double seamed; spreaders, 18 gauge black metal with welded arms; lids, 26 gauge black steel with ¾ in. flanged rim. The necessary lighting torch was copied from a photograph and description in the University of California Bulletin No. 398, the reference to "Torches and Torch Fuels" being as follows:—"A torch consists of a container with a spout, a wick, and a wire gauze in the base of the spout. The wick is made of asbestos, usually wrapped in a piece of screen. It is placed either directly in the spout, loosely enough so that the fuel will flow freely through it, or in a slot close to

the end of the spout. In either case the wick must be so arranged that the fuel leaving the spout flows over or through it. The lighted wick ignites the torch fuel as it flows out. The most important feature of the torch is the protective wire gauze at the base of the spout, and under no circumstances should a grower use a torch in which the wire gauze is lacking or defective. The gauze is of fine mesh brass or copper screen and is generally soldered into the base of the spout. It works on the same principle as the miner's safety lamp, the flame of the burning gas being cooled below the kindling point by the screen and not passing through to the reservoir below. Slight explosions sometimes occur in the spout, but the gauze prevents a disastrous explosion of the container. The spout should screw tightly on to the container against a metal gasket. The torches are usually filled with a mixture of equal parts of gasoline and kerosene. This mixture will carry fire clear to the ground if poured from a burning torch and give a fire hot enough to light heaters readily. An extra supply of torch fuel should be kept in some airtight container such as a 5gall. can or 15gall. oil drum in the field. It is a wise precaution to fill torches only by electric light."

The following are dimensions of the torch which was used in this test:—Container—Diameter, 6in.; height, 9in.; height to top of dome, 10½in. Spout—Diameter at union end, ¾in.; at wick end, ¾in.; length of spout, including union, 13in., and which contains approximately 1gall. of fuel. (See Fig. 2, showing torch, burning pail, spreader, and lid.)

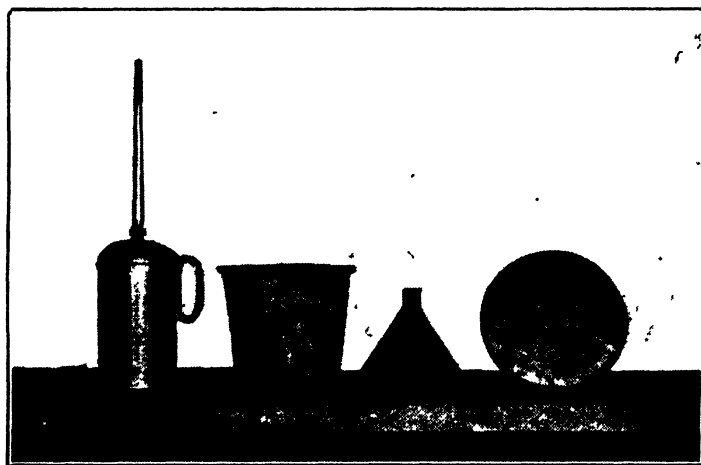


Fig. 2.—Liquid fire torch and burning pail with flame spreader and lid.

The Shell Oil Company kindly donated two samples of oil which they considered would be suitable, namely, "fuel" oil and "solar" oil.

Of the sample heaters supplied, some were of black iron and one was galvanized after manufacture.

An endeavor was made to carry out a preliminary burning test on July 24th with three black iron heaters and one galvanized. The black iron heaters were found to leak slightly at the seams; the galvanized pail did not leak. The heaters were immediately emptied as the oil was likely to be injurious to plant roots if it seeped into the soil in any quantity. The black iron pails were then soldered along the seams as a temporary measure. In lard pail heaters, which later arrived from New Zealand, it was seen that all seams are brushed on the inside of the bucket with what appears to be bituminous paint to prevent leakage.

On July 26th—Burning rates of Shell "solar" oil and Shell "fuel" oil were tested in four heaters. Shell fuel oil in heater with spreader on all the time burned 4 hours 6 minutes. Shell solar oil in heater with spreader on all the time

burned 4 hours 35 minutes. Shell fuel oil with spreader removed after 3 hours' burning burned 3 hours and a half. Shell solar oil with spreader removed after 3 hours' burning burned 3 hours 37 minutes. One gallon of oil was used for each of the four tests and as fuel oil costs approximately 6d. per gallon and solar oil 9d. per gallon, it was then decided to use fuel oil in all future tests. This test was carried out between 7.30 p.m. and midnight.

Following the success of this first burning test it was found that satisfactory heaters (galvanized), complete with spreader and lid, could be manufactured in Adelaide and sold in lots of 150 at 2s. 10d. each. All expense up to this time had been borne by the South Australian Frost Combating Committee—incidentally the first sample heaters cost considerably more than 2s. 10d. each—and the committee now decided to bring the matter under the notice of the Minister of Agriculture and request that a sum of money should be made available to the Department

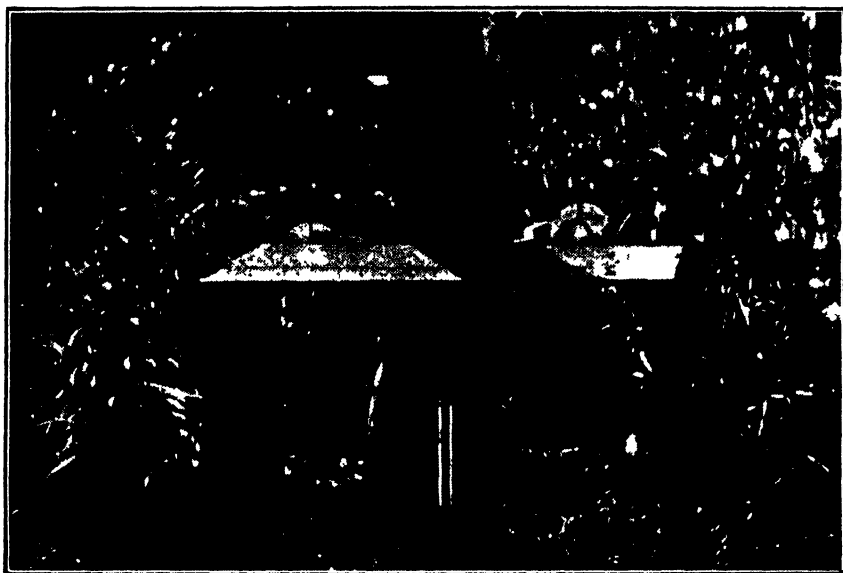


Fig. 3.—U tube thermometer, showing connections to electric bell alarm.

of Agriculture sufficient for the purchase of all equipment for an experimental heating of 1 acre of orchard. This request was granted and the following equipment purchased:—

- 120 lard pail type 5-quart orchard heaters.
- 1 torch lighter.
- 5 minimum alcohol thermometers.
- 1 frost alarm thermometer with wiring battery and bell.
- 360galls. of Shell fuel oil.

On August 12th—All thermometers for use on the experimental plots were tested at the Adelaide Observatory and found to be, with one small variation, correct for the purposes of this experiment. I would here acknowledge our indebtedness to Mr. Bromley, the Government Meteorologist, for his valued help and advice in the conduct of these experiments.

August 28th—The frost alarm thermometer was installed at the home of Mr. F. W. Boehm and tested by spraying with ethyl chloride to lower artificially the temperature. For this test we are indebted to Dr. A. Scholz of "The Willows"

Hospital. The thermometer and electric bell alarm functioned accurately when thus tested. The thermometer (Fig. 3) was placed about 9in. above ground level facing east on land approximately of the same level as the orchard where the tests were carried out. Mr. F. W. Boehm's house was the nearest home to the orchard.

August 29th—Levels were taken for comparison of altitude at various points on the "heated" and "check" plots. The greatest variation of level over the heated area was found to be 14in. The check plot was found to be generally 10in. higher than the heated plot, so that any advantage in the matter of altitude affecting temperature would be with the unheated area.

August 29th—Five minimum alcohol thermometers were installed in thermometer shelters erected on posts, the shelters being made from fruit cases with the bottom and one side knocked out and the outside of the case painted white, the open side of the shelter facing south. Four of the thermometers were erected on the heated plot to enable tests to be made of the comparative heat generated at different points; these were marked and subsequently referred to as B, C, D, E. One thermometer marked A was installed in the same manner on the check plot to record the temperature on the unheated area. The height of the thermometer is 3ft. above ground level. The thermometers were placed with a fall of 1in. towards bulb end (*see Californian Bulletin 398, p. 38*), but it was later found necessary to correct this as the thermometers used in this experiment are so constructed that when placed horizontally the bulb is approximately $\frac{1}{2}$ in. lower than the stem. The altered position of the thermometer is shown in Fig. 4; in this position they worked satisfactorily. The minimum temperature is recorded by these thermometers by means of a small indicator which is drawn down the column by the surface tension of the alcohol; as the temperature rises, and consequently the spirit indicator—the small indicator—remains stationary at the lowest point to which it has been drawn. To record the minimum temperature each 24 hours it is, of course, necessary for those indicators to be set each day, and this is only one of the many operations carried out by Mr. P. B. Boehm during the course of this experiment.

August 29th—One hundred and twenty-seven heaters were charged with approximately 1gal. of oil each and covered with spreaders and lids.

September 1st—Portion of the area which is a low-lying frost pocket, became flooded by the overflow of the North Para River during the night of August 31st. Lids were lifted off heaters and blown away by the gale and rain fell into them and caused the oil to overflow; also, some heaters were washed away and others inundated by the flood, so that all the oil from those heaters floated away. This misfortune involved the loss of about 40galls. of oil, but could not be foreseen in time to prevent it; it would not be mentioned here but for its important bearing on the subsequent burning rate of the oil. All the heaters were finally recovered from the flooded area, the oil was separated from the water as far as possible, the heaters were refilled where necessary, and the spreaders and lids replaced with a brick or other heavy object on each lid to prevent it being again blown off. The refilling of the heaters was done on September 13th, and the heaters were lighted for the first time that night to ascertain whether the adulterated oil would burn and also to ascertain the amount of time required to light 127 heaters with one lighting torch. The result of this test was that the fuel appeared to burn satisfactorily, but the 127 heaters took 50 minutes to light. This was, of course, the first time most of the heaters were lit, and it has been reported elsewhere, and confirmed here, that they can be much more readily lighted after having been once burned. It was, however, decided to alter slightly the construction of the lighting torch to help in the more rapid lighting of the heaters. In the original construction of the torch

the wick, in the form of a piece of loosely twisted asbestos rope, was inserted into the spout of the torch with a piece of wire gauze fastened across the end of the spout to prevent the wick from falling out; with the wick in this position the liquid fire dripped from the spout of the torch when lighting heaters. To hasten the rate of lighting heaters, the wick was removed out of the spout and enclosed in wire gauze, which was wired to the under side of the spout with the wick protruding just beyond the spout; in this position the liquid fire poured over the burning wick into the heaters and thus reduced the person's time taken to light the heaters to half.

The temperatures recorded immediately after lighting heaters on September 13th were—A (check plot), 42 degrees; B, C, D, E (heated plot), 47, 47, 47, and 46.5 degrees respectively at 9 p.m. It is evident from these figures that the temperature of the heated plot had increased considerably during the 50 minutes occupied in the lighting of the heaters. Temperatures recorded 10 minutes later were—A, 42 degrees; B, 48.5 degrees; C, 48.5 degrees, D, 49.5 degrees, and E, 48 degrees, showing that the average temperature had advanced 1.75 degrees in 10 minutes on the heated area. At this time there were more clouds in the



Fig. 4.—Minimum Alcohol Thermometer set Horizontally in Shelter, and Heaters in Position in Orchard.

sky and a distinct drift from the north-east. As there was no frost on this occasion all the heaters were then extinguished by placing the lids on the heaters at 9.10 p.m. At 10.10 p.m.—one hour after heaters were extinguished—the temperatures recorded were—A, 40 degrees; B, 41 degrees; C, 42 degrees, D, 42 degrees; and E, 42 degrees.

September 14th—Readings of thermometers showed that no frost had been recorded to date.

September 21st—The frost alarm bell rang at 3 a.m. and the alarm was telephoned to me at Gawler. I reached the plot at Light's Pass at 4.3 a.m. Mr. F. W. Boehm had, in accordance with my instructions, lighted 127 heaters. These heaters were lit with spreaders on, which militated against a rapid increase in temperature. Temperatures recorded prior to 4 a.m. and immediately prior to lighting of heaters were—A (check plot), 37 degrees; B, 36 degrees; C, 34 degrees; D, 32 degrees; and E, 36 degrees. Temperatures recorded at

4 a.m. were—A, 39 degrees; B, 40 degrees; C, 39 degrees; D, 41 degrees; E, 40 degrees. It will be seen from these records that the temperature on the unheated check plot had risen 2 degrees, and this being so, all heaters were extinguished at 4.15 a.m.

September 24th—Frost alarm bell recording 34 degrees F. rang at 3.30 a.m. Mr. B. Boehm read all thermometers at 3.30 a.m. and subsequently until 5.15 a.m., and recorded the following temperatures:—3.30 a.m.—A, 34 degrees; B, 34 degrees; C, 34 degrees; D, 34 degrees; E, 34 degrees. 3.45 a.m.—A, 33.5 degrees; B, 33.5 degrees; C, 34 degrees; D, 33 degrees; E, 34 degrees. 4 a.m.—All 33 degrees. 4.28 a.m.—A, 33 degrees; B, 32.5 degrees; C, 33 degrees; D, 32.5 degrees; E, 32.5 degrees. At this time the alarm was telephoned to me at Gawler. I advised Mr. B. Boehm to light heaters at his discretion, and I left Gawler for Light's Pass. 4.35 a.m.—Mr. Boehm commenced lighting every other heater, and lit 58 heaters without removing spreaders. 5 a.m.—A, 32.5 degrees; B, 34.5 degrees; C, 34 degrees; D, 34.5 degrees; E, 34.5 degrees. 5.15 a.m.—A, 33 degrees; B, 35.5 degrees; C, 34 degrees; D, 35.5 degrees; E, 35 degrees. 5.40 a.m.—By this time I had arrived at the plot and recorded the following temperatures:—A, 32.5 degrees; B, 35 degrees; C, 33.5 degrees; D, 36 degrees; E, 35.5 degrees. As thermometer "A" on check plot was above freezing point and sunrise was approaching, all heaters were extinguished by 5.52 a.m. 6.03 a.m.—A, 32 degrees; B, 33.5 degrees; C, 32.5 degrees; D, 33.5 degrees; E, 33.5 degrees. 6.33 a.m.—A, 32 degrees; B, 32 degrees; C, 32 degrees; D, 32 degrees; E, 32.5 degrees. 7 a.m.—A, 34 degrees; B, 34 degrees; C, 34.5 degrees; D, 34 degrees; E, 34.5 degrees. On this occasion 12 heaters to the north and east of thermometer C were not lit, as at the time of lighting thermometer C showed a slightly higher reading than other thermometers on the heated plot.

October 1st—Hoar frost deposit was observed at Angaston, and slight hoar frost at Mr. P. B. Boehm's homestead, which is situated about 1 mile north of the experiment plot and the alarm thermometer. This frost was noticed at 6 a.m. Clear sky, still atmosphere, and falling temperature at Gawler between 9 p.m. and 10 p.m. on September 30th indicated likelihood of frost. Alarm did not ring. Readings of minimum thermometers on check and heated plots taken at 7 a.m. on October 1st, 1933, showed that minimum temperatures recorded during the past night were—A, 35 degrees; B, 34.5 degrees; C, 35 degrees; D, 34.5 degrees; E, 34.5 degrees; all corroborating the inference that the alarm thermometer did not fall to 34 degrees, at which temperature it is set to ring.

October 24th—Called to Light's Pass at 2.10 a.m. on account of alarm bell having rung at 34 degrees. The following observations of temperature and atmospheric conditions were made:—2.30 a.m.—Sky clear, no clouds, stars bright. Temperatures—A, 35 degrees; B, 34 degrees; C, 34 degrees; D, 34 degrees; E, 34 degrees. 3 a.m.—A, 34 degrees; B, 33.5 degrees; C, 34 degrees; D, 34 degrees; E, 33.5 degrees. 3.30 a.m.—Clouds appearing; A, 35 degrees; B, 34 degrees; C, 35 degrees; D, 34 degrees; E, 34 degrees. 4.30 a.m.—Dawn, sky overcast; A, 37 degrees; B, 37 degrees; C, 37 degrees; D, 37.5 degrees; E, 37.5 degrees. 5 a.m.—A, 39 degrees; all the rest 40 degrees. The night was calm throughout.

October 24th and 25th—Owing to an unfortunate breakdown of the alarm system no alarm was given when the temperature fell to 34 degrees on the night of October 24th, or early morning of October 25th, and many crops in the district were damaged by a frost which was recorded on the plot thermometers as 28.5 degrees.

The frost recorded, *i.e.*, 28.5 degrees F., destroyed a large proportion of the fruit on the plot which should have been heated and on the check plot, as well as in other orchards throughout the district; the characteristic small white spots which are seen on frosted apricots indicated a few hours after sunrise that much

fruit had been destroyed, but as the crop was an exceptionally heavy one, it appeared likely that a small proportion of the crop might have escaped, and it was therefore decided to continue the test in the event of another frost occurring—as it did on the following night—as in any case a further test would result in added data of results of heating under frost conditions. At the time of writing (November 23rd, 1933) it appears that a proportion of the crop did escape the first night, and was saved by heating on the second night (October 25th and 26th) on the heated plot, although the second night of frost almost completely destroyed the crop on the unheated plot. The results of the heating expressed in terms of fruit harvested from the heated and unheated plots will be published at a later date.

This breakdown of the alarm system was investigated by members of the Executive Committee, together with the writer, about two hours after Mr. F. W. Boehm had reported that a severe frost had occurred and the alarm bell had failed to ring. The U tube alarm thermometer which is connected to an electric bell system is so arranged that the electric current passes through the mercury column and so completes the circuit and rings the bell when the temperature reaches 34 degrees. Mr. Boehm reported that the bell had not rung, and when he examined the thermometer at daylight the mercury was still well beyond the point of contact although the bell was not ringing. The bell had always rung previously when the mercury reached 34 degrees and thus made contact, and when tested by spraying, as already mentioned, with ethyl chloride, in the presence of members of the Committee it was found that the bell rang perfectly when 34 degrees was recorded.

As in the case of frost prevention by orchard or vineyard heating the alarm system is of paramount importance, it is considered worth while to give here a likely explanation of the failure of the alarm. Also it is deemed worth while to quote "Californian Agricultural Extension Service," Circular 40, which unfortunately, was not to hand when this test was set up. With reference to thermometers this circular states, pages 37 and 38, "The U tube type of thermometer which reads both maximum and minimum is very likely to be out of order, and is not recommended for use in connection with orchard heating." And again, "In districts where there are no frost warning patrols frost alarms are frequently used. In order to be safe they should be of the type that rings when the circuit is *broken* rather than when the contact is made. If anything goes wrong with the line the bell rings. This will occasionally result in the grower being called too soon. The alarm should be tested each night by pulling the switch."

Fig. 5 represents an ordinary maximum and minimum U tube thermometer with electrical contact points for use as a frost alarm, the sketch being made from the thermometer used in the experiment referred to. When the temperature is falling the mercury column D falls in the right hand tube and rises relatively in the left hand tube. When the temperature falls to 34 degrees F. the mercury rises sufficiently high in the left hand tube to connect the electric wires which are inserted into the tube from the terminals A and B, thus the electric circuit is completed and the alarm bell is rung. Should a bubble or a break appear in the mercury column between the wires inserted from terminals A and B as at C, the electric circuit will not be completed although the mercury has fallen below 34 degrees on the right hand column and risen above 34 degrees on the left hand column. Such a break is known to have occurred in this particular thermometer on a previous occasion, and it is presumed that the column again broke when the apparatus failed to ring the alarm bell when the temperature reached 34 degrees F. on the night of October 25th or early morning of October 26th. Although this alarm system has operated quite satisfactorily on very many occasions when chilled artificially or naturally during a period of 59 days it is known to have

developed a break in the mercury column once during that period, and it is now assumed that it developed a similar fault on the occasion when it failed to work the alarm bell.

Fig. 6 represents an ordinary thermometer fitted with terminals and wire inserts and wiring for frost alarm purposes. This type of frost alarm thermometer is designed to ring the alarm bell when the continuous electric circuit which is passing from terminal A to B through the mercury column D is broken by the mercury

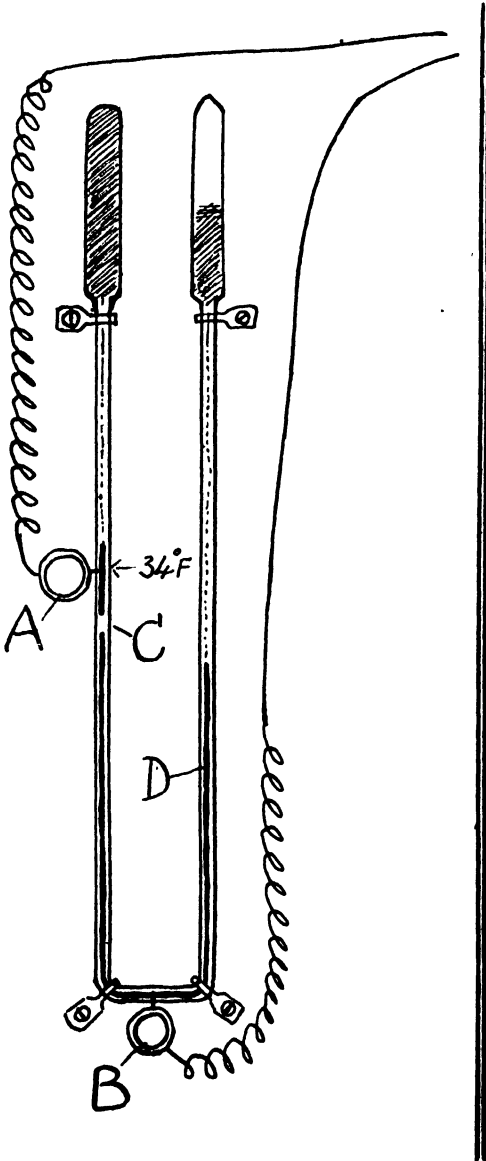


Fig. 5.—Maximum and minimum U tube thermometer.

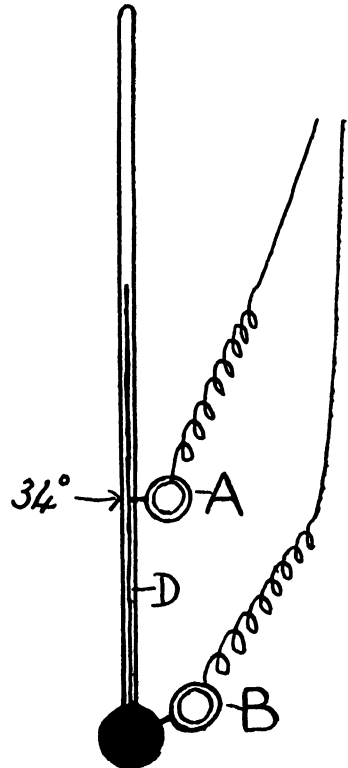


Fig. 6.—Ordinary thermometer fitted with electric terminals.

column falling below 34 degrees, at which point the wiring from terminal A is inserted. Similarly, if a bubble or break should accidentally form in the mercury column between the points A and B the alarm bell will ring on account of the

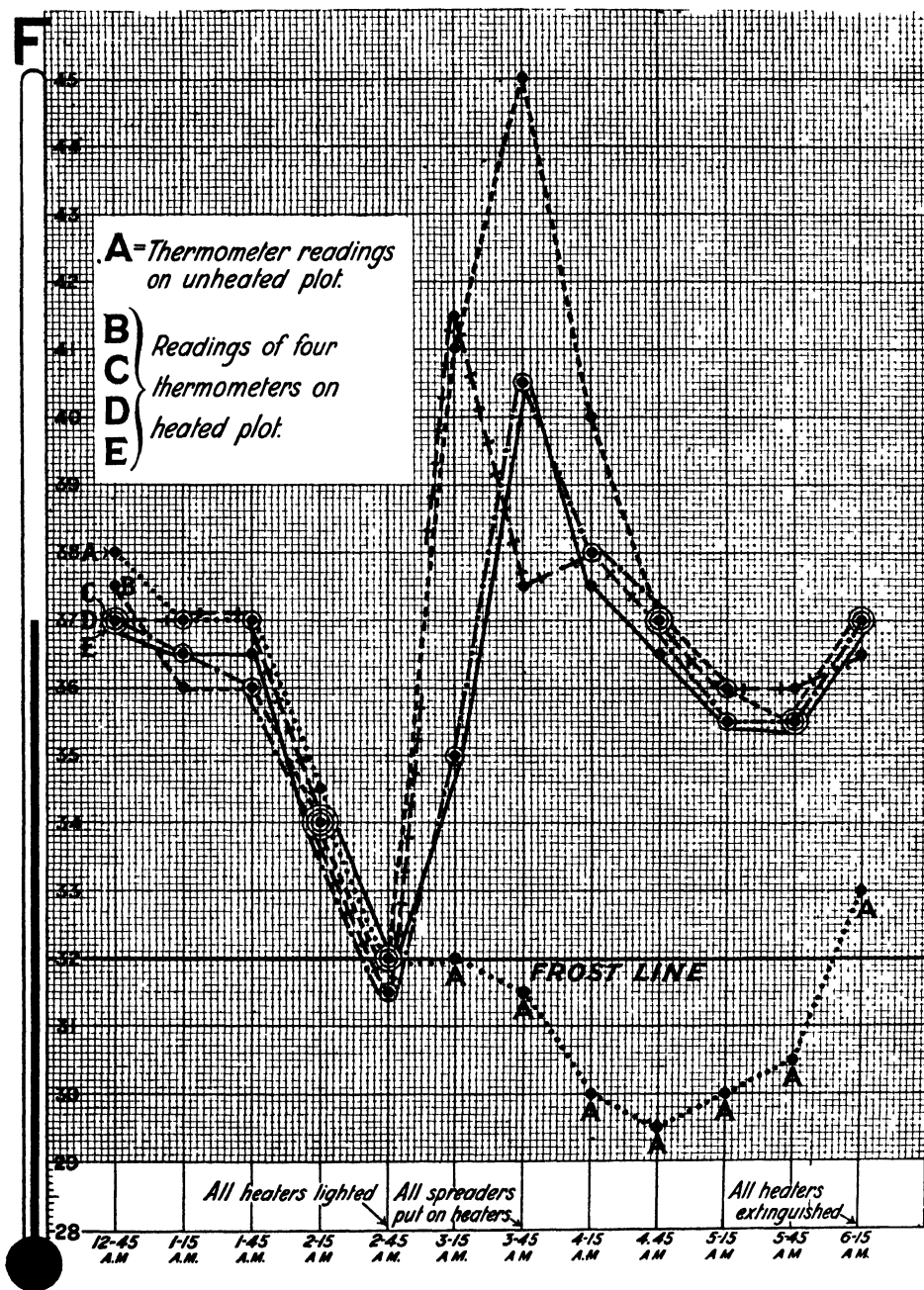


Fig. 7.—Graph illustrating record of heating on October 26th.

broken circuit. With the latter type of alarm two circuits—one of which is continuous, and operating a switch by means of a magnet—are used, the second circuit operates the bell. When the first circuit is broken through the temperature falling below the point A the magnet releases the switch which brings the second circuit into operation and thus the alarm bell is rung.

Unfortunately neither of these types of thermometers were obtainable when the breakdown in the thermometer which was in use took place.

On October 26th the alarm bell rang at 12.30 a.m., indicating that the temperature had fallen to 34 degrees F. on the alarm thermometer, which, as previously stated, is 9in. above ground level. Proceeded immediately to experiment plot, where the temperatures were recorded. The difference in temperatures in this case between the check plot and heated plot thermometers and the alarm thermometer being probably due partly to the difference in elevation of the plot thermometers which are 3ft. above ground level, whereas the alarm thermometer is 9in. above ground level:—12.45 a.m.—A, 38 degrees; B, 37.5 degrees; C, 37 degrees; D, 37 degrees; E, 37 degrees. 1.15 a.m.—A, 37 degrees; B, 36 degrees; C, 37 degrees; D, 36.5 degrees; E, 36.5 degrees. 1.45 a.m.—A, 37 degrees; B, 36 degrees; C, 37 degrees; D, 36 degrees; E, 36.5 degrees. 2.15 a.m.—A, 34.5 degrees; B, 34 degrees; C, 34 degrees; D, 34 degrees; E, 34 degrees. 2.45 a.m.—A, 32 degrees; B, 32 degrees; C, 31.5 degrees; D, 31.5 degrees; E, 32 degrees. All heaters available, namely, 127, were then lit with spreaders off. Time required for lighting by two men—one using torch and one removing lids and spreaders—was 25 minutes. Atmospheric conditions then were—calm, cloudless night, clear starlit sky. 3.15 a.m.—A, 32 degrees; B, 41 degrees; C, 41.5 degrees; D, 35 degrees; E, 35 degrees. When these readings were taken, heaters in the vicinity of thermometers B and C had been burning for approximately 25 minutes, whereas heaters in the vicinity of thermometers D and E had been burning less than 10 minutes. This was due to the fact that lighting which occupied 25 minutes was commenced at the northern end of the plot where thermometers B and C were situated, and lighting finished at the southern end of the plot alongside thermometers D and E. 3.45 a.m.—A, 31.5 degrees; B, 45 degrees; C, 37.5 degrees; D, 40.5 degrees; E, 40.5 degrees. All spreaders were then put on heaters to reduce rate of fuel consumption. 4.15 a.m.—A, 30 degrees; B, 40 degrees; C, 38 degrees; D, 38 degrees; E, 37.5 degrees. 4.45 a.m.—A, 29.5 degrees; B, 37 degrees; C, 37 degrees; D, 37 degrees; E, 36.5 degrees. 5.15 a.m.—A, 30 degrees; B, 36 degrees; C, 36 degrees; D, 35.5 degrees; E, 35.5 degrees. 5.45 a.m.—A, 30.5 degrees; B, 35.5 degrees; C, 36 degrees; D, 35.5 degrees; E, 35.5 degrees. 6.15 a.m.—A, 33 degrees; B, 37 degrees; C, 36.5 degrees; D, 37 degrees; E, 37 degrees. All heaters were extinguished at 6.30 a.m. For further record of this heating see accompanying graph, Fig. 7.

October 27—Alarm rang at 1.25 a.m., recording 34 degrees. A calm, clear, and starlight night. The following temperatures were recorded:—4.43 a.m.—A, 36 degrees; B, 35 degrees; C, 35 degrees; D, 35.5 degrees; E, 35 degrees. Thermometer readings were then taken half-hourly until sunrise. Shortly before dawn clouds appeared on the western horizon, moved by north to the north-east horizon; a light breeze from the north-east then developed and the sky became cloudy. At no time during the night did the temperature fall to 32 degrees.

SUMMARY OF TEMPERATURES RECORDED.

September 13th—Average temperature of unheated plot, 42 degrees. Average temperature of heated plot during 1 hour's heating (124 heaters with spreaders on all the time), 47.75 degrees.

September 21st—Average unheated, 38 degrees; heated average, 40.62 degrees. Time of heating not known, but less than 1 hour, spreaders on, 127 heaters.

September 24th—Average unheated, 32.66 degrees. Average heated plot, 34.8 degrees. Heated by 58 heaters for 1½ hours with spreaders on. Average of heated plot, exclusive of thermometer C where no heaters lit, 35.11 degrees.

October 26th—Average unheated temperatures, taken 3.15 a.m. to 5.45 a.m., equals 30.58 degrees. Average on heated plot, heated from 2.45 a.m. to 6.30 a.m., temperatures taken same times as unheated plot, 37.6 degrees; 127 heaters burning half to one hour with spreaders off, afterwards with spreaders on.

In connection with the above summary it should be borne in mind that the lowest temperature reached may do more damage to the crop in one half-hour than a low average will do over a long period.

Rate of Fuel Consumption.—It was found necessary to re-fuel some of the heaters, but not the majority, during the 3½ hours' burning on October 26th. It was found at daylight that some of the heaters contained an inch or more of water as an aftermath of the flood and rain previously referred to; this accounted for their tendency to boil over and to require re-fuelling after about three hours' burning. Re-fuelling can be carried on without extinguishing the heater by simply pouring in more fuel.

Economic Aspect of Orchard Heating.—It would appear from temperature records and orchardists' experience that what is required in this district is protection against frosts which may occur on two or three nights each spring, generally between the hours of, say, 2 a.m. and 6 a.m. From Californian and New Zealand experiments, and from this test, we can deduce that 80 to 100 5-quart Lard Pail heaters will be sufficient to maintain a temperature of 33 degrees under conditions of 27 to 28 degrees on the unheated area. In other words, we can expect to maintain an increase of 5 degrees which will be sufficient to counteract the damage done by general spring frosts. With spreaders off and a consequent greater fuel consumption a much higher range of increased temperature could doubtless be obtained. Heaters can now be obtained in Adelaide in lots of 150 at a cost of 1s. 9½d. each. They can be purchased cheaper in greater quantities, and I propose later to suggest modifications in design and manufacture which should also cheapen them. Fuel costs from 5d. to 6½d. per gallon, plus freight, when used for primary production and exempted from sales tax. The heaters are said to last for 10 years with care. Therefore, cost of heating one acre with 100 heaters would be—

	£	s.	d.
For one heating of four hours—annual rental value of 100 heaters ..	0	18	0
100galls. of fuel oil at 6d.	2	10	0
	<hr/>		
	3	8	0
For two heatings of four hours each—extra fuel	2	10	0
	<hr/>		
	£5	18	0

The foregoing paragraph gives an outline of the costs of orchard heating, as conducted in this experiment, without taking into account interest on the capital outlay and labor. It is proposed to deal with this aspect more fully in a later issue, together with a statement showing values of crop harvested from the heated and unheated plots. Many growers, however, who have watched the experiment with great interest are now of the opinion that it is economically possible and advisable to protect fruit crops from occasional spring frosts by adopting the practice of orchard heating.

FACTORS AFFECTING THE SEVERITY OF TAKE-ALL.

[By S. D. GARRETT, B.A., Assistant Plant Pathologist, Waite Agricultural Research Institute, University of Adelaide.]

1. THE IMPORTANCE OF SOIL MICRO-ORGANISMS.

In 1932 severe losses from take-all were experienced in South Australia, more especially on Eyre's Peninsula and in the Murray Mallee area. Many crops which right up to the time of heading promised an exceptionally good yield were rendered practically worthless by the sudden appearance of the disease in the whitehead stage. Until recently the conditions leading to the occurrence of take-all epidemics were little understood, but recent research work has led to a much clearer understanding of the factors concerned. Some of this work, bearing particularly on South Australian conditions, is described below.

FIELD OCCURRENCE OF TAKE-ALL.

Under South Australian conditions the first indications of take-all appear in August when the crop is 6in. to 1ft. in height, in the shape of small, generally circular patches, in which the plants are stunted, backward in growth, and yellowing off. The plants in these patches are usually dead before harvest, and weed growth becomes established. There is a gradation in size of affected wheat plants from those killed early, in the centre of the patch, to nearly full-grown plants at the edges, which go off with whiteheads. This suggests that there has been a slow extension of the fungus through the soil, during the growing period of the crop. Under certain seasonal conditions the patch form of take-all may not show up until the crop is heading in October. In this case the plants are not killed by the fungus until out in ear; instead of ripening off in the normal manner, the plants bleach off to a dead-white color, and the ears fail to fill out, hence the names "whiteheads" and "hay-die" applied to this stage of the disease. On the heavier classes of wheat soils, the disease usually does not develop further than these "primary patches." But on light sandy soils recently cleared from scrub, take-all may occur in certain seasons in a much more severe form. Whole paddocks of wheat, standing 4ft. high and just coming into ear, may rapidly bleach off with the disease, the affected plants not being in definite patches but scattered indiscriminately through the crop.

The primary patches of take-all are tentatively ascribed to the presence of *Ophiobolus mycelium* in the soil, which has survived from a preceding season on infected wheat stubble and on roots and haulms of infected pasture grasses. The date of appearance of such patches may be determined by the concentration of the infectious material in the soil, a comparatively heavy infection being necessary for the production of an early patch, or it may be influenced by the temperature and rainfall conditions during the winter. The number of such primary patches in any paddock will depend largely upon the previous treatment of the soil. If the crop has been sown on a fallow well-worked during the previous season, and on which rainfall was adequate, the early patches may be scarce or absent altogether. If, on the other hand, the fallow was neglected, or did not receive sufficient rainfall, or if the crop was sown on the stubble of a preceding crop affected by the disease, or immediately following a pasture of some years duration, then infectious material might be abundant in the soil, and the primary patches so numerous as to coalesce over large parts of the paddock. Crops sown after pasture seem to be especially liable to take-all, more particularly if the pasture has been of some years' standing.

Some pasture grasses are very susceptible to the disease, so that this is scarcely surprising. Finally, lack of consolidation of the soil also seems to favor the appearance of primary patches of take-all.

Another important source of infection in certain years may be the infected stem bases of cereals or grasses blown about in the wind. In a bad take-all year many crops and pasture paddocks suffer from the disease, and during the dry weather of the following summer the brittle stem bases of infected plants become loosened by stock or by wind and blow all over the farm, and on to clean fallow paddocks waiting to be sown with wheat in the autumn. Primary patches may thus occur in the next crop, even when the fungus had been eliminated from the soil by good fallowing methods, through reinfection by wind-blown material. In such a case, the take-all patches are concentrated chiefly round the edges of the crops. This is a commonplace experience of farmers. An example has already been given by Samuel (¹⁰), together with a photograph of infected pieces of barley grass stems picked up on fallows. Barley grass (*Hordeum murinum*) is probably the chief source of this wind-blown infection in the mallee areas. If it could be replaced by Wimmera rye grass, as advocated by Griffiths (⁴), this would undoubtedly constitute a considerable advance towards the control of take-all.

Whilst the primary patches thus appear to be to some extent within the control of the farmer, the occurrence of epidemics of whiteheads, involving whole paddocks of wheat in the heading stage, does not. The occurrence of such epidemics appears to be limited mainly to light sandy soils during the first 20-25 years after clearing, and to occur only in years in which the spring weather is dull and showery. It was discovered last year that the ascospores of the take-all fungus are ejected into the air during rainy weather in spring, from spore-cases formed on dead plants in the primary patches. The theory was advanced (⁹) that the epidemic whitehead stage of the disease usually resulted from late infection by these ascospores, dispersed over the paddocks by wind. The matter will be further discussed in Part 3 of this paper.

But an explanation had still to be found for the apparent limitation of extensive losses from whiteheads to light sandy soils in the first 20-25 years after clearing. To-day, such soils are mainly to be found in the Murray Mallee and West Coast areas in South Australia. On Yorke Peninsula, the soils of which are of the same general types, severe losses from take-all were experienced in the early years of settlement, but they are now comparatively rare. In the present paper, experiments are described, which suggest that this limitation of epidemic take-all to the light sandy soils is directly related to the lesser activity of the microbiological factor in such soils, or, in other words, that these soils are more susceptible to take-all because of the low numbers of soil bacteria present in them.

PREVIOUS WORK ON SOIL FACTORS.

The biological antagonism exerted by other soil organisms towards the cereal footrot fungi has been well established in recent years by Canadian research workers. The rapid deterioration of inoculum of the footrot fungi when added to soil, to which attention was first drawn by Simmonds (¹²), was attributed by Broadfoot (¹) to the operation of this factor. This suggestion was followed up by Sanford and Broadfoot (¹¹), who were able to show that infection of wheat seedlings by *Ophiobolus graminis* was completely suppressed by the antagonistic effect of a number of fungi and bacteria—not only by the living cultures, but also in many cases by their filtrates as well. Henry (⁸) showed that the growth of *Helminthosporium sativum* upon sterilised soil in small flasks might be completely inhibited by the addition of very small amounts of unsterilised soil, or by simultaneous inoculation with a number of other fungi and bacteria, so that no infection

resulted when wheat seeds were inoculated with the contents of the flasks in 5 in. pots. The work of McKinney and others on the soil temperature relations of *Ophiobolus graminis* is dealt with separately in Part 2 of this paper.

EXPERIMENTAL WORK.

Methods.

The soils used in these experiments were as follows:—

Gawler River Sand.—A river sand, very poor in organic matter and low in mineral salts. For some of the experiments the sand was treated with hydrochloric acid and well washed before use; in such cases the sand is described as "treated."

Glen Osmond Loam.—A red clay-loam, typical of the Adelaide Plains and Lower North wheat-growing soils.



Fig. 1.—Infection of a seedling root of wheat by *Ophiobolus graminis*.

(a) Surface view, showing the growth of the dark-colored runner hyphae of the fungus along the root.

(b) Longitudinal section, showing the connection between the dark-colored runner hyphae and the colorless infection hyphae which penetrate the cortex.

Murray Mallee Sandhill Soils.—Red brown sands.

Murray Mallee "Clay Flat" Soils.—Red loams.

Method of Estimating Infection.—The usual method employed for recording infection by cereal footrot fungi has been that of assigning infection-ratings by eye to the diseased seedlings after some four weeks' growth (McKinney (⁶)). For work upon the effect of soil micro-organisms, a more accurate measure of the activity of the take-all fungus under different experimental conditions was desired. A study was therefore made of the early stages of infection. The

progressive infection of wheat seminal roots by the fungus *Ophiobolus graminis* occurs through the growth of the fungal hyphae along the roots (Fig. 1, a). Under favorable conditions this is a rather rapid process, since it results from the growth along the outside of the roots of the dark-colored *runner hyphae* (the macrohyphae of Fellows⁽²⁾), which send in infection hyphae as they go to tap the food reserves of the root (Fig. 1, b). Invasion is by direct penetration, as described by Fellows, and may be accompanied by the formation of protuberances known as *lignitubers*, which appear to originate from the reaction of the host cell wall to penetration. The infection hyphae (Fellows' microphyphae) are colorless, and branch directly off the runner hyphae. (More rarely, colored branches of the runner hyphae themselves penetrate the cortex. Occasionally, too, the runner hyphae may travel one or two cells deep in the cortex, in the middle lamella at the junction of several cells). It will be realised that the progress of infection in the way described will be considerably more rapid than would be the advance of the fungus through a cellular tissue, owing to the absence of transverse cell-walls, better conditions of aeration, &c. Repeated microscopical examination has shown that infection never lags behind the apices of the runner hyphae for more than one or two cells.

The method adopted for the quantitative estimation of infection consisted simply in measurement of the rate of growth of the runner hyphae along the roots. In comparing the effect of two or more different soil conditions upon infection, wheat seeds were planted above small pieces of agar or cornmeal-sand inoculum of the fungus in the experimental soils to be compared. At intervals, pots were washed out, and the extent of infection along the roots recorded. Glass tumblers, of approximately 250c.c. capacity, were found very convenient for many laboratory experiments. Under such conditions, too, very good control could be obtained of soil temperature, moisture content, texture, and other factors difficult to adjust so accurately in larger pots in a greenhouse. By planting a sufficient number of such small pots in the first place, the progress of infection could be recorded weekly over a period of four weeks or more, although two readings, or only one, have generally been found sufficient for purposes of comparison.

The actual measurements were quickly and conveniently made under the binocular microscope, using an 8 × objective with an 8 × eye-piece. The root system of the plant was floated out in water in a petri-dish, and then viewed by reflected light from a reading lamp over a white opaque background. The runner hyphae were then easily visible under the 64 × magnification.

The roots were quickly followed down under the microscope until the limit of the runner hyphae was observed; they were then grasped with forceps at this point, and the distance to the point of inoculation (at the seed) conveniently read off against a scale drawn on the white background under the microscope stage. Restriction of measurements to the three oldest seminal roots was found to result in greater uniformity of results. These roots are all put out at approximately the same time, and under the same infection conditions. The fourth and fifth seminal roots are put out somewhat later, but they frequently showed a greater extent of infection (this is tentatively attributed to a decreased resistance of the cell-walls to penetration, since these roots are put out by a plant already laboring under the effects of infection). Finally, whenever possible, experiments were carried out at a temperature below 20°C. At the lower temperatures the advance of the runner hyphae along the roots was found to be very regular, and the limit of infection very easily perceived. At temperatures above 20°C, however, the behavior of the hyphae suggested a decrease in cell-wall resistance of the roots; a single hypha was frequently found quite a long way ahead of the remainder, and the runner hyphae even travelled occasionally one or two cells deep in the cortex—which made their detection, although by no means impossible, considerably more difficult.

It was found that the results obtained by this method corresponded with those obtained by means of the arbitrary infection ratings assigned by eye at a somewhat later stage, according to the method of McKinney (*). Whilst the method took rather longer for the recording of infection than that of McKinney, this disadvantage was offset by the greater accuracy of results, and by the fact that only comparatively small numbers of plants were necessary to establish experimental differences with statistical significance. Moreover, there was a saving in time, since many experiments could be concluded within a period of 2-3 weeks.

Experiment 1.—Growth of the Fungus Through Soil and Sand.

Glass tubes, 12in. long by 1in. internal diameter were employed; eight were filled with Glen Osmond soil and eight with treated Gawler River sand—each at approximately 50 per cent. saturation. After being filled to within some 2in. of either end, the tubes were plugged with cotton wool and divided into two lots, one of which was sterilised in the autoclave at 1 atm. pressure for 45 minutes. All the tubes were then inoculated at one end with *Ophiobolus graminis* growing on cornmeal-sand mixture, and placed in the incubator at 25°C. After 17 days, growth of the mycelium along the different tubes was as follows:—

	Mean. cms.
Soil, sterilised. 7.0, 7.5, 6.75, 7.25	7.13
Soil, not sterilised—0, 0, 0, 0	0
Sand, sterilised—5.75, 5.75, 5.75, 5.75	5.75
Sand, not sterilised—2.25, 1.5, 1.3, 0.8	1.5

In the sterilised soil growth of the mycelium was particularly dense and even, and easily visible to the naked eye; it was composed of fine, hyaline hyphae. In the sand the growth was sparse, and only to be observed with the aid of a hand lens; the hyphae were considerably coarser, and frequently dark-colored. In the non-sterilised soil no measurable growth had occurred.

Experiment 2.—Progress of Infection Down the Roots of Wheat Seedlings.

This experiment was conducted in glass tumblers. Six tumblers were filled with treated Gawler River sand, and six with Glen Osmond soil, both at approximately 50 per cent. saturation. Half of these were then sterilised in the autoclave for one and three-quarter hours at a pressure of one atmosphere. On cooling, the sterilised tumblers were placed under sterile bell jars. Inoculation and planting of the sterile tumblers was done in an enclosed chamber. A shallow layer of cornmeal-sand inoculum of the fungus was dropped on to the surface of the sterilised soil or sand and then the sterilised wheat seeds, which were finally covered with a layer of moist sterilised sand. The non-sterilised tumblers were planted in a similar manner, but without, of course, any special precautions. All tumblers were then placed in a glass-fronted incubator at 25°C. After 12 days, the plants were washed out for examination of the roots. Measurements of the progress of infection were as follows:—

Mean Extent of Infection along three oldest Seminal roots, in cms.	Mean.	Standard Error of Mean.
Sand, sterilised (12 plants)—4.6, 4.6, 4.1, 4.5, 4.6, 4.1, 4.5, 3.7, 4.7, 4.9, 4.5, 4.7	4.5	0.09
Sand, not sterilised (12 plants)—3.1, 2.7, 3.0, 2.8, 2.2, 2.7, 3.6, 3.5, 3.1, 1.9, 4.1, 4.7	3.1	0.21
Glen Osmond soil, sterilised—All roots completely killed before 3cm. long by vigorous growth of fungus extending 4.5 cm. through soil	4.5	—
Glen Osmond soil, not sterilised—Infection nil, or less than 0.5 cm.	0.5	—

In the sterilised Glen Osmond soil a dense and uniform growth of *Ophiobolus* mycelium had occurred in all three tumblers to a depth of 4.5cm. below the inoculum; the roots of the wheat seedlings had all been killed back at a depth of 3cm. or less. In the non-sterilised Glen Osmond soil, on the other hand, practically no progress of infection downwards from the inoculum had taken place; no measurements were recorded, but in no case had growth of the mycelium down the roots exceeded 0.5 cm. It would appear from these two experiments, then, that whilst sterilised Glen Osmond soil is a very favorable growth medium for *Ophiobolus graminis*, the unsterilised soil contains some factor which greatly checks the growth of the fungus. In unsterilised sand, on the other hand, the same factor, if present, only retards the rate of growth of the fungus down the roots by some 30 per cent.

Experiment 3.—The Progress of Infection Down the Roots of Wheat Seedlings in the Field.

Similar soil conditions to those in the last experiment were arranged in a field plot. Untreated Gawler River sand was used to fill a trench, 1ft. wide by 18in. deep and 10ft. long. Rows of wheat seeds were then planted in the sand, and in the adjacent soil. For inoculation, a pinch of cornmeal-sand inoculum of the fungus was dropped into each planting hole before the seed. At intervals, plants were dug up, washed free of soil, and the progress of infection down the roots recorded in the usual manner.

Mean Extent of Infection down three oldest Seminal Roots, in cms.	Mean.	Standard Error of Mean.
After 17 days—		
In soil (12 plants)—0.4, 0.0, 0.2, 1.1, 0.6, 0.0, 0.9, 0.2, 0.1, 0.5, 0.0, 0.0	0.3	0.1
In sand (11 plants)—3.3, 2.9, 3.0, 3.3, 3.4, 1.8, 2.8, 2.8, 1.2, 2.0, 2.5	2.6	0.2
Difference of Means, 2.3 ± 0.23		
After 24 days—		
In soil (12 plants)—0.6, 2.0, 0.0, 0.0, 0.0, 0.0, 2.3, 0.8, 0.7, 1.7, 0.9, 1.5	0.9	0.24
In sand (11 plants)—3.0, 5.8, 5.7, 4.2, 3.1, 5.7, 1.4, 1.8, 4.9, 2.5, 4.5	3.9	0.48
Difference of Means, 3.0 ± 0.53		

Microscopical examination of the infected roots from sand and soil, respectively, showed that whereas in sand the progress of infection was invariably of the rapid type due to runner hyphae growing down the outside of the root, in soil, on the other hand, the progress of infection was sometimes, though not always, limited to growth of the fungus inside the root. Growth inside the root is necessarily slower than that along the outside, owing to the presence of transverse cell walls, poorer conditions of aeration, &c. Thus in unsterilised soil there appeared to be some factor antagonistic to the growth of the runner hyphae of *Ophiobolus* along the outside of the roots.

Experiment 4.—A Comparison of Infection and Bacterial Numbers in some Murray Mallee Soils.

The soils selected for this experiment were taken from typical mallee sandhills and clay flats, respectively. Gawler River sand was also included in the series, for the purpose of comparison with the preceding experiments. The mallee sandhills are susceptible to the epidemic form of take-all, which occurs much less frequently on the clay flats. A sample of soil from the sandhill and another sample from the clay flat in the same paddock were taken from three Murray Mallee farms some distance apart. Two 4in. flower pots were filled with each soil, and all the pots were then well watered before planting, to allow the soil to settle

properly. Eight seeds were sown per pot; under each seed was placed a small block of the take-all fungus growing upon agar. The pots were maintained at a temperature of approximately 18°C., and one of each group was washed out at the end of 13 days. Mean infection in cms. for each soil is given below. At the same time, a sample of soil was taken from each of the pots, and counts of bacterial numbers were made by the plate method for each soil. These are also given below.

Soil.	Mean Infection in cms. after 13 Days.	Standard Error of Mean.	Bacterial Numbers in Millions per gm. of Dry Soil.	Standard Error of Mean.
Mallee clay flats—				
Yurgo	0.5	0.11	21.6	0.98
Karoonda	1.4	0.10	18.8	1.37
Wynarka	1.6	0.10	12.6	0.54
Mallee sandhills—				
Yurgo	1.9	0.14	14.8	0.80
Karoonda	2.3	0.11	8.4	0.62
Wynarka	2.5	0.12	7.2	0.72
Gawler River sand	2.0	0.18	7.5	1.20

Examination of the above results, also set out in diagrammatic form in Fig. 2 shows that (1) infection is consistently more rapid in the sandhill than in the clay flat soils; (2) the three clay flat soils (Yurgo, Karoonda, and Wynarka) fall into the same infection order as the three sandhill soils; (3) infection appears to be

INVERSE RELATION BETWEEN BACTERIAL NUMBERS AND SUSCEPTIBILITY TO TAKE-ALL IN SOME SOUTH AUSTRALIAN SOILS

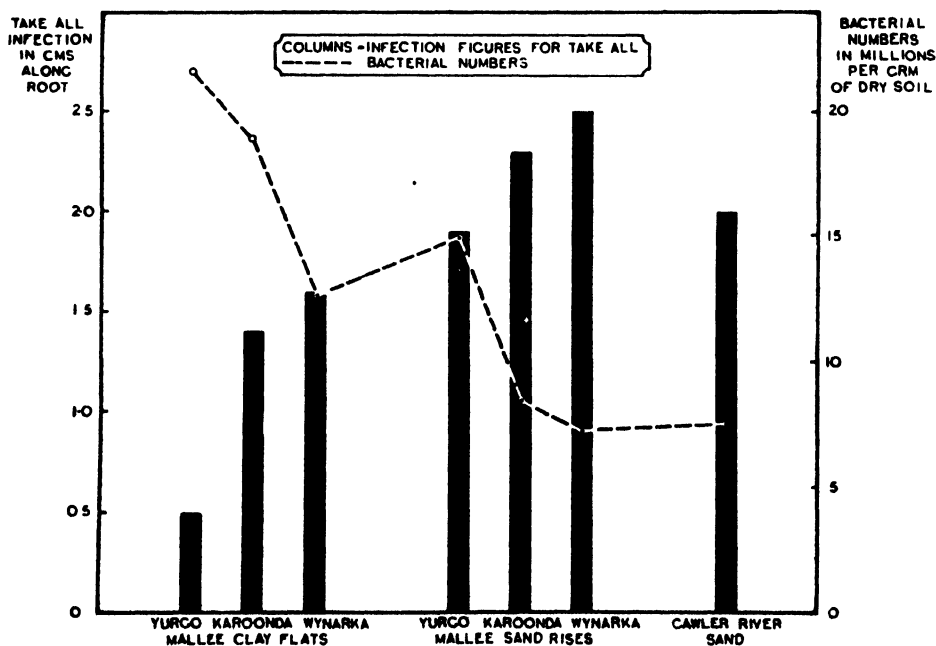


Fig. 2.

inversely related to bacterial numbers in these soils. The infection figures recorded above, however, constitute only a partial record of the observed differences in infection between the sandhills and the clay flats. For, whereas in the sandhill soils the roots were thickly encrusted with runner hyphae over practically their whole infected length, in the clay flat soils the fungus might be represented by just a single straggling runner hypha for the greater part of the length recorded as infected, which would often appear quite healthy to the unaided eye.

Experiment 5.—The Effect of Adding Organic Matter to the Sand.

If the restriction to the growth and infection of *Ophiobolus graminis* in the heavier soils is due to the action of soil micro-organisms, it should be possible to modify the character of sand in this respect by the addition of organic matter. In the following experiment, therefore, untreated Gawler River sand was mixed with fowl manure in the proportion of 12 parts to 1 by weight, and filled into 6in. pots. Wheat seeds were planted with a small piece of agar inoculum immediately below as usual. Other pots were filled with sand alone, and planted with inoculated seeds in the same way. Measurements of the progress of infection down the roots in the two series were made after 20 days (the pots were kept in the open).

Mean Extent of Infection, in cms.	Mean.	Standard Error of Mean.
Sand alone (12 plants)—4.6, 4.3, 4.1, 4.0, 5.2, 4.4, 4.3, 4.7, 4.2, 3.7, 3.6, 4.2 ..	4.3	0.13
Sand + 1/12 fowl manure (12 plants)—1.4, 0.1, 3.3, 1.5, 1.1, 1.5, 1.5, 0.5, 0.5, 1.8, 0.3, 1.2 ..	1.2	0.25
Difference of Means, 3.1 ± 0.28		

The great retarding effect of fowl manure upon infection by the take-all fungus can once again be attributed to the increased activity of the soil micro-organisms. That it was not due to the extra nitrogen available to the plants appears unlikely from the results of the next experiment, which was running at the same time. It has been reported by Fellows ⁽³⁾ that liberal use of fowl manure gave good control of take-all in field tests conducted at the Kansas Agricultural Experiment Station.

Experiment 6.—Effect of the Vigor of the Plant on the Progress of Infection.

It was realised that any conclusions attributing differences in infection obtained in the above experiments chiefly to the action of biological antagonism might be justly criticised on the grounds that differences in the chemical and physical characteristics of the soils might well be reflected in differences in resistance of the plant roots to infection. Additional weight is lent to this criticism in view of the fact that sterilisation is known to be accompanied by chemical changes in the soil. It was therefore decided to compare the progress of infection along the roots of plants grown under four widely different conditions of nutrition, viz.:—

Full sunlight, with and without nutrient solution.

Poor diffuse light, with and without nutrient solution.

The nutrient solution employed was as follows:—

Ca(NO ₃) ₂	0.80 gm. per litre.
KNO ₃	0.30 "
KH ₂ PO ₄	0.20 "
MgSO ₄ ·7H ₂ O	0.20 "
KCl	0.20 "
FeCl ₃ ·6H ₂ O	0.025 "

The plants were grown in treated Gawler River sand; the supply of nutrient solution was certainly in excess of their requirements. The condition of poor diffuse light was obtained by the erection of a cardboard cylinder around the plant containers, all of which were sunk in an insulated tank, and covered with a mulch of granulated cork, so that there was no appreciable difference in soil temperature between the full sunlight and the poor diffuse light series. The plants were allowed to grow for 16 days before inoculation of the root-bases at the scutellar nodes. By this time, considerable differences in the size and character of the tops in the four series had appeared, and it was considered that any differences in resistance of the roots due to differences in nutrition should have had ample time to appear. In the full sunlight series, the addition of nutrient solution had already resulted in a very considerable increase in size of the plants, which were also of a much darker green colour; in the poor diffuse light series, all the plants, both with and without nutrient solution, were very poor and spindly. After 21 days, the plants were washed out and the progress of infection recorded.

Mean Extent of Infection, in cms.	Mean.	Standard Error of Mean.
Full sunlight, with nutrient solution (eight plants)—4.5, 3.4, 2.8, 5.3, 3.4, 4.3, 4.6, 4.8	4.0	0.31
Full sunlight, no nutrient solution (eight plants)—2.9, 2.8, 3.8, 3.8, 2.9, 3.9, 4.4, 4.4	3.6	0.26
Poor diffuse light, with nutrient solution (nine plants)—1.8, 2.7, 3.5, 3.7, 3.2, 2.8, 2.4, 2.8, 3.2	2.9	0.18
Poor diffuse light, no nutrient solution (five plants)—4.6, 2.7, 3.1, 3.7, 4.5 ..	3.7	0.37

From this experiment, then, it is clear that increased vigor of the plant from improved conditions of nutrition does not result in any increase of resistance in the seminal roots; at any rate, no such differences are reflected by the infection figures shown above. The differences in infection obtained in the preceding experiments would therefore appear to be attributable chiefly, if not entirely, to the operation of the micro-biological factor. Further work is in progress to demonstrate the antagonistic effect towards the take-all fungus of various types of bacteria from South Australian soils.

DISCUSSION.

In the experiments reported above satisfactory correlation has been obtained between the degree of infection obtained under laboratory conditions in a number of South Australian wheat soils, and the susceptibility of these soils in the field to epidemics of take-all. The experiments on soil sterilisation indicate that the micro-biological factor constitutes the important point of difference between the susceptible mallee sandhills on the one hand and the much less susceptible mallee-clay flats and the clay loams of the Adelaide Plains on the other. The mallee sandhill soils are characterised by a very low organic matter content, which would make for a poorer development of their microflora. Whilst counts of bacterial numbers in the mallee soils have indeed shown that infection increases with decrease of bacterial numbers, the degree of antagonism exerted towards *Ophiobolus graminis* by the soil bacteria must be influenced by other factors than that of mere numbers alone.

A similar correlation between infection experiments in the laboratory and the field incidence of take-all was reported by Moritz (*) for some German soils. The severity of take-all on the three main types of soil investigated by him—high-land soils, marsh soils, and Fehmann soils—was in the order 1.23; the values of

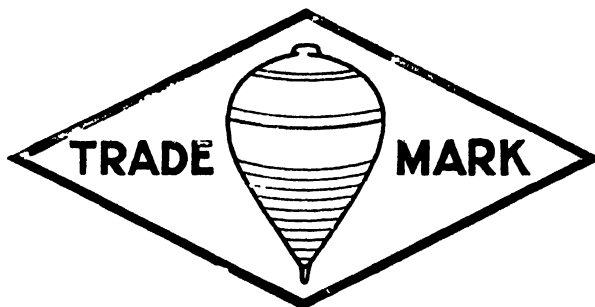
Moritz's "protective factor" in these three soils ran in the inverse order, 3.2.1. The "protective factor" gave a measure of the protection afforded to the wheat plant against take-all in any soil by the micro-organisms of that particular soil. It was obtained simply by dividing percentage infection in the sterile soil by that in the non-sterile soil. It is thus clear that the differences in incidence of take-all in these three German soil types are also to be attributed to the micro-biological factor.

Reference has already been made to the fact that the light sandy soils of the mallee areas, at first very susceptible to epidemics of take-all, later cease to suffer seriously from this disease, after some 25 to 30 years of cultivation. Thus, in the year 1917, Professor A. J. Perkins, Director of Agriculture in South Australia, remarked during the course of an address to the Conference of Upper Eyre's Peninsula Branches of the Agricultural Bureau (*), "Something like 25 years ago, this question (of take-all) was a very live one throughout Yorke Peninsula, which was then in comparatively early stages of settlement. Similarly, as soon as the settlement of the Murray Mallee and Pinnaroo district began, we had the same question cropping up, and again in Eyre's Peninsula on the lighter mallee lands I feel certain, however, that as you emerge from the pioneering stage, this disease will gradually disappear in the same way as it has practically disappeared on Yorke Peninsula." In the light of the experimental work reported in this paper, it is hard to resist the conclusion that the gradual decrease in the prevalence of take-all on these soils has been brought about by the increased activity of the soil microflora with cultivation.

Further studies will undoubtedly have to be made on the changes in the organic matter content and in the character and numbers of micro-organisms which take place with continued cultivation of South Australian soils under different systems

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of rotation, &c. The evidence is now very strong that the micro-organisms present in a soil may exercise an exceedingly important controlling influence on take-all. If efforts are directed in mallee areas towards increasing the organic matter content of the lighter soils and therefore the population of soil micro-organisms, this will probably lead to a considerable reduction in the susceptibility of the land to take-all. It seems likely that the beneficial effect of sheep is due just as much, if not more, to their effect in changing the soil microflora as to their compacting influence on loose soils.

SUMMARY FOR PART I.

Epidemics of take-all in South Australia are practically confined to the light sandy soils of the mallee areas during the first 20-30 years of cultivation. On the older mallee soils, and on the heavier clay-loam soils of the Adelaide Plains and Lower North wheat-growing areas, severe attacks of take-all only occur under exceptional conditions, such as follow the ploughing in of infected grass or stubble.

Laboratory and field experiments have shown that infection of the roots of wheat seedlings by *Ophiobolus graminis* is very much more rapid in the lighter soils.

The difference in the rate of growth of the take-all fungus in these two classes of soils was completely eliminated by soil sterilisation, suggesting that the biological antagonism of micro-organisms in the heavier soils was responsible for the retarding of infection. This conclusion was supported by counts of bacterial numbers, which were found to be uniformly higher in the heavier soils, and by an experiment in which the addition of fowl manure to sand was found greatly to retard the progress of infection.

That the observed differences in infection in these two classes of soils were not due to differences in the resistance of the wheat plants themselves was proved by an experiment in which widely different conditions of nutrition were found to exert no effect on the progress of infection along the roots of wheat seedlings.

It is suggested that the gradual decrease in prevalence of take all upon the light sandy soils of the mallee areas with progress of cultivation is due chiefly to the increase in their organic content. Any measures which can be taken to hasten this process should therefore result in a decrease in the prevalence of take all.

A description is given of a quantitative method for the estimation of infection by *Ophiobolus graminis* under different soil conditions, by means of direct measurement of hyphal growth down the roots of wheat seedlings.

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(To be continued.)

RESULT OF WHEAT CROP COMPETITIONS.

SEASON, 1933-34.

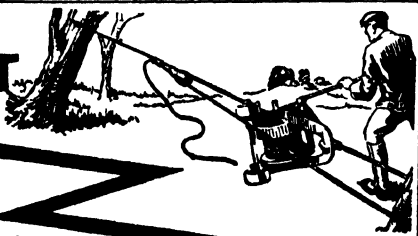
Position.	Name and Address.	Variety.	Apparent Yield.	Freedom from Weeds.	Freedom from Disease.	Truthfulness to Type.	Evenness of Crop.	Total.
		Maxima—	35	25	20	15	5	100

TATIARA.

Judged by E. S. ALCOCK (District Agricultural Instructor).

1	Fisher Bros., Bordertown	Ranee	33	23	19	14.5	5	94.5
2	H. C. M. Pilgrim, Wolseley	Gallipoh	34	23	18	15	2	92
3	E. J. Buckley, Bordertown	Gallipoli	30	24	18	14	3.5	89.5
4	J. Gall, Wolseley ...	Gallipoli	29	24	18	14	3.5	88.5
5	S. Pitcher, Bordertown	Ranee	31	20	19	13	3.5	86.5
6	W. Gill, Keith	Gallipoli	26	23	19	13	4.5	85.5
6	E. Norton, Wolseley.	Gallipoli	31	20	17.5	13	4	85.5
8	A. G. Butler, Wolseley	Waratah and Gallipoli	29	20	19	13	4	85
8	F. B. Milne, Bordertown	Sword and Gallipoli	28	23.5	19	12.5	4	85
10	D. R. Milne, Bordertown	Gallipoli	30	19	17	13	3	82
10	R. A. Grosser, Wolseley	Gallipoh	29	20	16	14	3	82
12	C. England, Bordertown	Gallipoli	28	19	16	13	3	79
13	Vercoe & McDonald, Bordertown	Gallipoli	27	18	15	13	3	76

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DAIRY INDUSTRY PRICES.

ROYAL COMMISSION REPORT TO HIS EXCELLENCY THE GOVERNOR.

[A Royal Commission, consisting of Messrs. W. J. Dawkins (Chairman), Professor A. J. Perkins, and J. W. Wainwright, was appointed in January to inquire into and report upon the disparity between the prices paid by the consumer for dairy produce, the London parities of dairy produce, and the prices received by dairymen for milk and cream, the cause of such disparities, and the remedies therefor. The report is dated October 20th, 1933, and portion of it is quoted below. It is proposed to complete the report in subsequent issues.]

(Continued from Page 526, December issue.)

I. ADMINISTRATIVE MACHINERY.

In preceding pages a plan of operations has been outlined which, if adopted and adequately applied should do much towards improving the metropolitan milk supply, whilst protecting the interests of producers, vendors, and consumers alike. It is realised, however, that success in this matter will depend very much on the efficiency of the administrative machinery, and careful consideration has therefore been given to this question.

1. *Effectiveness of Control of Authority.*—It has become the settled conviction of most progressive communities that effective control over the milk supplies of large cities should be vested in a single authority with jurisdiction extending from the farms on which the milk is produced to the premises of each consumer; and it is generally admitted that when control ceases at the boundaries of a limited metropolitan area, its effectiveness is correspondingly weakened so soon as metropolitan requirements outgrow the economic possibilities of milk production within that metropolitan area; and it is something of this kind that seems within recent years to have affected the control of the milk supply of the Adelaide metropolitan area.

In the above connection the corresponding position in other large cities of the Commonwealth will be briefly glanced at; in Melbourne the State Department of Agriculture is sole controlling authority for both city and country milk supplies; provision for control may therefore be accepted to be adequate. In Sydney and Perth, milk boards control supplies from farm to consumer. In Brisbane control by a milk board with adequate powers has recently been recommended by a Committee of Inquiry, and it is anticipated that necessary legislation will be introduced in the coming Parliamentary Session.

Methods of control in Adelaide have already been described, but will be recalled here for purposes of comparison. Since 1909 control of the metropolitan milk supplies has been in the hands of the Metropolitan County District Board, which is presided over by the Lord Mayor, and over and above the control of milk has many other responsibilities thrown upon it. Apart from the distracting influence of varied responsibilities the main weakness of this type of control from the standpoint of milk is that its powers cease on the boundaries of the Metropolitan County District; and it follows that 50 per cent. of the milk consumed within the metropolitan area does not come under the control of the board until it crosses these boundaries. Beyond the latter, farms supplying milk to wholesale distributors or to milk vendors are supposed to be controlled by the Department of Agriculture; farms, on the other hand, the owners of which retail their own milk, are supposed

to be controlled by Local Boards of Health, if the latter function, and if not, by the Central Board of Health. But all milk intended for human consumption, whatever its origin, comes under the control of the Metropolitan County Board as soon as it enters the metropolitan area. This multiplicity of authorities controlling the destinies of milk has led to endless confusion, and has been partly responsible for lack of efficiency in the control of milk consumed within the metropolitan area and possibly in the country as well.

Hence, whatever might be the form ultimately given to the controlling authority, it is vitally important both to the success and the smooth working of the general scheme outlined in this report that such authority should have complete jurisdiction over milk production and transport, both within and without the Metropolitan County District, and obviously, too, over handling and distribution within the district.

2. Types of Controlling Authorities.—Your Commissioners have had under consideration three types of controlling authorities, namely:—

- (1) Control by the Metropolitan County Board with appropriate extension of powers.
- (2) Control by the Department of Agriculture.
- (3) Control by a special milk board.

(i.) *Control by the Metropolitan County Board.*—The opinion has already been expressed that control by the Metropolitan County Board has, of recent years, lacked in effectiveness for two main reasons, namely:—

- (1) The constitution of the board, and
- (2) Limited jurisdiction.

Of these two reasons the former cannot, and it is doubtful whether the latter could be remedied without introducing new disturbing elements.

If the Metropolitan County Board were to continue in control of the metropolitan milk supply under the proposed new scheme, its jurisdiction would have to be extended to all country farms licensed to supply the metropolis with milk. Any such extension, however, would lead to inevitable overlapping of corresponding functions of the Department of Agriculture, local authorities, and in some instances of the Central Board of Health.

The following facts should serve to illustrate the probable position:—

All country dairy farms licensed under the new scheme to forward whole-sale milk to the metropolis would, by the terms of their licences, be both suppliers of milk for human consumption and milk or cream for manufacturing purposes; nor would there be anything to prevent some of the owners from retailing milk in their immediate neighborhood. In extreme cases such activities would bring the unfortunate cowkeepers under the control of—

- (1) Metropolitan County Board;
- (2) The Department of Agriculture; and
- (3) According to circumstances, the local authorities or the Central Board of Health;

and each of these authorities would have its own set of regulations and its own inspectorial staff. It must be obvious that any such arrangement would be both uneconomic and costly to all concerned, and that it must lead to confusion and irritation in the minds of producers.

It is for reasons such as these that your Commissioners cannot see their way to recommending any extension to the existing powers of the Metropolitan County Board; and as, after a careful study of the whole question, they are convinced that radical changes in policy are essential in the interests of both producers and consumers alike, it is to be feared that the control of the milk supply of the metropolitan area will have to be placed in the hands of a differently constituted authority, on the sufficient grounds that the existing authority could not adapt itself to the change in policy.

(ii.) *Control by the Department of Agriculture.*—It has already been stated that the milk supply of Melbourne is under the control of the Victorian Department of Agriculture. An arrangement such as this presents certain obvious advantages, such as effective control of milk from the farm to the consumer by technically competent officers, and the disappearance of overlapping authorities, apart, perhaps, from health authorities with whom mutually satisfactory arrangements should always be possible. In principle, therefore, control of this character should be both technically and economically satisfactory, and its adoption in this State was urged by some witnesses before the Commission.

In South Australia at the present moment the authority of the Department of Agriculture over milk is limited by the Dairy Industry Act, 1928, to—

Every dairy farm outside the metropolitan area, from which milk is supplied in bulk to any factory, or to any milk vendor, whether for wholesale or retail trade; or the milk from which is used in manufacturing dairy produce.

It follows, therefore, that control of the metropolitan milk supply by the Department of Agriculture would imply no more than the inclusion of metropolitan dairy farms and retail milk trade generally within the ambit of its jurisdiction.

But there are objections to this mode of control which are perhaps less apparent at first sight than its obvious advantages. The first of these is probably that a public activity immediately affecting a section of the community only—those resident within the metropolitan area—and which custom would assign to local authorities concerned, would be administered and financed by a State Department. It is true that good reasons can be advanced for this delegation of authority and action. Reasons of economy, for instance, greater technical efficiency, elimination of overlapping, &c. It can be urged, too, that since unity of control is essential from the source of supply to the consumer, it would be necessary under purely local control to invest metropolitan authorities with powers over-riding those of established country local authorities, and such a policy might be difficult to justify.

Secondly, control by a State Department would usually imply one-man control, which could be justified when executive action only was in question, but not so well when matters of policy called for decisions. And if the recommendations made in this report for the better control of the metropolitan milk supply be carefully studied, it would soon be realised that, should these recommendations be adopted, wise policy decisions would, in the future, be of even greater importance than firm executive actions. The difficult claims of country and metropolitan milk will call for frequent readjustments. The fluctuating relationship of licences issued to the growing requirements of the community will call for careful consideration; and equally so the character and scope of supervision of producers, wholesale and retail vendors, shops, &c.; the periodic fixation of wholesale and retail prices; and many other delicate questions of policy involving intricate financial, economic, and technical problems, in the matter of which errors of judgment might easily lead to very serious consequences. It is for reasons such as these that your Commissioners are convinced that control by a corporate body, suitably constituted, should prove more satisfactory than control by a State Department.

(iii.) *Control by a Milk Board.*—It has already been pointed out that in Sydney and Perth the metropolitan milk supply is controlled by a milk board, and that in the near future the Brisbane supply will probably be under the same type of control. It is now suggested that control by a milk board would probably help to solve many of the difficulties of the Adelaide metropolitan milk supply. In this connection, however, much will depend upon the actual constitution of the board.

(a) *Type of Board Suggested by Milk Producers and Vendors.*—On various occasions in 1931 and 1932, deputations of milk producers and vendors waited upon the Chief Secretary and urged that the disabilities under which they labored

might be investigated and remedied, and, among other things, that the milk supply of the Adelaide metropolitan area be placed under the control of a milk board. In order to stress their earnestness, they went so far as to submit a detailed draft for legislation in the matter of the constitution of the board and the powers that should be vested in it.

The suggested board was to consist of five members, one of whom would be elected by country producers, one by metropolitan producers, one by retail milk vendors, one by metropolitan municipal and district councils to represent consumers, and one to be appointed by Government as chairman.

The powers to be vested in this board, on the other hand, were to be comprehensive and far-reaching. It was to have power to fix both wholesale and retail prices of milk; to vary such prices according to districts and quantities; to control all methods of handling and treating milk; to regulate the number of milk stores; to divide and subdivide milk distribution areas; to license all dairyfarmers and milk vendors; to collect all licence fees; to confine individual licences to well defined areas; to determine chemical and bacteriological standards of milk; to inspect all premises, and to examine all books and utensils wherever milk was handled or stored; to compel the production of business statements from dairyfarmers or milk vendors; to prohibit the sale of milk thought to be unwholesome; to require dairymen and vendors to keep prescribed books; to collect samples of milk for examination; to fix the hours during which retail milk might be sold; to cancel licences; to act as a local authority under the Dairy, Health, and Food and Drugs Act.

The document from which the above data have been summarised was forwarded by the Chief Secretary for consideration by the Commission. In addition, representatives of the original deputationists, together with other individual country and metropolitan producers and milk vendors, appeared before the Commission and stressed the pressing difficulties that beset them in their respective callings. That your Commissioners have not been unsympathetic, and that they recognised the justice of many of the claims brought before them is amply evidenced by many of the recommendations already made, but they regret that they feel quite unable to support the creation of a board on the lines desired by the deputationists. It would be wrong to place the control of an article of diet like milk, so liable to mishandling and contamination, so apt to be a vehicle of disease, and yet so essential to every member of the community, in the hands of a board, the majority of whose members was immediately interested in its sale.

3. *Type of Board recommended by the Commission.*—In the above connection the practice almost universally adopted by shareholders of vesting control of large undertakings in selected directorates, has in many countries been extended to specialised State undertakings. When this is done the major lines of policy are indicated in enabling Acts, and Cabinet Ministers are relieved of the irksomeness, and sometimes of the political difficulties, that attach to repeated decisions on minor matters of policy which are outside the usual functions of Government. The relative success or failure of such undertakings usually depends on the appropriateness of appointments to the board of control; and the latter again is frequently dependent upon the methods of appointment adopted. In this connection it can be stated in principle that apart from the question of personal competence of members, board control of any national activity cannot be expected to succeed unless members of the board can be depended upon to sink sectional bias and to adopt policy decisions based upon their due merits rather than those of vested interests. It has been urged by representatives of milk producers and retail vendors that the majority of the members of the milk board should be elected by their own constituents, from which, however, wholesale distributors appear to have been overlooked. In the opinion of your Commissioners a board

so constituted would from the national standpoint be bound to fail, and for the reasons that follow: its members would be unable to sink sectional bias; in the clash of their conflicting interests deadlocks and waste of time would be common, and the interests of the community might be overlooked; nor would appointment by election be any guarantee of personal fitness and competence in individual members.

It is certain that the milk board's prime duty of controlling adequate supplies of wholesome milk at reasonable retail rates would be jeopardised if its members were elected by conflicting sectional interests. The importance of the transactions involved may be gauged by the fact that the retail value of milk used within this area is approximately £400,000 per annum. Hence, it is strongly urged that the haphazard method of electing members of the board by sectional interests would be contrary to the public interest, and it is recommended that the board be constituted as follows:—

The Director of Agriculture (*ex officio*)—Chairman.

The Chairman of the Central Board of Health (*ex officio*).

A representative of the Metropolitan County Board.

Two members appointed by Government after consultation with organisations representing producers, and wholesale and retail distributors.

It is also recommended that the staff required to carry out the policy of the board should form part of the Department of Agriculture with the Chief Dairy Instructor as chief executive officer on the inspectorial and technical sides.

In making the above recommendations, special consideration has been given to the following points:—

(1) The necessity that varying degrees of competence should be represented on the board in order to deal effectively with difficult technical questions that will frequently come up for consideration. Hence the recommendation that the Director of Agriculture and the Chairman of the Central Board of Health should both be members of the milk board.

(2) It was considered that a representative of the Metropolitan County Board would adequately represent consumers.

(3) It was considered that the recommendation that the staff of the milk board form a section of the Department of Agriculture would lead to a maximum of economy in working expenses and to a minimum of overlapping.

(4) It was considered that adequate technical efficiency in staff work would be ensured if inspectors were under the immediate control of the Chief Dairy Instructor. This should render possible occasional assistance from District Instructors acting as *ex officio* milk board inspectors.

(5) It was considered essential to the smooth functioning of the milk board's work that the Director of Agriculture should be chairman of the board. Under this arrangement the possibly conflicting claims of a dual allegiance would be avoided as the Director would be in a position to issue instructions to officers both as Director of Agriculture and as chairman of the board.

(6) It was considered that the two remaining members of the milk board need not necessarily have had personal experience of the industry or the distributing trade although, other things being equal, it was admitted that men with such experience should be given preference over others. It was thought essential that these members should be able to take a broad national view of questions coming up for decision and that they should not look upon themselves as representatives of any particular section of the industry. It is nevertheless recognised that the earlier functioning of the board would be all the easier if from the outset it could be assured of the confidence of all concerned; hence, this aspect of the question should receive consideration, but not at the expense of the efficiency of the board.

4. *Inspectorial Staff of the Milk Board.*—It is a common although erroneous and dangerous opinion when technical matters are at issue, that any person of average intelligence should be competent to act as an inspector; and it can be added that this opinion is particularly dangerous when milk is concerned. Milk, in the course of its brief existence, is more than any other foodstuff exposed to contamination at so many points, and is so frequently controlled by those who do not realise the dangers of contamination, that it can be taken for granted that for one instance of official detection there will be 10 or more that escape detection. It follows, therefore, that in order to mitigate the evil the function of an inspector should be not only to detect breaches of regulations, but in addition to render their future occurrence unlikely, by endeavoring to appeal to the mind of the offender, and explaining to him the adequate reasons that should be behind every regulation. Hence, some degree of training must be looked upon as essential to the efficiency of every inspector.

In Victoria the Dairy Supervision Act, 1928, requires "that dairy supervisors should have *bona fide* practical experience in dairy farming and allied branches of agriculture and amongst animals."

In addition, candidates for appointment are required to sit for written and oral examinations, and undergo practical tests at Abattoirs relative to diseases in livestock. Appendix V. gives an account of the syllabus of the subjects in which candidates are examined.

In New South Wales the qualifications required by the milk board from its Supervisors are said to be similar in most respects to the standards required of health inspectors to local governing bodies, namely:—

- (1) Certificate of the Royal Sanitary Institute of London; or
- (2) Full Health Inspector's certificate at Sydney Technical College; or
- (3) Certificate of the Royal Sanitary Institute of Scotland; or
- (4) Certificate of the Sanitary Inspectors' Joint Examination Board of London.

In addition to the above qualifications, supervisors to the Sydney Milk Board must have an adequate knowledge of livestock and their diseases.

In the circumstances, it is recommended that should legislation be introduced towards giving effect to the recommendations of this report the board should have power to determine the qualifications required.

It is realised that upon the appointment of a milk board, some of the present inspectors under the Metropolitan County Board may become redundant. In such circumstances, these redundant officers should receive, in the opinion of your Commissioners, first consideration in the appointment of inspectors under the new board, subject however to the condition that they must satisfy the board that they are sufficiently well equipped for the purpose.

5. *Financial Arrangements.*—The work to be carried out by the milk board would be for the special benefit of a section of the community only, namely, the consumers of the metropolitan county district and those mainly concerned in the production and distribution of the milk required by these consumers. It follows that the administrative and general costs of the board should not be a charge upon the public purse, but should be directly defrayed by those on whose behalf the work would have been done. Towards this end it is recommended that:—

(1) A special fund be created to meet the expenses of the board, into which shall be paid all licence fees, fines, &c., together with a special contribution from the Metropolitan County Board of £2,000 per annum, increasing *pro rata* to increase in population of the Metropolitan County District.

(2) The first year or two's expenditure be met by means of a loan from the Treasury, repayable at interest within a reasonable period of years.

In support of the above recommendations it can be said that under the changed conditions that would obtain, should the general scheme outlined herein be adopted, the charges made for licence fees could be considerably increased without injury to anybody concerned. The progressive reduction in the numbers of licensed producers and of licensed vendors respectively should alone justify such increases. Indeed, many witnesses who appeared before the Commission advocated increases in licence fees as one of the measures that would help them out of their difficulties. On the other hand, under the scheme that is recommended, the Metropolitan County Board would be completely relieved of the control of the milk supply of the metropolitan area. The Commission was informed that the revenue of the board varied from £5,000 to £6,000 per annum, and that the greater portion of the time of its inspectors was concerned with milk. Hence, a metropolitan contribution of £2,000 per annum, increasing *pro rata* to increase in the population of the Metropolitan County District, is deemed a reasonable contribution of consumers of that area towards costs of improvements in their milk supply.

6. *Powers of the Milk Board.*—The extent of the chief powers of the board should be as follows:—

- (1) To issue licences for such purposes and subject to such conditions as it deems fit and proper.
- (2) To fix any fees by notice published in the *Government Gazette*.
- (3) To employ inspectors subject to the Public Service Act.
- (4) To take over the functions of the Central and Local Boards of Health and of the Department of Agriculture in controlling the production and distribution of milk in the Metropolitan County District.
- (5) To fix wholesale and retail prices of milk.
- (6) To regulate the milk supply of the metropolitan area.

J. RECOMMENDATIONS AS TO THE CONTROL OF THE MILK SUPPLY OF THE METROPOLITAN COUNTY DISTRICT.

I. A Controlling Metropolitan Milk Board.

It is recommended that special legislation be introduced to provide—

Recommendation 1.—That control over milk intended for human consumption in the Metropolitan County District shall be vested in a milk board with plenary jurisdiction over the farms upon which such milk would be produced, and over the milk itself from the farm to the consumer's door.

Recommendation 2.—That this milk board shall be constituted as follows:—

- (a) Director of Agriculture (*ex officio*), Chairman.
- (b) Chairman of the Central Board of Health (*ex officio*), member.
- (c) A representative of the Metropolitan County Board.
- (d) Two members selected and appointed by the Minister of Agriculture after consultation with representative associations of the dairy industry in all its phases.

Recommendation 3.—That a special fund shall be created to meet the expenses of the board, into which should be paid all licence fees, fines, &c., together with a special contribution from the Metropolitan County Board of £2,000 per annum, increasing *pro rata* to increase in population of the Metropolitan County District.

Recommendation 4.—That during the opening years—probably one or two years—the board's expenditure shall be met by means of a loan from the Treasury, repayable at interest within a reasonable period of years.

Recommendation 5.—That licensing fees shall be reviewed by the board and raised sufficiently to meet the board's expenditure concurrently with the Metropolitan County Board's contribution.

Recommendation 6.—That in the matter of vendors, licence fees shall be based upon the number of carts in use.

Recommendation 7.—That on the technical side the Chief Dairy Instructor in the Department of Agriculture shall be chief executive officer of the board, and that all District Dairy Instructors shall be *ex officio* inspectors of the board, but that their services shall be called upon in cases of emergency only.

Recommendation 8.—That the milk board shall take early steps towards determining what shall be the qualifications of an inspector under the board, and what measures shall be adopted to ascertain the fitness of applicants.

Recommendation 9.—That inspectors at present in the employ of the Metropolitan County Board, but who may become redundant when the milk board begins to function, may apply for appointment under the milk board on presentation of a clean discharge, and such application shall be accepted by the Public Service Commissioner, with the assent of the milk board, and subject to the certificate of its chief executive officer, to the effect that in the latter's opinion the applicants appear to be competent to carry out the duties of their office. All such appointments, however, shall be probationary in character only, in conformity with the current rule of new Public Service appointments.

II. Deduction of Metropolitan Milk Vendors to an Economic Number.

It is recommended—

Recommendation 10.—That subject to due protection of consumers' rights and requirements, the board shall take steps that will bring about a natural reduction of metropolitan milk vendors and increase in the mean delivery of individual rounds, and towards this end the following measures are recommended:

(a) Refusal to issue new licences until such time as metropolitan requirements should appear to render such issue desirable.

(b) Encouragement of legitimate vendors to buy out redundant vendors, and refusal to transfer licences to any but established vendors, excepting heirs or members of the licensee's family: Provided that such action shall cease as soon as the board is satisfied that the vendors have been sufficiently reduced.

(c) Encouragement of concentration of milk round by exchanges or sales.

(d) Insistence on scrupulous attention to hygiene and sanitation with a view to improvement of the milk supply and the gradual elimination of those unwilling or unable to comply with the milk board's requirements.

(e) Insistence on a buildings and appliances minimum for every vendor.

(f) Strict definition of a milk vehicle. Insistence of the presence on such vehicle in large letters of the owner's name, his residence, and the number of his licence.

(g) Stipulation that milk shops shall be limited to the sale of pasteurised milk bottled by licensed bottlers only.

(h) Refusal to recognise any licences issued after the first publication of this report.

(i) Abolition of the afternoon milk delivery.

(j) Power to refuse to issue licences if the board considered it not in the public interest to do so.

(k) Separate licensing of vendor on the one hand, and his premises on the other.

III. Adjustment between Metropolitan and Country Supplies of Milk, and Control of Pressure of Surplus Country Milk.

It is recommended—

Recommendation 11.—That with due regard to metropolitan milk requirements the board shall have power to determine:—

(a) That no dairy farm, whether situated in the country or in the Metropolitan County District, shall be allowed to supply milk for human consumption within the metropolitan area, unless specially licensed by the board so to do; and that

such licences shall be obligatory whether the milk be delivered directly to consumers or to vendors or to large wholesale firms for subsequent delivery to consumers.

(b) That such licences shall show, among other things, the name and situation of the farm concerned, the names and address of the licensee and the maximum number of cows the owner is allowed to carry under such licence; provided that such maxima on licensed farms may be varied on yearly renewal of the licences at the request of the licensees and with the consent of the board.

(c) That farm licences shall be refused unless the board were satisfied that the area used by the cowkeeper was adequate to the upkeep of the number of cows the latter proposed keeping; and in any circumstances, should the board decide that the land in question was situated within a well-defined residential area.

(d) That milk from licensed country dairy farms shall be adequately cooled immediately after being drawn from the cows, and shall not reach pasteurising depots at temperatures in excess of a minimum to be prescribed; provided that such milk may be sold as untreated milk if it reach its metropolitan destination at temperatures not higher than 40 degrees Fahrenheit, be immediately placed in refrigerators, and kept there until required for distribution.

(e) That all pasteurising depots handling household milk for distribution by their employees, or through the medium of vendors, shall be specially licensed for the purpose and shall receive milk from licensed dairy farms only; that such depots shall keep such records as the board may prescribe, and that their books and premises shall at all times be open to inspection by the board's officers.

(f) That with a view to spreading the advantages of the metropolitan price of milk over as wide a field as is economically possible, and at the same time providing ample means for meeting metropolitan probable requirements in months of low production, the quantities of milk sold by licensed country producers to pasteurising depots for human consumption shall in each case be limited to a fixed weekly quantity to be indicated upon the licence certificate of the supplier; and that such quantity shall not be exceeded except with the consent of the board.

(g) That on assuming authority, the board shall take immediate steps to ascertain the names of all cowkeepers, who in the 12 months immediately preceding publication of this report have been supplying the metropolitan area with milk, and of the weekly quantities of milk supplied by each cowkeeper. The board shall register the names of all such cowkeepers, and if so desired shall issue to them temporary permits to continue the supply of corresponding quantities of milk from their own farms for a period of six consecutive months. And all such cowkeepers shall pay to the board the value of one-half of the prescribed licence fees. At the end of these six months all those cowkeepers who are unable to comply with the requirements of the board shall be licensed as metropolitan suppliers, but those who are unable to do so will be refused a licence, unless good cause can be shown that they will be able to comply with these requirements within not more than three months from the expiry of the probationary six months.

(h) That purchasing pasteurising depots shall pay for the milk quota intended for human consumption at the metropolitan wholesale price prescribed by the board.

(i) That during a reasonable period pasteurising depots shall not sell or distribute for human consumption more than the aggregate quantity of milk they were licensed to receive for human consumption, and did receive and pay for at the prescribed metropolitan price during the currency of the same period and that adequate penalties be prescribed for any infringement of this regulation.

(j) That the board shall take early steps towards reviewing existing Board of Health regulations concerning milk, and in consultation with the health

authorities and the Department of Agriculture, agree upon such amendments and additions as may appear necessary to effective control of hygiene and sanitation on all licensed dairy farms, wherever situated, in licensed pasteurising depots, on the premises and conveyances of licensed vendors, and in all shops in which milk was sold.

(k) That in order to overcome the apparent lack of knowledge of the majority of those who usually handle milk, officers of the Department of Agriculture be asked to issue a printed statement setting out in detail the dangers to which milk is exposed from the time it leaves the cow's udder to the time it reaches the consumer; together with a description of the most approved methods of avoiding these dangers, and of rendering possible the delivery of the milk to the consumer in wholesome and sound condition.

IV. Measures of Price Control.

It is recommended—

Recommendation 12.—That in order to ensure to licensed country producers a reasonable price for milk, and to enable them to comply adequately with the board's hygienic and sanitary conditions, the board shall prescribe from time to time what shall be the minimum price payable for wholesale milk delivered in Adelaide and intended for human consumption, and corresponding parities at country pasteurising or receiving depots.

Recommendation 13.—That in order to assist towards the sale of household milk on a "quality" basis it shall be paid for on measured weights and on the basis of 4 per cent. butterfat, that is to say, that milk with a lower test will be paid for proportionally less, and milk with a higher test proportionally more.

Recommendation 14.—That in order to protect consumers against possible exploitation by vendors in combination, the board shall have power to prescribe, if necessary, a maximum retail price for milk delivered on the premises of consumers, and such maximum retail price shall correspond with the minimum wholesale price on a ratio to be determined.

V. Miscellaneous Recommendations.

It is recommended—

Recommendation 15.—That the board shall take steps to see that pasteurised milk shall be bottled in such a manner and under such conditions that purchasers of the same shall have the assurance that they are purchasing a sound natural product, free from contamination of any kind. Towards this end it is recommended—

(a) That no firm or individual shall be allowed to bottle milk for sale in the metropolitan area unless specially licensed to do so by the board.

(b) That such licences shall not be granted indiscriminately, but only to such as the board is satisfied are both willing and able to conform to the board's regulations on the subject.

(c) That such regulations shall prescribe, among other things, the bacterial count and sediment percentage of the milk to be bottled; the conditions under which it shall be pasteurised, chilled, and bottled; the maximum temperature at which the bottles shall be kept until delivered to the consumer; the type of bottle and distinctive brand to be used; and the marking of the capsule with the date of bottling in ink.

(d) That the proprietary rights of the bottler in his bottles should be given legal recognition and adequate protection against misuse.

(e) That neglect to comply both in the spirit and the letter to the board's regulations on the subject should render the offender liable to cancellation of his licence.

Recommendation 16.—That no cowkeeper, whether situated in the country or in the Metropolitan County District, shall make use of milking machines for drawing milk intended for human consumption unless specially licensed for the purpose by the milk board; that regulations shall be prepared indicating in detail precautions to be taken in the use of these machines; that cancellation of licence may follow any breach of such regulations: provided that a licence to use a milking machine may be refused by the board if it judges the applicant not to be a fit and proper person to use such a machine.

Recommendation 17.—That the standards prescribed by the Board of Health relatively to the composition and wholesomeness of milk intended for human consumption be reviewed, and, if thought advisable, extended on the lines suggested in this report.

Recommendation 18.—That the practice of collecting samples of milk intended for human consumption on farms, at pasteurising depots, and on vendors' carts for analysis and bacterial examination be made an essential part of all inspectorial work. Towards this end it is recommended for consideration—

(a) That the whole of the time of one inspector shall be devoted to this work.

(b) That special arrangements shall be made for adequate analysis and bacterial examination.

(c) That the results of such analyses and examinations with appropriate comments thereon shall be published regularly in the board's yearly reports.

Recommendation 19.—That the Act providing for the control of the metropolitan milk supply by a milk board shall empower the board to establish at opportune time "grades" of milk, and, among others, grade "A" milk which shall be the raw, untreated, milk from regularly tuberculin-tested herds, handled under strictest supervision and bottled on the farm. Towards this end it is recommended—

(a) That the board shall prepare very strict regulations on the subject, setting out in close detail the procedure to be followed in producing and handling grade "A" milk, and the standards to which it must conform.

(b) That dairyfarmers desirous of producing and selling grade "A" milk shall be specially licensed for the purpose after searching inquiry by the board into their personal fitness and the suitability of their premises for the purpose.

(c) That such licences shall not be transferable on sale or lease of the farm, or on death of the licensee, except with the consent of the board.

(d) That the licence fee shall be such as adequately to recoup the board for costs of special supervision.

Recommendation 20.—That power be given to the board to make such provision as it thinks fit for the control of blending and standardising of milk which is intended for human consumption.

DISSENT.

I dissent from the Commission's non-committal majority recommendation relative to the artificial standardisation of milk. I hold milk to be a natural and not a manufactured product from which nothing can be taken and nothing added. I believe, too, that human nature, being what it is, it is extremely dangerous to place in the hands of all and sundry the power to tamper with the composition of milk. I am strongly of the opinion that not only should artificial standardisation be discountenanced, but, in addition, that vigorous measures should be adopted with a view to stamping out the practice.

ARTHUR J. PERKINS.

(To be continued.)

[The Commission's report on the butter position will appear in the next issue.
—Ed.]

FRUIT CROP PROSPECTS IN SOUTH AUSTRALIA.

[Compiled on December 20th, 1933, by GEO. QUINN, Chief Horticultural Instructor.]

Apples.—The present season should have been a year of heavy crop in South Australia. The promise for a good all round yield was present in all districts up till the setting period when widespread but singularly patchy frosts occurred in most of the districts. The orchards which suffered have lost the great bulk of the crop, but those which missed the October frosts have an exceptionally fine showing, more particularly of the three leading export varieties, viz.:—Cleopatra, Jonathan, and Dunn's Seedling. The fruit is growing well, and up to the present is remarkably free from Black Spot fungus and Codlin Moth. It is somewhat premature to estimate the damage the latter may yet do, but generally, when November is passed in this State, and the fruit remains fairly free from Black Spot, the danger period has mostly been left behind. Unless something unusual occurs between now and harvest time this State should gather well over a million bushels of apples, and there should be no difficulty in filling the export quota suggested for the State at the Apple and Pear Export Council's meeting in November.

Pears.—The district reports indicate a somewhat light crop in most varieties, the Williams' Bon Chretien or "Duchess"—as it is locally termed—having the best showing. Frosts interfered with this fruit also. As the canners at present do not appear to be looking for the Williams' pears, no doubt an effort will be made to ship a good many thousands of cases to Europe.

Apricots.—In the valley of the Murray the crop is somewhat below average, and in the Barossa apricot orchards a magnificent showing has in many orchards been almost totally destroyed by the October frosts. The crop is good where no frosts occurred, but the aggregate for the State must result in only a medium yield, or 70 per cent. of the normal. The fruit which escaped frost is remarkably clean and well developed.

Cherries.—This fruit is not grown over a wide area in this State, but is usually of excellent quality. The harvesting season is now well advanced and the crop has proved an abundant one for nearly all varieties, the earlier softer kinds selling at ridiculously low prices. Owing to the absence of rainy and humid weather, little or no splitting, and rotting occurred this year.

Nectarines and Peaches.—The former are good, whilst the latter are showing from fair to good. The peaches grown are chiefly of dessert or drying freestone sorts, but a good sprinkling of trees of the better type of clingstones for canning purposes is coming into bearing.

Plums and Prunes.—The promise at blossoming time indicated good crops, but the ill effects of the frosts in most localities resulted in only very moderate yields now showing on the trees in all but a few favored spots. The prune crop on the whole will be a meagre one.

Citrus Fruits.—*Lemons* are showing for only a fair crop of winter main crop fruit. *Oranges* in most plantations and districts seem to have shed the newly formed fruits rather more freely than usual. It is still a trifle early to estimate the coming year's yields, but when the final drop has ceased, it is confidently believed quite a fair crop will be found on a majority of the trees. It is now recognised that the improved soil management and manuring methods which are being more widely adopted have a tendency to mitigate the heavy sheddings which formerly left the trees with scanty yields when the oranges reached maturity.

Figs.—In the Murray Valley the quantity of Smyrna drying figs is slowly increasing and the crop promises well. In the coastal areas where figs are widely grown for dessert and jam making, the trees are showing good promise for average crops.

Almonds.—There has been more activity in planting almond trees in this State during the past three or four years than for a long period. There has also been more interest displayed in attending to the older trees which have reached a bearing age, with the result that the yields are beginning to become more regular. This season there is from a medium to an average good promise of a crop in the various districts.

Walnuts.—The propagation of grafted trees of well proved named sorts has aroused new interest in this product, and many more trees have been planted, some of which are now coming into their first fruitings. At present the crops obtained are from the older irregular seedling sorts, and much of the fruit is destroyed each year by the Bacteriosis of the Walnut. The present promise is for a fair crop.

Quinces.—This much—but wrongly—despised fruit is grown almost without any attention, being usually planted alongside water courses in the hilly country. In consequence, the cropping is erratic, but seldom do the trees fail to yield more than the State's requirements. Reports indicate that a good yield is promising at present.

Grapes (drying sorts).—*Currants:* Excepting in parts of the coastal areas around Clare and in the Nuriootpa-Tanunda area where spring frosts devastated much of the vine growing acreage, this fruit is promising good yields. These losses, however, must seriously reduce the aggregate output of dried currants in South Australia in the coming harvest period. *Sultanas:* These are only a commercial success in the Murray Valley irrigated lands. The promise there is stated to be for a good average crop, but lighter than that of last season. A good deal of shedding of the newly set berries has occurred, but this will probably improve the size of the sample of fruit which remains on the bunches. *Gordos:* These are stated as showing for a crop above the average in the irrigated areas where they are more largely grown.

Wine Grapes.—In many areas in the Clare and Barossa districts the spring frosts decimated the grape crop, but in the central and southern and Murray Valley districts, the vines escaped serious injury. Taken on the whole, it is considered that the tonnage available this coming season must prove to be much below that of last season. Some of the heavier cropping sorts, such as the Doradillo, are not showing up for an average yield.

Bush and Small Fruits.—*Bush Currants:* The Black Currant is very sparsely grown in this State, but Red Currants are produced in sufficient quantities to meet domestic needs. The crop this season promises to fulfil this purpose. *Gooseberries* are stated to be cropping in from fair to good quantities sufficient for local requirements. *Strawberries:* Notwithstanding a long dry spell from the flowering onwards, the cool spring and early summer weather helped this crop, which is proving an excellent one. *Raspberries,* like Black Currants, are only produced in sufficient quantities to meet local needs. The crop this season is good. *Loganberries:* The blossoms on these plants were severely affected by the spring frosts in the principal districts, and the crops are poor.

Miscellaneous Fruits.—*Persimmons:* These are grown rather in excess of the local demand. Last season produced a heavy crop, the present promise is for only a fair return. *Tomatoes:* The glasshouse grown crops have been abundant during the season now drawing to a close. From reports received it appears the demand has been quite well maintained in interstate markets, but doubtlessly the competition from Western Australian fruit grown outdoors around Geraldton and shipped as deck cargo to Melbourne has kept prices down in that market over a portion of the ripening season of the Adelaide glasshouse grown tomatoes. The South Australian glasshouse tomato growers are exploring all the avenues in which reductions in cost, improvement of transport, and improved quality of the product may be achieved, and will not lightly yield to competitors in those markets which are lying closest to their doors.

SEED WHEAT FROM CROP COMPETITIONS.

In Wheat Competitions conducted in the undermentioned districts the following competitors exhibited crops which, in the opinion of the judge at the time of inspection, should produce grain suitable for seed purposes:—

Competition. Competitor. Address. Variety.

NORTHERN YORKE PENINSULA—

L. G. Northey, Kadina—Sword.
C. Rodda, Thrington—Sword.
F. P. Price, Paskeville—Sword.
G. E. Meier, Paskeville—Sword and King's White.
R. M. Yelland, Cunliffe—Daphne.
G. E. Rodda, Thrington—Sword.
R. S. Bussenschutt, Paskeville—Sword.
E. L. Yelland, Cunliffe—Waratah.
Yelland Bros., Cunliffe—Sword.

CENTRAL—

T. W. Day, Reeves Plain—Sword.
E. W. Day, Reeves Plain—Sword.
L. W. George, Wasleys—Sword and Ford.
R. Perry, Wasleys—Sword.
R. L. Lines, Wasleys—Sword.
C. R. and R. P. Currie, Wasleys—Sword.
W. K. Oliver, Wasleys—Nabawa.
A. M. Dawkins, Angle Vale—Nabaw.
A. W. Roediger, Gawler—Sword.
J. H. Dawkins, Gawler River—Sword.

BALAKLAVA—

J. D. Campbell, Baraba—Sword and Ford.
Harkness Bros., Owen—Sword.
J. A. Campbell, Stockyard Creek—Sword and Ford.
D. J. Wilson, Stockyard Creek—Ford.
L. C. Mills, Balaklava—Sword.
R. P. Anderson, Halbury—Sword.

*ALFRED—

A. C. Webb, Paruna—Ranee 4H, Sword.
A. A. Patterson, Paruna—Sultan.
E. M. Edwards, Paruna—Ranee 4H.
A. A. Marsh, Meribah—Sword.
W. Paull & Sons, Alawoona—Nabawa.

*ALBERT—

G. H. Sutherland, Copeville—Canberra.

BUXTON—

E. J. Beinke, Kimba—Waratah.
F. Newman, Kimba—Sword.
C. G. and G. W. Cant, Kimba—Sword.

JERVOIS—

D. C. McCallum, Rudall—Waratah.
J. C. Kobelt & Son, Darke's Peak—Waratah.

WESTERN—

L. O. Roberts, Port Pirie—Currawa.

LE HUNTE—

W. P. Bartley, Wudinna—Nabawa.

MID-NORTHERN—

A. Maitland, Rochester—Nabawa.
F. J. Pedler, Koolunga—Ranee, Sword, Carmichael's Eclipse, Mogul
Button Bros., Koolunga—Aussie, Ford, Nabawa.
H. S. and O. S. Freeman, Koolunga—Sword.
P. J. Saunders, Hoyleton—Sword.
Chapman Bros., Hoyleton—Sword, Ford.
Jas. Hay, Yacka—Sword.
J. and D. Teakle, Gulnare—Sword.
Higgins Bros., Georgetown—Free Gallipoli.
M. Smart and Sons, Gulnare—Sword.

Competition. Competitor. Address. Variety.

NORTHERN—

W. F. Wurst, Laura—Nabawa.
 W. D. Pearce, Gladstone—Sword.
 J. W. Prior, Gladstone—Nabawa.
 R. A. Bundle, Gladstone—Ford, Sword.
 H. C. Jaeschke, Wirrabara—Nabawa.
 W. M. Neate, Caltowie—Sword.
 F. H. Symonds, Caltowie—Sword.
 W. H. Adams and Sons, Caltowie—Sword, Waratah.
 Blessing Bros., Gladstone—Nabawa.
 W. S. Bennett, Gladstone—Ford.

FAR NORTH—

T. F. Orrock, Wepowie—Ranee 4H.
 J. G. Crocker, Wepowie—Ranee.
 W. G. Gregurke, Wepowie—Felix.
 D. J. Crocker, Box 56, Orroroo—Ranee.
 E. H. Hampel, Terka—Onas.

*CHANDOS—

A. J. Beelitz, Parrakie—Waratah.
 C. and L. Fischer, Pinnaroo—Robin.
 H. S. Angel, Pinnaroo—Robin.
 L. M. Symon, Pinnaroo—Ranee 4H.
 H. L. Badman, Pinnaroo—Sword.
 Young and Blacksell, Pinnaroo—Ranee 4H.
 Young and McInerney, Pinnaroo—Waratah.
 J. H. and C. H. Spratt, Lameroo—Gallipoli.
 A. J. A. Koch, Lameroo—Bencubbin.
 C. E. Koch, Lameroo—Sultan.
 J. L. Koch, Lameroo—Waratah.

MID-YORKE PENINSULA—

G. F. Pearce, Maitland—Ford.
 S. Heinrich, South Kilkerran—Gerralying.
 H. C. Schrapel, South Kilkerran—Ford.
 O. H. Heinrich, South Kilkerran—Ford.
 J. S. Henderson, Artherton—Ford.

SOUTHERN—

C. Brook, Woodchester—Nugget.
 J. M. Hudd, Hartley—Waratah.
 J. F. C. Paech, Callington—Nabawa.
 C. F. Altmann, Monarto South—Nabawa.
 E. E. Liebelt, Monarto South—Nabawa.
 L. M. Thiele, Monarto—Nabawa.
 Frahn Bros., Monarto—Nabawa.
 E., T., and L. Jaensch, Hartley—Nabawa, Bencubbin.
 A. B. Jaensch, Hartley—Nabawa.

MIDLAND DISTRICT—

F. D. Lake, Owen—Sword and Nabawa.
 W. H. Brown, Alma—Sword and Waratah.
 P. McD. Smyth, Salter's Springs—Sword and Ford.
 D. L. Clarke, Tarlee—Sword.
 A. T. Hill, Tarlee—Sword.
 G. Hazel, Kapunda—Gallipoli, Nugget, Ranee, and Ranee 4H.
 W. Parham, Hamilton—Nugget.
 Reg. Durdin, Buchanan—Sword.
 W. R. Durdin, Buchanan—Sword.
 W. Armstrong, Buchanan—Sword.
 L. V. Bell, Marrabel—Ranee and Clarence.
 L. J. Harvey, Hilltown—Turvey and Dan.
 J. Ross, Mintaro—Waratah and Gallipoli.
 R. and L. Blatchford, Mintaro—Sword.
 G. W. Woods, Mintaro—Gallipoli.
 A. S. Woods, Mintaro—Waratah.
 H. Schunke, Manoora—Gallipoli and Waratah.
 M. E. Glynn, Riverton—Sword.

MIDLAND DISTRICT—continued—

Competition. Competitor. Address. Variety.

C. H. J. Behn, Riverton—Ranee, Waratah, Florence, and Baringa.
 E. W. Williams, Tothill's Creek—Ranee and Gallipoli.
 F. Mahoney, Farrell's Flat—Clarence.
 G. Miller, Farrell's Flat—Bena.
 L. Martin, Farrell's Flat—Mogul and Sword.
 A. E. Crossing, Farrell's Flat—Gallipoli.
 S. Garrard, Farrell's Flat—Gallipoli.
 F. Coleman, Saddleworth—Nabawa, Waratah, Tuela x Ford, and Gallipoli.

FLINDERS—

R. Kain, Yeelanna—Waratah, Gallipoli.
 W. Watkins—Ford.

TATIARA—

Fisher Bros., Bordertown—Ranee and Gallipoli.
 H. C. M. Pilgrim, Wolseley—Gallipoli.
 E. J. Buckley, Bordertown—Gallipoli.
 J. Gall, Wolseley—Gallipoli.
 S. Pitcher, Bordertown—Ranee.
 W. Gill, Keith—Gallipoli.
 F. B. Milne, Bordertown—Gallipoli and Sword.
 R. H. Grosser, Wolseley—Gallipoli.
 D. R. Milne, Bordertown—Gallipoli.

*Owing to the quick ripening of the crops in these districts the judge states that grading will be necessary in these seed wheat crops to eliminate pinched grain.

OATS.

Mr. E. L. Orchard advises that he inspected oat crops on the farm of Mr. F. J. Pedler, Koolunga, and reported that crops of Guyra and Mulga oats were suitable for seed.

MIDLAND DISTRICT—

G. Hazel, Kapunda—Palestine.
 C. H. J. Behn, Riverton—Calcutta Cape and Imbros Island.
 F. Coleman, Saddleworth—Calcutta Cape.

NARRUNG HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR NOVEMBER, 1933.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during Nov.	Per Cow during Nov.	Per Cow October to Nov.	Per Herd during Nov.	Per Cow during Nov.	Per Cow October to Nov.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
5/C ..	33	31.40	21,561	653.36	1,384.90	1,133.03	34.33	70.73	5.25
5/D ..	34	32.83	19,652½	578.01	1,289.19	1,078.85	31.73	71.01	5.49
5/E ..	38	31.70	18,810	495.00	1,183.73	1,019.20	26.82	63.15	5.42
5/P ..	34-37	31.43	25,762½	749.40	1,563.37	1,204.91	35.04	73.77	4.67
5/B ..	62-53	60.07	32,339	517.23	1,110.87	1,280.68	20.48	45.05	3.96
5/S ..	13	13	6,810	523.84	1,338.18	335.60	25.82	64.25	4.93
5/E ..	17	17	12,015	706.76	1,503.79	610.42	35.91	73.66	5.08
5/G ..	19	14.73	7,080½	372.66	838.55	343.96	18.10	40.18	4.86
5/K ..	20	14.93	11,371	568.55	1,327.99	522.18	26.11	60.99	4.59
5/N ..	15-23	15.10	9,437	619.63	1,411.16	445.00	29.22	69.60	4.72
5/Q ..	16	13.60	8,031	501.94	1,109.35	431.47	26.97	56.39	5.37
5/B ..	21	18.17	8,394½	399.74	933.52	500.22	23.82	52.70	5.96
5/S ..	17	17	8,670	510.00	1,114.50	413.36	24.32	51.62	4.77
5/T ..	12	12	8,850	737.50	1,698.29	418.93	34.91	83.38	4.73
5/V ..	14	14	8,475	605.36	1,337.18	377.15	26.94	58.70	4.45
5/W ..	23	21.37	10,703½	465.37	1,103.56	507.95	22.08	51.93	4.75
5/X ..	17	17	10,050	591.18	1,313.80	501.23	29.48	63.93	4.99
5/Y ..	14	12.87	5,612	400.86	974.61	273.29	19.52	48.94	4.67
5/Z ..	30	28.37	21,847	728.23	—	753.00	25.10	—	3.45
5/AAA ..	19	17.20	8,643	454.89	—	416.81	21.94	—	4.82
5/BBB ..	17	16.63	8,759½	515.26	—	432.45	25.44	—	4.94
Means	23-15	21.46	12,994.00	561.32	1,237.25	619.03	26.74	59.36	4.76

LAKE ALBERT HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR NOVEMBER, 1933.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during Nov.	Per Cow during Nov.	Per Cow December to Nov.	Per Herd during Nov.	Per Cow during Nov.	Per Cow December to Nov.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
6/B ..	19-93	18-97	12,642	634-32	6,413-40	645-09	32-37	293-18	5-10
6/C ..	21-97	18-13	15,352	698-77	6,668-51	653-01	29-72	290-10	4-25
6/E ..	24	23	19,425	809-37	8,654-35	928-99	38-71	436-26	4-78
6/H ..	27-80	26-80	20,533½	738-61	7,592-37	1,029-31	37-03	367-57	5-01
6/Y ..	11-97	9-97	7,001½	584-92	4,853-55	273-69	22-86	206-90	3-91
6/I ..	28-23	19-43	19,523	702-19	7,222-14	883-62	31-75	312-32	4-56
6/LL ..	25-90	22-47	13,728½	723-11	6,934-72	742-77	28-68	266-07	3-97
6/Oo	20-33	18-47	13,601	914-95	8,970-50	774-64	38-10	393-58	4-16
6/PP ..	11-53	11	8,517½	738-72	6,505-78	427-07	37-04	350-08	5-01
6/QQ ..	22	18	19,380	880-91	8,791-88	800-31	36-38	377-41	4-13
6/RR ..	30	26-20	30,463	1,000-03	8,678-97	1,265-65	41-60	363-72	4-15
6/TT ..	21-53	15-60	15,350	712-95	7,139-99	675-73	31-39	316-92	4-40
6/VV ..	25-43	25	27,105	1,065-87	9,177-02	1,120-72	44-07	414-03	4-13
6/XX ..	24-90	19-83	19,133½	768-41	7,442-20	802-62	32-23	314-66	4-19
6/YY ..	28	20-73	15,066½	538-09	5,487-20	671-70	23-99	297-59	4-46
6/ZZ ..	28	23-40	20,106	718-07	7,035-27	920-41	32-67	324-12	4-58
6/BBB	28-43	23-13	21,588	758-71	7,914-59	886-28	31-14	323-42	4-10
6/CCC	21-83	18-07	16,177	741-04	6,940-40	630-16	23-87	234-45	3-90
6/DDD	25	22	19,080	763-20	7,550-60	792-76	31-71	329-31	4-15
6/EEE	27-37	23-93	25,362½	926-65	10,100-59	993-28	36-29	409-18	3-92
6/FFF	31-13	30-47	28,974½	934-39	8,637-09	1,169-77	37-73	358-92	4-04
6/GGG	22-93	19-17	15,525½	677-08	9,509-21	641-34	27-97	376-50	4-13
Means	24-01	20-63	18,797-26	782-90	7,610-32	805-86	33-56	333-38	4-29

THE HILLS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR NOVEMBER, 1933.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during Nov.	Per Cow during Nov.	Per Cow July to Nov.	Per Herd during Nov.	Per Cow during Nov.	Per Cow July to Nov.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
7/E ..	28	20-80	20,923	747-25	2,534-07	700-59	27-16	101-09	3-64
7/H ..	7-63	5-63	4,888½	640-69	2,712-30	222-28	29-13	126-25	4-55
7/K ..	15-20	13-10	12,721½	836-94	3,619-62	470-36	30-94	138-26	3-70
7/L ..	34-40	27-63	21,229	617-12	2,786-26	987-90	28-72	132-91	4-65
7/P ..	25	24-53	18,555	742-20	3,794-73	846-28	33-85	176-79	4-56
7/T ..	16-90	12-47	9,266	548-28	2,097-54	381-10	22-55	91-30	4-11
7/Y ..	24-20	21-60	18,680½	771-92	2,981-05	779-95	32-23	130-59	4-18
7/AA ..	14	14	9,963	711-64	2,732-64	404-35	28-88	115-60	4-06
7/KK ..	21-27	17-73	20,208	950-07	3,912-57	782-08	36-77	169-48	3-87
7/MM ..	40	37-67	33,311	832-78	3,887-98	1,255-97	31-40	146-72	3-77
7/PP ..	20	16-17	14,325½	716-28	2,998-67	710-70	35-54	157-72	4-96
7/TT ..	20-07	18-17	15,556	780-06	3,272-94	638-84	31-83	137-62	4-08
7/UD ..	20-87	16-20	12,214½	585-26	2,056-95	601-11	28-80	95-98	4-92
7/VV ..	16	15	15,060	941-25	4,014-58	681-04	42-67	183-50	4-52
7/XX ..	19-07	14-50	13,759	721-49	3,242-80	719-67	37-74	169-09	5-23
7/YY ..	24-60	17-63	9,223	376-45	1,843-02	357-70	15-82	81-41	4-20
7/BBB	68-40	59-30	35,504½	519-07	3,009-71	1,543-06	22-56	136-03	4-35
7/CCC	20	19	13,995	699-75	3,057-44	582-34	29-12	138-49	4-16
7/DDD	12-90	12-90	9,004½	693-02	3,199-88	427-68	33-15	149-96	4-75
7/EEE	11	9-80	5,772	524-72	2,369-33	249-77	22-71	114-63	4-38
7/FFF	20-13	19-43	12,910	641-33	1,388-26	575-82	28-60	62-27	4-46
7/GGG	16	15-07	8,535	535-44	—	399-34	24-96	—	4-63
Means	22-52	19-50	15,259-80	677-45	3,054-17	654-90	29-08	135-43	4-29

WHEAT CROSSES AT ROSEWORTHY COLLEGE.

In a recent report to the Chairman of the Governing Council of Roseworthy Agricultural College, the Principal (Dr. A. R. Callaghan) stated that the 1933 programme of wheat crossing commenced on September 29th. Weather conditions on the whole were favorable, but the material available was not as complete as was desired.

The main objectives kept in mind in planning the crosses were, in order of importance:—

1. Improvement in the baking quality of commercial Australian wheats.
2. Increasing disease resistance of commercial varieties, thereby increasing yield.
3. Breeding for short strong straw.
4. Breeding for improved holding capacity in varieties which show a tendency to shatter.
5. To increase size and fullness of head and fill sterile spikelets.
6. Breeding for drought resistance.

Generally speaking, popular varieties were used in all crosses, though in a few instances, non-commercial varieties were used as the male parent with a special motive.

Under the column headed "Objective," the improvement to the female parent only is considered. For example, in the cross Nabawa x Florence, the objective is to obtain a wheat similar to Nabawa in performance but with the quality and bunt immunity of Florence. Such a wheat would therefore be resistant to Flaxsmut and have high yield.

The salient objectives only are mentioned. The main objective in the cross Gallipoli x Sword 4 x Dundee is baking quality, but it should also be possible to obtain a wheat from this cross with the resistance to disease and straw strength of Dundee.



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The following successful crosses were made.

Female Parent.	Male Parent.	Objective.
Ford	Dan	To increase flagsmut resistance of Ford and improve head.
Ford	Dundee	Combination of two wheats of moderately high quality and good disease resistance in an endeavor to combine complementary factors if such exist.
Ford	Baringa	To improve holding capacity of Ford and to strengthen straw.
Ford	Forel	To improve baking quality of Ford.
Ford	Heiti (D)	A wide cross made in an endeavor to obtain the drought resistance of a Durum in a Vulgare.
Nabawa	Florence	Improve quality and resistance to bunt.
Nabawa	Dan	Improve head of Nabawa.
Nabawa	Dundee	Baking quality and stronger straw.
Nabawa	Heiti (D)	Drought resistance.
Sword	Currawa	Improve head and straw.
Sword	Dundee	Baking quality and straw.
Sword	Pusa 4	Baking quality.
Sword	Palestina (D)	Drought resistance.
Florence	Dan	Resistance to flagsmut and larger head. Will also have high quality and bunt resistance.
Florence	Dundee	Quality cross also for stronger straw in Florence and non-shattering.
Waratah	Sword	Improve disease resistance and yield
Waratah	Dan	Flagsmut resistance.
Dan	Baringa	Improve straw and improve yield.
Dan	Forel	Baking quality.
Currawa	Florence	Baking quality and earliness. Bunt resistance.
Baringa	Finch	Baking quality.
Baringa	Duri	Baking quality.
Riverina	Dan	Flagsmut resistance and improved head.
Gallipoli x Waratah	4 Gullen	Baking quality.
Gallipoli x Sword	1 Dundee	Baking quality.
Gallipoli x Sword	Pusa 4	Baking quality.
Gallipoli x Sword	Nabawa	Flagsmut resistance.
Indian F x Canberra	5 Minflos	Baking quality.
Dundee	Dan	Flagsmut resistance.
Dundee	Caliph	Improve yield.
Dundee	Gullen	Baking quality and earliness.
Dundee	Pusa 4	Baking quality.
Dundee	Haurani (D)	Drought resistance.
Gluyas	Dundee	Baking quality and straw.
Ghurka	Minflos	Baking quality.
Hope	Nabawa	Baking quality (from female side).
Marquis	Comeback	Baking quality.
Marquis	Canimbla	Baking quality.
Bobin	Baringa	Disease resistance and non-shattering.
Nabawa	Dundee	Baking quality.
Nabawa	Florence	Baking quality.
Florence	Nabawa	Flagsmut resistance.
Florence	Dan	Flagsmut resistance.
Dundee	Nabawa	Flagsmut resistance.
Nawab	Nawab x Bunyip	Flagsmut resistance.
Nawab	Bunyip	Baking quality and flagsmut resistance.
Gullen	Ford	Baking quality.
Bobin	Ford	Baking quality.
Bobin	Bunyip	Baking quality and flagsmut resistance.
Firbank	Gallipoli	
Waratah	Firbank	
Bunyip, x Waratah	Gallipoli x	Improved yield.
Yandilla King x Gluyas	Sword	Improved yield.

IMPORTANT WEEDS OF SOUTH AUSTRALIA.

[By G. H. CLARKE, B.Sc., Botanist at the Roseworthy Agricultural College.]

No. 1.—ST. JOHN'S WORT

(*Hypericum perforatum*, L., var. *angustifolium*, DC.).

A weed specimen from Nuriootpa, forwarded to the Agricultural College recently for purposes of identification, proved to be one of St. John's Wort, the narrower-leaved form (variety *angustifolium*) of the plant known to botanists as *Hypericum perforatum*, L. It was stated in the accompanying letter that the weed was new to the district, and had first appeared evidently from a chance seed on the roadside, whence it had spread into an adjoining paddock.

The appearance in a new district of a plant, known to be one of the worst weeds in the Commonwealth, serves to illustrate the importance of early recognition and prompt action in the case of definitely noxious weeds. While a farmer can hardly be expected to know every plant that has proved to be troublesome in the State, he should at least know the weeds growing on his own, and on adjoining, land, and be able to recognise, as a stranger, any new plant as soon as it appears. He should also be familiar with the appearance of those weeds which, on account of their known harmful properties, have been proclaimed noxious, either for the State or for the district in which he lives. The early recognition of such plants is obviously a matter of great importance. Many of them seed very freely and, if one such plant is allowed to form and disperse its seeds in a new locality, others are certain to appear, and the eradication becomes correspondingly more difficult and costly. If several generations have been permitted to grow and flourish before notice is taken of a weed, the problem of its effective control may then assume such proportions as to be quite beyond the financial powers of the owners of the land infested. When it is remembered that some weeds can so depreciate the value of land as to render it quite worthless for productive purposes, at least for many years to come, it will be realised how necessary it is to attack such invaders early, and to prevent their becoming established on new ground. As St. John's Wort has shown itself to be a weed of this type, it will be of advantage to select it as the subject for the first of a series of descriptive articles, written with the object of assisting farmers and others to become familiar with some of the more important weeds domiciled in South Australia.

Botanical Name and Classification.—Prior to the year 1928 all forms of St. John's Wort growing in Australia were believed to conform to the type of *Hypericum perforatum* found in Britain, and on the Continent of Europe. Doubt was expressed on this point, however, by Sir Arthur Hill, Director of the Royal Botanic Gardens, Kew, England. The Australian forms seemed to him to possess properties far more harmful than those in Britain, where St. John's Wort had never been regarded as a very bad weed. At his request specimens from New South Wales, Victoria, and South Australia, were sent to Kew for exact identification. It is now accepted that the forms of the Wort growing in Australia belong to a continental variety originally described by De Candolle as the variety *angustifolium* (literally "narrow-leaved"). The name *Hypericum* is of uncertain significance, and is derived from the Graeco-latin name of some unknown plant. The species name *perforatum* is due to the presence of small transparent oil glands, which gives to the leaves the appearance of being perforated with tiny holes when held up to the light. The leaves and flowers also bear a number of small dark-purple opaque dots. The name "St. John's Blood" has been applied to the plant on account of a red dye obtainable from the flowers.

Hypericum belongs to a family of plants, the family *Guttiferae* or *Hypericaceae*, most of whose representatives are tropical shrubs or trees. The genus *Hypericum* is exceptional in having a distribution mainly outside the tropics. Of the 200 species of the genus, two occur in this State, in addition to the introduced Wort, namely, *H. gramineum*, Forst. f., and *H. japonicum*, Thunb. Both are much smaller plants than *H. perforatum*.

Description of Plant.—St. John's Wort is a smooth perennial with a woody underground stem, or rhizome, from which there arise a number of erect shoots growing to a height of from 1 ft. to 3 ft. The aerial stems are often of a reddish color, and are somewhat compressed. In cross section they appear spindle-shaped, due to the presence of two opposite, and decurrent, longitudinal ridges. Lateral branching occurs mainly towards the upper parts of the plants, and is usually more developed in one plane, the branches curving gracefully upwards, and thus giving to the plants a characteristic flattened and corymbose appearance. The leaves are opposite, unstalked, and are mostly about $\frac{1}{2}$ in. long by about $\frac{1}{4}$ in. wide. They are oblong in shape, obtuse, entire, and paler-green on the underside. The leaves contain minute transparent oil-glands, and are dotted, also, with a few dark-purple opaque glands.

The flowers are large, about $\frac{1}{2}$ in. across, bright yellow in color, and are borne in terminal corymbose cymes. The calyx is divided, almost to the base, into five pointed lobes. The five petals are dotted along their margins with small dark-purple glands; they are at first yellow, but become brown when dry. The stamens are numerous, and are arranged in three bundles. There is a superior three-celled ovary, containing numerous ovules, and bearing three styles, each with a terminal stigma.

The fruit is a capsule containing many seeds, which are small, golden-brown in color, and pitted on their surfaces.

The plants are in flower from November, to February.

Means of Spreading.—Locally the plants spread to some extent by means of their underground stems. These grow more or less horizontally, and send up new aerial shoots at intervals. This habit of growth leads to the formation of very dense stands of the Wort in situations favorable to its growth.

But it is mainly by seed that the plant spreads to other localities. The seeds are formed in very great numbers, and are very small and light. Probably they are dispersed in the first instance by wind, though rain and flood may play a part in the process. By wind action seeds will doubtless be deposited in gradually diminishing numbers over a wide radius from an infested area. Hay and other crops, stacked or growing in the vicinity, are almost certain to contain seeds of the weed, and so provide a medium for distribution. Seeds will fall also on fallowed land and on roads, so that mud on the feet of grazing animals or birds is another means whereby seeds may be carried for great distances. It has also been suggested that the seed capsules, which are sticky, may adhere to the coats of animals. Bushfires may also facilitate seed dispersal. Though vast numbers of seeds are destroyed by a fire, the tremendous draught created must carry many seeds high into the air. In general it may be assumed that the higher the seeds rise the further they will be carried before being deposited on the ground.

Effects on Stock.—St. John's Wort is poisonous to stock, and its evil reputation as a weed is partly due to this circumstance. When eaten in quantity it causes a peculiar sensitiveness to light. If animals have been fed on the Wort and then exposed to strong sunlight for a prolonged period, the unpigmented areas of the skin become inflamed and ulcerated. In severe cases actual death may result. In addition the plant, when eaten, is stated to produce an effect on the central nervous system, causing severe mental depression in most cases, but occasionally intense mental excitement.

History in Australia.—It would be difficult to find a better—or a worse—example of the depreciation of the value of land by a weed than is afforded by the history of St. John's Wort in parts of Victoria and New South Wales. The plant was introduced and grown in a garden at Bright, in Victoria, on account of its numerous and showy yellow flowers. It escaped from cultivation and established



ST. JOHN'S WORT.
(*Hypericum perforatum* var. *angustifolium*).

itself on vacant land in the district. It took complete possession of the local racecourse, and so earned for itself the name of "Racecourse Weed." Here it began to produce seed in such prodigious quantities that hay and other crops in the vicinity were liberally contaminated with it. These fodder crops provided a medium for the distribution far and wide of a weed, which soon showed remarkable powers of growth and development in its new environment. Owing to its habit of forming aerial shoots from a perennial underground rootstock, it was soon found that, not only was St. John's Wort able to spread with amazing rapidity, but it formed so dense a growth, when once established, that it choked out practically everything else, and came to occupy large areas to the almost complete exclusion of any other type of herbage. Attempts to get rid of the pest by hoeing or cultivation proved futile; it was found impossible to avoid leaving fragments of the underground system behind—fragments which, by the subsequent development of new shoots, gave rise to an infestation as dense as before. Some idea of the seriousness of the pest may be formed when it is realised that the area covered by the weed in Victoria to-day is something like a quarter of a million acres; that in the Tumbarumba district of New South Wales some 6,000 acres are more or less densely infested; and that of some 13 shires in the latter State, and in which the Wort is a serious problem, one shire alone was stated in 1926 to be spending £1,200 annually solely on the eradication of St. John's Wort.

Fortunately for South Australia, local conditions do not appear to favor the growth of this plant to the same extent as in Victoria and New South Wales, preferring as it does elevated regions with a fairly high rainfall. The weed is believed to have been present in the Coromandel Valley for very nearly 50 years, and though it has been spreading slowly during that time, it has not so far shown any tendency to do so at an alarming rate. It would be unsafe to assume, however, that there is no need to take precautions against its spread into new districts, for there are certain parts of the Mount Lofty and Barossa Ranges where the weed might produce serious results if allowed to spread unhindered. It is worthy of note in this connection that, both in Victoria and New South Wales, the spread of the weed was slow at first. From the date of its introduction at Bright, about 1880, it took 25 years for the plant to occupy 10,000 acres of land; but during the next 10 or 11 years the acreage increased to about 184,000. During the three years from 1902 until 1905 the area of Crown Lands infested increased by about 33 per cent.; in the next 10 or 11 years there was an increase of nearly 4,000 per cent. Similarly at Tumbarumba, New South Wales, though the plant was first observed in the district about 1899, it was not until 1926 that its potentialities as a serious weed made themselves fully appreciated. Though the total area of land occupied by St. John's Wort in this State is probably not more than 2,000 acres, the plant is spreading slowly, and from time makes its appearance in new districts. It is by no means impossible that, in the absence of strict precautions against its spread, the weed might reveal itself to be capable of producing results almost as disastrous as in the two Eastern States.

Occurrence in South Australia.—It is exactly 30 years ago that St. John's Wort was first brought before the notice of the readers of this *Journal*. In the issue of January, 1904, there appeared a description of the plant by Mr. W. L. Summers, accompanied by a fine colored plate. With regard to its occurrence in this State Mr. Summers then wrote as follows:—

To my knowledge the only place in South Australia where this *Hypericum* is growing wild is along the Coromandel Valley, about nine miles from Adelaide. Commencing near the Blackwood Railway Station, the weed is plentiful on the main road, and on land on either side for a distance of about 2½ miles. In places it is very plentiful, covering patches several acres in area. I believe the weed was first noticed about 18 years ago in this locality.

At the time this was written, the area covered by the Wort in Victoria was estimated to be nearly 9,000 acres. It was shortly after this, from 1905 onwards, that the weed began to spread at so phenomenal a rate in that State. The attention of other States was naturally drawn to the occurrence, and, very largely as a result of it, St. John's Wort was proclaimed a noxious weed in South Australia. This was in August, 1911. In the *Journal of Agriculture* for September, 1911, there appeared another short account of the plant by Mr. Summers, together with an improved colored illustration, which is reproduced again in the present issue. To quote Mr. Summers once more:—

It (i.e., St. John's Wort) has been known to exist for fully 20 years in the Coromandel Valley, where it occupies a good many acres of pasture besides being in possession of the rough land along the roadsides. It apparently does not thrive except in land with a fair amount of moisture, and up to a few years ago had not been reported in this State outside the district referred to. During the past few years, however, specimens have been received from Port Lincoln, Meningie, and Klemzig (i.e., Gaza) while it is also steadily spreading both north and south of Coromandel Valley.

Calvert (1932) gives the areas affected in this State as follows:—Coromandel Valley to Bridgewater, 1,300-1,500 acres; Port Lincoln, 50-60 acres; and at Clare, Yankalilla, and Birdwood.

Methods of Eradication.—St. John's Wort is not usually troublesome on land which is regularly cultivated; it is on arable and pasture land, especially in hilly parts, that the weed is so serious a problem. Deep ploughing, followed by thorough and persistent cultivation, would doubtless bring it under control in places where such methods are practicable. The method of eradication to be adopted in a given case, however, will depend upon the particular circumstances, and especially upon the size of the area infested. Where this is very small, a single plant or a small patch of them, it may be possible to dig them out completely. Unfortunately the underground stems are very brittle, and it is difficult to remove them completely. Unless this is done the portions left behind will continue to grow. It is usually advisable, therefore, to make use of a chemical exterminator. In all cases the aerial parts should, if possible, be cut down as near as possible to the flowering stage, and then raked together and burned. The chemical should then be applied liberally to the bases of the shoots and adjacent soil. The advantage gained by this preliminary cutting is that it reduces the surface area to which the chemical has to be applied, and enables the latter to act more effectively upon the underground system and its developing shoots and buds. Whatever substance is used for this purpose, the important thing is to persevere. More than one application of a spray is almost invariably necessary, and in the case of deep-rooted weeds like St. John's Wort several may be required. The purpose of the treatment is to kill out the underground systems of the plants, and this is accomplished partly by direct poisoning and partly by starvation. The initial cutting weakens the underground parts, especially if it is done at the flowering stage, but they will still contain sufficient reserve food to produce another crop of shoots. Application of the poison at this stage will kill these new shoots, as well as portions of the rootstocks from which they develop. But there will still be some underground parts not destroyed. These must be prevented from adding to their depleted stocks of food, which, of course, they will do if they are allowed to display any green foliage to the sunlight. If, then, there is not sufficient poison in the soil to kill any subsequent growth, and if any new green shoots appear, another spraying will be necessary, since every green leaf exposed to the light serves to strengthen the underground system which the treatment aims at destroying. Where the patch

is small, it may be possible after spraying to cover the area completely with sheets of galvanized iron. This excludes light, and so assists the action of the poison.

Chemical Exterminators Used.—The following chemicals have all been used with satisfactory results:—

1. Sodium Arsenite.—This substance is extremely poisonous, and so can only be used where stock can be rigidly excluded from the area. The solution is made by mixing 1lb. of arsenic and 2lbs. of washing soda with 5galls. of water. This should be liberally sprayed on the plants and surrounding soil. After spraying, animals should not be allowed access to the area until rain has washed the poison into the ground.

2. Salt (Sodium Chloride).—Where arsenic cannot be used, fairly coarse salt is effective. The salt, which should not be too coarse, is heaped liberally round each plant, making sure that none is missed. The method is expensive, since it requires from 3 to 6 tons to the acre. The Victorian Department of Agriculture advises applying the salt in the form of a strong brine solution.

3. Sodium Chlorate.—This is applied as a spray, the solution being made by dissolving 1lb. of the chlorate in water so as to form 1gall. of solution. Owing to the danger of spontaneous combustion, care should be taken to prevent clothing, or boots, &c., from being wetted by the liquid. The danger can be lessened by adding the more deliquescent calcium chlorate to the solution.

Biological Control.—On the large scale, where hundreds or even thousands of acres are covered by the weed, it has been found possible to control St. John's Wort by growing trees, especially *Pinus radiata*. This has been done with success at Bright, where the old racecourse—once so heavily infested with the weed—is now covered with pines, and the weed is effectively under control. The same is being done at Tumarumba. The very dense shade produced by these trees when grown close together in plantations effectively excludes the light, and so prevents the growth of the Wort.

In certain areas it has been found possible to suppress St. John's Wort by growing Subterranean Clover as a smothering crop. This is possible, however, only where a particularly luxuriant growth of the clover is obtainable.

The problem of control by means of insect parasites has been taken up by the Division of Economic Entomology of the Council for Scientific and Industrial Research. Some very encouraging results have been obtained in the laboratories at Canberra with species of *Chrysomela* beetles, which feed almost exclusively on species of *Hypericum*. While similar results have not as yet been obtained in the field, the work shows promise of being ultimately successful.

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BETTER QUALITY WHEAT.

[Correspondence on the subject of better quality wheat has passed between representatives of the flour trade and the Department of Agriculture. At a meeting of the Advisory Board of Agriculture, the Director of Agriculture pointed out that good milling wheats generally yielded lower crops than the poorer types of milling wheats, and unless advances on ordinary prices were paid for high-class milling wheats farmers would not be induced to make a change. Amongst the correspondence referred to is a report (dated May 6th, 1933) by Mr. S. R. Cowley, who visited the "East" on business connected with compressed yeast. The report deals with the flour trade in general, and the extract published below is a plea for better quality.]

For a considerable time Australia has been sending fairly considerable quantities of both wheat and flour to many parts of what we speak of as "The East," and in the China market—by far the greatest consumer of Australian flour—the price factor is the only factor. The reason Australia has had such large demands for both wheat and flour is merely because the price quoted has been in more than favorable competition with that of other countries, particularly Canada and the United States of America.

Information from reliable sources shows that enormous quantities of wheat and flour are being imported in increasing quantities from Canada and the United States of America into Japan and North China particularly. In lesser measure the same remark holds good for practically the whole of South China, French Indo-China, the Federated Malay States, and in the Dutch East Indies. In the immediate future imports of flour into the East from Canada and the United States of America will show much larger figures than those concerned in Australia would expect to find.

There must be a reason why Canada and the United States of America are able to send such substantial quantities of wheat and flour into the East notwithstanding the much more favorable price position of Australia. The only reason is the quality factor, which means that the average standard of both wheat and flour from Canada and the United States of America is higher than that of Australia. There is also a distinct margin in favor of Canada as regards having a better general standard of quality than that of the United States of America.

It is rumored in many parts of the East that a scheme has been co-opted to flood Eastern flour mills with Canadian and North American wheat, and alternatively to get the baking trade of the East to use only Canadian and United States of America flours.

A number of bakers were interviewed by Mr. Cowley, and demonstrations were conducted in bakehouses. Everywhere the view was held that Australian shipments of wheat and flour had not been of a consistently standardised quality as regards quality and content of gluten, moisture content, and color. The Eastern market is a specialised market, and will always be so. The whole of the East is a different world entirely from that which we in Australia know. The Eastern mind has never been prepared and never will be prepared to accept an irregular and unstandardised quality, whether in wheat, flour, or any other product. Until and unless Australia learns this lesson severely, then Canada and the United States of America, so far as wheat and flour consumption in the East is concerned, will continue to enjoy the lion's share of the market.

Australian shippers of wheat and shippers of flour must be prepared to guarantee to the East a reasonably consistent color and a guaranteed minimum gluten content and maximum moisture content. It is not an impossible thing to standardise these factors, though it will entail important re-arrangements in

milling practice as well as in control of the strains and varieties of wheat sown in Australia. Within the next 10 to 15 years those parts of the East which are now so quickly taking on the consumption of white bread products will have adopted those styles of fermentation which necessitate the use of quick processes of bread making, and also those processes which produce rich varieties of bread because of added ingredients such as shortening, sugar, and eggs. Nowhere throughout the East in the modern bakeries was any tendency to adopt long process doughs observed. This simple fact decides that the flour used shall be, if not a high gluten content, at least standardised gluten content. This gluten content may perhaps be not more than a fixed average of 11 per cent., but so long as it is a fixed guaranteed standard then bakers of the East would know just how to conduct their fermentations.

The longer Australia is able to continue the present favorable price factor for flour supplies to the East, and the quicker the Commonwealth arranges to standardise the quality of her shipments, the firmer will be the hold upon flour consumers of the East to be obliged to use Australian flour. The reason is simply that every particular type of flour demands a particular type of fermentation. Australian flour requires different treatment from the flour of Canada and the United States of America.

Recommendations and submissions are:—For immediate action to be taken through the aid of cereal chemists to strengthen and standardise the gluten content of Australian flour; to equalise the moisture content; to see that the routine procedure of the mills that seek this trade conform to the requirements of the Eastern markets; to devise methods and formulae suitable for the fermentation of the various types of doughs as applied to conditions throughout the East; to send through the East a competent commercial milling ambassador accompanied by a skilled baking technician. It has been definitely arranged for skilled technicians from Canada and the United States of America to visit all parts of the East and demonstrate the use of their flours. In addition to this, competent technical officers have for at least two years been touring the East for the purpose of demonstrating the advantage of Canadian and United States of America wheats. Whilst climatic conditions associated with Canada and North America tend to give a permanent variety of high gluten content in the wheats, the deciding factor in the use of the resulting flour is not so much high gluten content as uniform gluten content. Methods of fermentation suitable for making high-class bread products can quite successfully be devised for flour of an average gluten content of, say, 10.5 per cent. to 11.5 per cent., or thereabouts. Bakers throughout the East—except in Japan—are chiefly composed of Chinese. All look for very

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white products in their bakeries, as well as volume of bulk. It is this trait in the Eastern mind which has been taken advantage of by Canada and the United States of America. Important milling concerns have permanent men touring the whole of the East amongst bakers and merchants for the sale of their flour, and they always give definite grades with guaranteed gluten and moisture content for the respective classes of goods for which their flours are suitable.

It will be found upon careful testing that in normal seasons Australian flours could be standardised to a definitely higher gluten content than the average of the United States of America soft wheat flours. Therefore, by reason of the lower price quoted by Australian millers it is easily within the reach of Australian millers to train their Eastern customers in the proper use of Australian flour, thus securing permanent customers. There should then be no difficulty to earmark a certain percentage of the Commonwealth high gluten wheats to combat the trade of the Canadian higher gluten wheats and flours.

It was rather interesting to hear in Hong Kong that there had been no fixed ratio of price between the soft wheat flours and the hard wheat flours of Canada and the United States of America, and that it has frequently happened that the soft wheat flours have been higher in price than the hard wheat flours of the high gluten content.

There are several brands of the United States of America flours which regularly command as much as 20 cents per sack of 50lbs. higher price than a similar grade of flour from both the United States of America and Canada, and this higher price is obtained solely upon the simple fact that the milling firms under certain brands send only a definite grade of flour. In this respect the Chinese market differs from any other part of the East, so that *uniform quality and/or standard quality under a reputable name or brand commands respect in the Chinese market*. As one proof of this the Double Star brand of the United States of America origin which was first sold at as low as 15 cents to 20 cents per 50-lb. sack below ordinary brands has gradually worked up to a position where it now commands 10 cents and higher above all others, and the demand for this favorite brand is increasing in volume. It must be remembered that both China and Japan want our wheat and flour, but it is folly to send poor and indifferent grades of wheat and flour, because the Eastern peoples are not fools, and "anything" will not do for them. They are perfectly alert to what they are buying.

Wheat is still grown to-day throughout Australia for its capacity to yield bushels per acre rather than for its suitability for bread making. It is significant in this connection that New Zealand wheatgrowers, millers, and bakers have recently unanimously decided to recommend the New Zealand Cabinet to continue for a further period of five years the excellent work conducted under the Department of Scientific and Industrial Research.

Much of the trade in flour in New Zealand lost by Australia to Canada has been due to the lack of uniformity in the quality of the shipments. As a result of this lack of uniformity New Zealand bakers turned their attention to Canadian wheat. The result has been that New Zealand bakers and millers will not easily, even for price, revert to their former large use of Australian wheat and flour until such time that Australia can deliver more uniform quality. In addition to this, New Zealand, through its research scheme, has eliminated through the control of the field officers of the Agricultural Department many wheats which were unsuitable for bread making though prolific yielders of bushels per acre. Wheat-growers have happily co-ordinated with the millers and bakers, and with the aid of the Canadian cerealists engaged under the Wheat Research Institute millers have been able to devise methods of controlling their grists which give greater standardisation.

REGISTERED EARMARKS OR FIREBRANDS FOR SHEEP.

[Until recently there was no legislation in this State dealing with the registration of earmarks for sheep. Under the Brands Act, 1933, it is now necessary to register, and in the accompanying notes the Registrar of Brands (Mr. H. O. Laurenti) draws attention to the provisions of that Act in relation to earmarks and firebrands. The text of sections of the Act dealing with the subject is also quoted below.]

1. Every earmark or firebrand shall be registered in respect of a run of which the person applying for registration is the proprietor; and shall be used by such person only so long as he is the proprietor of such run. Upon ceasing to be the proprietor as aforesaid the registration of such earmark or firebrand shall be deemed to be cancelled: Provided that the registration may be transferred by any such proprietor to his successor as proprietor.

2. The registration of an earmark or firebrand shall entitle the person by whom it is registered to the exclusive use thereof within the sheep brands district within which the said run is situated.

3. Every registered earmark shall, in the case of male sheep, be placed on the off ear, and in the case of female sheep, be placed on the near ear.

4. No person shall place any registered earmark or firebrand on any sheep except in the position determined by the Registrar and stated on the certificate of registration.

5. If any sheep has been earmarked with a registered earmark, no person shall place any other earmark on such sheep on the ear upon which such sheep is earmarked as aforesaid: Provided that nothing in this section shall apply to the placing of a registered tattoo mark or a registered stud-stock brand on the ear of any sheep.

6. No earmark other than a slit shall be made on sheep except with pliers.

7. No earmark shall exceed $\frac{3}{4}$ in. in length or $\frac{1}{2}$ in. in width or diameter unless such earmark is a slit, which may be $1\frac{1}{2}$ in. in length from the tip of the ear.

8. In no case shall an earmark be made by means of a crop. "Crop" means a straight cut taking off any portion of the ear.

9. Subject to paragraphs 6, 7, and 8, any owner of a registered paint brand or tattoo mark for sheep may mark his sheep with any earmarks which he thinks proper, and may also attach tags to the backs of the ears of his sheep, but no such owner shall make any such mark or attach any tag to the off ear of any male sheep or to the near ear of any female sheep.

10. It is important that the Registrar of Brands be immediately advised of any alteration of run or of postal address.

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LEGISLATION AFFECTING CATTLE AND SHEEP EARMARKS.

BRANDS ACT, 1933, No. 2117.

Section 60.—(1) No earmark other than a slit shall be made on any cattle or sheep except with pliers.

(2) A distinctive mark shall be made only as indicated by the registrar on the certificate of registration.

(3) In the case of cattle not more than one-third of the ear shall be affected by the making of any earmark thereon.

(4) In the case of sheep, no earmark shall exceed three-quarters of an inch in length or half an inch in width or diameter, unless such earmark is a slit, which may be one inch and a quarter in length from the tip of the ear.

(5) In no case, either of cattle or sheep shall an earmark be made by means of a crop.

(6) In the case of cattle, if any registered earmark is placed on the ear of any such cattle, no further earmark, mark, cut, or crop shall be placed on either ear of such cattle: Provided that this subsection shall not apply to anything done before the passing of this Act.

Section 38.—If any sheep has been earmarked with a registered earmark, no person shall place any other earmark on such sheep on the ear upon which such sheep is earmarked as aforesaid: Provided that nothing in this section shall apply to the placing of a registered tattoo mark or a registered stud-stock brand on the ear of any sheep.

Definition of "Crop".—"Crop" means a straight cut taking off any portion of the ear.

Section 69.—Any person who—

(d) marks, or assists in marking, or causes, authorises, or suffers to be marked, any cattle or sheep on the ear in any manner contrary to the provisions of section 38 or 60, or by cutting off part of the dewlap; or

(e) has in his possession any cattle or sheep with its ear marked contrary to the provisions of sections 38 or 60, or, in the case of cattle, with any part of the dewlap cut off; or

(f) marks or cuts the ear of any cattle whereon a distinctive mark has already been made;

shall be guilty of an offence, and liable to a penalty of not less than two pounds and not more than one hundred pounds, or shall be liable to be imprisoned for any term not exceeding six months:

Provided that it shall be a defence in any proceedings under subdivision (e) of this section if the defendant satisfies the court that the ear was marked or dewlap cut off by some person other than the defendant and without his knowledge or authority, express or implied.

Section 70.—(e) Any person who introduces into the State from any other State of the Commonwealth of Australia any cattle or sheep with its ear marked contrary to the provisions of section 60 or, in the case of cattle, with any part of the dewlap cut off; shall be guilty of an offence, and liable to a penalty, which, except where a different penalty is expressly prescribed by this Act, shall be not more than twenty-five pounds, or shall be liable to be imprisoned for any term not exceeding three months.

Section 71.—No person shall be deemed guilty of an offence against paragraph (e) of section 70 if the cattle or sheep introduced by that person contrary to the provisions of the said paragraph are, within ten days after introduction into the State, slaughtered at the Metropolitan Abattoirs established under the Metropolitan Abattoirs Act, 1908: Provided that the Minister may with respect to any sheep or cattle extend the time for slaughter mentioned in this section, and may approve of some other place than the said Metropolitan Abattoirs as the place for slaughter, or may approve of the keeping of the sheep or cattle in the State for any period he thinks fit.

THE OCCURRENCE OF EELWORMS ON THE ROOTS OF CERTAIN GRASSES.

[By W. C. JOHNSTON, R.D.A., Agricultural Instructor.]

INTRODUCTION.

Eelworms are known to be serious pests to many types of plants in the Old World and America, as well as here, but in most cases they have been observed on the roots of cultivated plants.

In South Australia their occurrence has been recorded as a pest with cereals only, but it is now proposed to show that they become apparent on the roots of at least three different species of grass.

No attempt has been made to classify the worm, but it has been assumed that it is the same species as that which attacks cereals in this State. It is proposed to deal with them under three headings:—

- I. History of the pest in this State.
- II. Its occurrence on the roots of naturalised grasses.
- III. Its occurrence on the roots of a grass sown for its seed.

I.

Davidson discussed the presence of Eelworms in South Australia in the November issue of the *Journal of Agriculture*, 1930, when he dealt at some length with the disease as it affects cereal crops. He further reviews crops liable to be attacked in other parts of the world, but makes no reference to the pest being found on any other than cultivated plants.

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Hickenbotham, in the same issue of the above *Journal*, discusses the pest as it affects cereal crops in the district immediately surrounding the Roseworthy College, but makes no reference to it being found on the roots of other graminaceous plants which are to be found in close proximity to the affected crop or as weeds in the stubble of an affected cereal crop.

II.

In the course of investigating the serious "no-growth" of wheat and oats in the Bute district, it was decided that the chief cause of the trouble was the very heavy infestation of Eelworms on the roots of the plants. The worms were easily visible at the time of inspection, as the females were then in the cyst stage.

Many of the plants taken up for observation were found to be literally covered with cysts; their prevalence led to the discussion as to whether they attacked the naturally occurring grasses. As Barley Grass was the most common naturalised species a critical examination of its roots was made, and in almost every case was evidence of infection forthcoming. This being so it was decided to make a further search on the roots of Sterile Brome—a grass known in this area as Sland's Grass—and it became evident that this species was not immune from attack.

During the course of the day evidence of the pest attacking these two grasses could be established in almost every case where it was actively looked for, which, in effect, meant that it was found in fields some miles apart. Whether the grasses were taken from a crop where it was a weed or from a stubble the female cysts could be easily found.

In this season there are no outward symptoms to suggest that these grasses are being attacked by the pest, either when they are in a crop or when in stubble. There is a theory amongst the farmers that Barley Grass seldom makes rapid growth on the stubble of a crop which has been a failure through identical symptoms, as shown by the crops this season. If this is so it may reasonably be assumed that the poor growth of Barley Grass on stubbles is largely due to the ravages of Eelworms—a fact that must not be lost sight of when attempting to control the pest.

III.

The sowing of Canary Grass (*Phalaris canariensis*) as a crop for the production of its seed is a rural activity which has gained considerable popularity in the last few seasons, and it was during an inspection of an area sown to this plant that small patches exhibiting similar symptoms to Eelworm attack in cereals were observed. In this case careful examination failed to locate the female cysts, although the roots had all the characters of being infested. However, similar patches were noted in another field of the grass, and an investigation revealed the presence of numbers of cysts on the root, thus establishing the fact that this crop is not immune from the ravages of Eelworms.

CONCLUSIONS.

(1) Eelworms are found to attack at least two naturalised grasses in South Australia.

(2) The pest attacks these plants whether in stubble land or as a weed in a crop.

(3) The pest may prove to be of economic importance in the production of Canary Seed in this State.

EXPERIMENTAL FEEDING TESTS CONDUCTED AT PARAFIELD POULTRY STATION.

[By C. F. ANDERSON, Poultry Expert.]

A series of feeding tests are being conducted at Parafield Poultry Station with a view to ascertaining if suitable foods which are obtainable on the majority of our farms can be satisfactorily fed to poultry. The tests are each of 50 White Leghorn pullets, and commenced on April 1st, 1933.

The feeding is as follows:—

No. 1 Test.—Morning—Wet mash composed of 1 part crushed barley, 2 parts wholemeal (by weight), $\frac{1}{2}$ lb. meat meal, 50 per cent. chaffed greenfeed

Midday—1oz. wheat per bird.

Night—1oz. wheat per bird

No. 2 Test.—Dry mash composed of same proportions as No. 1 Test

Midday—Greenfeed.

Evening—Wheat.

No. 3 Test.—Morning—Wet mash composed of 1 part bran, 2 parts pollard (by weight), $\frac{1}{2}$ lb. meat meal, 50 per cent. chaffed greenfeed.

Midday—1oz. wheat per bird

Night—1oz. wheat per bird.

No. 4 Test.—Morning—Wet mash composed of 1 part bran, 2 parts wholemeal (by weight), $\frac{1}{2}$ lb. meat meal, 50 per cent. chaffed greenfeed.

Midday—1oz. wheat per bird.

Night—1oz. wheat per bird

No. 5 Test.—Morning—2ozs. wheat per bird.

Evening—2ozs. wheat per bird.

Greenfeed in season

The following are the numbers of eggs laid by each pen from April 1st, 1933, to December 31st, 1933

METROPOLITAN ABATTOIRS, ADELAIDE

MANUFACTURERS OF

Meat Meal for Pigs

Read Report of Trials made by PROF. PERKINS,
Journal of Agriculture, January and July, 1921.

Meat Meal for Poultry

For full information on above write to

**The GENERAL MANAGER, Metropolitan Abattoirs Board,
Box 573E, G.P.O., Adelaide.**

ALSO MANUFACTURED—

Blood Manure

Bone Manure

Definite conclusions, however, cannot be given at this juncture with regard to the various methods of feeding. It is necessary for the tests to complete the 12 months before any satisfactory opinions can be formed.

No. of Test.	No. Eggs Laid April 1st to November 30th.	No. Eggs Laid Month December.	Total Eggs Laid April 1st to December 31st.
No. 1	4,964	686	5,650
No. 2	4,613	649	5,262
No. 3	4,244	550	4,794
No. 4	4,936	601	5,537
No. 5	2,230	294	2,524

RED COMB EGG ASSOCIATION.

OFFICIAL EGG-LAYING COMPETITION, 1933-34.

Conducted at the Parafield Poultry Station under the supervision of the Department of Agriculture.

LEADING SCORES TO WEEK ENDED DECEMBER 29th, 1933.—FIRST GRADE EGGS ONLY.

WHITE LEGHORNS.

	Eggs Laid.	Bird No.
<i>Singles—</i>		
H. H. Hefford	141	67
A. G. Dawes	141	136
B. Rowe	140	105
<i>Trios—</i>		
W. C. Slape	381	55-57
A. G. Dawes	370	136-138
B. Cooke	345	19-21
<i>Teams—</i>		
L. A. G. Pitt	649	88-93
B. Rowe	628	103-108
G. C. Gavin	613	58-63

MINORCAS.

<i>Singles—</i>		
V. F. Gameau	115	139
M. O. and C. A. Roberts	86	143

BLACK ORPINGTONS.

<i>Singles—</i>		
A. G. Dawes	165	176
N. F. Richardson	158	205
A. G. Dawes	152	202
<i>Trios—</i>		
N. F. Richardson	422	205-207
L. H. Crawford	409	154-156
H. J. Mills	392	187-189
<i>Teams—</i>		
H. J. Mills	782	184-189
L. H. Crawford	683	151-156
L. Darcy	594	157-162

ANY OTHER HEAVY BREEDS.

Rhode Island Reds.

<i>Singles—</i>		
H. J. Mills	132	229
H. J. Mills	129	230
B. Rowe (Barnevelders)	118	238
<i>Trios—</i>		
H. J. Mills	337	229-231
V. F. Gameau	274	226-228
V. F. Gameau	270	223-225
<i>Teams—</i>		
V. F. Gameau	544	223-228
W. R. Williams	479	232-237

RED COMB EGG ASSOCIATION.

OFFICIAL SINGLE TEST.

EGG-LAYING COMPETITION, 1933-34.

SECTION 1.—WHITE LEGHORNS.

Competitor.	Address.	Score to Month ending December 29th, 1933.			
		Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Totals
E. F. Ashmeade	398, Magill Road, Kensington Park	(1) 99	(2) 60	(3) 130	289
L. R. Badcock	77, Findon Rd., Woodville	(4) 94	(5) 114	(6) 111	319
C. J. C. Burton	Mallala	(7) 94	(8) 99	(9) 65	258
C. J. C. Burton	Mallala	(10) 86	(11) 65	(12) 120	271
W. A. Carter	2, Grosvenor St., Glandore	(13) 100	(14) 128	(15) 68	296
W. A. Carter ..	2, Grosvenor St., Glandore	(16) 114	(17) 129	(18) 72	315
B. Cooke	Kanmantoo	(19) 133	(20) 117	(21) 95	345
H. F. Cox	Samson Road, Glanville Blocks	(22) 57	(23) *	(24) 25	82
H. F. Cox	Samson Road, Glanville Blocks	(25) 87	(26) 91	(27) 118	296
L. H. Crawford	Military Road, Grange ..	(28) 61	(29) 112	(30) 105	278
L. H. Crawford	Military Road, Grange ..	(31) 71	(32) 10	(33) 76	157
R. C. Crittenden	William Street, Kilkenny North	(34) 114	(35) 130	(36) 58	302
Chas. H. Day	Box 28, Salisbury	(37) 116	(38) 79	(39) 101	296
J. H. Dowling	Glossop	(40) 107	(41) 101	(42) 88	296
T. Duhring	Mallala	(43) 116	(44) 109	(45) 101	326
T. Duhring	Mallala	(46) 102	(47) 65	(48) 81	238
H. Fidge	313, Cross Roads, Clarence Park	(49) 92	(50) 88	(51) 83	243
V. F. Gameau	Findon Road, Woodville .	(52) 72	(53) 102	(54) 99	273
W. Chas. Slape	Magill Road, Magill	(55) 118	(56) 131	(57) 132	381
G. C. Gavin	Salisbury	(58) 97	(59) 79	(60) 115	291
G. C. Gavin	Salisbury	(61) 122	(62) 83	(63) 117	322
H. H. Hefford	McHenry St., Murray Bdge.	(64) 71	(65) 67	(66) 11	149
H. H. Hefford	McHenry Street, Murray Bridge	(67) 141	(68) 99	(69) 55	295
W. H. A. Hodgson ..	Commercial Rd., Salisbury	(70) 101	(71) 115	(72) 76	292
W. H. A. Hodgson ..	Commercial Rd., Salisbury	(73) 89	(74) 78	(75) 68	235
E. A. Lamerton	Cross Roads, Edwardstown	(76) 85	(77) 39	(78) 120	244
C. H. Lines, jun. ...	Box 75, Gladstone	(79) 107	(80) 125	(81) 40	272
C. H. Lines, jun. ...	Box 75, Gladstone	(82) 115	(83) 98	(84) 91	304
V. F. Gameau	Findon Road, Woodville .	(85) 96	(86) 86	(87) 37	219
L. A. G. Pitt	24, John Street, Payneham	(88) 123	(89) 94	(90) 90	307
L. A. G. Pitt	24, John Street, Payneham	(91) 109	(92) 129	(93) 104	342
H. A. Rasmussen ...	Swan Terrace, Ethelton .	(94) 38	(95) 115	(96) 98	251
H. A. Rasmussen ...	Swan Terrace, Ethelton .	(97) 109	(98) *	(99) 49	158
S. E. Reedman	51, Gilbert Street, Gilberton	(100) 74	(101) 123	(102) 72	269
Bruce Rowe	"St. Kevern," Two Wells	(103) 90	(104) 92	(105) 140	322
Bruce Rowe	"St. Kevern," Two Wells	(106) 104	(107) 103	(108) 99	306
H. J. Stacey	Uraidla	(109) 81	(110) 23	(111) 105	279
H. J. Stacey	Uraidla	(112) 112	(113) 110	(114) 35	257
Thomas & Elson ...	53, Clifton Street, Hawthorn	(115) 23	(116) 25	(117) 107	155
Thomas & Elson ...	53, Clifton Street, Hawthorn	(118) 96	(119) 105	(120) 96	297
H. L. Twartz	Gawler	(121) 72	(122) 123	(123) 112	307
H. L. Twartz	Gawler	(124) 86	(125) 66	(126) 107	259
F. F. Welford	1, Ludgate Circus, Colonel Light Gardens	(127) 100	(128) 119	(129) 68	287
F. F. Welford	1, Ludgate Circus, Colonel Light Gardens	(130) 124	(131) 120	(132) 38	282

EGG-LAYING COMPETITION—SECTION 1—WHITE LEGHORNS—continued.

Competitor.	Address.	Score to Month ending December 30th, 1933.			
		Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Totals
A. P. Urlwin	Box 80, Balaklava	(133) 88	(134) 129	(135) 124	341
A. W. Dawes	230, Portrush Road, Glenunga Gardens	(136) 141	(137) 121	(138) 108	370
Total—Section 1		—	—	—	12,673
SECTION 2—ANY OTHER LIGHT BREEDS.					
V. F. Gameau	Findon Road, Woodville (Minorcas)	(139) 115	(140) 77	(141) 56	248
M. O. and C. A. Roberts	Torrens Road, Kilkenny (Minorcas)	(142) 37	(143) 86	(144) 57	180
Total—Section 2		—	—	—	428
SECTION 3—BLACK ORPINGTONS.					
Arthur Cook ..	187, Goodwood Road, Colonel Light Gardens	(145) 137	(146) 145	(147) 87	369
B. Cooke	Kanmantoo	(148) 34	(149) 10	(150) 55	99
L. H. Crawford	Military Road, Grange ..	(151) 79	(152) 78	(153) 117	274
L. H. Crawford	Military Road, Grange ..	(154) 135	(155) 132	(156) 142	409
Les. Darcy	Mypolonga	(157) 137	(158) 113	(159) 111	361
Les. Darcy	Mypolonga	(160) 67	(161) 108	(162) 58	233
J. H. Dowling	Glossop	(163) 79	(164) 52	(165) 20	151
H. Fidge	313, Cross Rds., Clarence Pk.	(166) 112	(167) 62	(168) 73	247
H. H. Hefford	McHenry Street, Murray Bridge	(169) 82	(170) 17	(171) 160	249
F. J. Hudson	54, Wilcox Av., Prospect	(172) 76	(173) 125	(174) 32	235
A. G. Dawes	230, Portrush Road, Glenunga Gardens	(175) *	(176) 165	(177) 77	242
C. H. Lines, jun.	Box 75, Gladstone	(178) 93	(179) 48	(180) 94	235
C. H. Lines, jun.	Box 75, Gladstone	(181) 109	(182) 66	(183) 114	289
H. J. Mills	Edward St., Edwardstown	(184) 121	(185) 140	(186) 129	390
H. J. Mills	Edward St., Edwardstown	(187) 145	(188) 124	(189) 123	392
J. Rowe	Honeyton St., Seaton Pk.	(190) 130	(191) 59	(192) *	189
S. E. Reedman	51, Gilbert St., Gilberton.	(193) 88	(194) 78	(195) 116	282
S. E. Reedman	51, Gilbert St., Gilberton.	(196) 36	(197) 134	(198) 126	296
H. L. Twartz	Gawler	(199) 46	(200) 108	(201) 97	251
A. G. Dawes	230, Portrush Road, Glenunga Gardens	(202) 152	(203) 120	(204) *	272
N. F. Richardson ...	60, Beaufort St., Wood- ville Park, Kilkenny	(205) 158	(206) 139	(207) 125	422
W. H. L. Wittenberg	3, Rushton St., Goodwood	(208) 116	(209) 34	(210) 58	208
W. H. L. Wittenberg	3, Rushton St., Goodwood	(211) 74	(212) 107	(213) 129	310
W. Woodley	Tailem Bend	(214) 23	(215) *	(216) 89	112
W. Woodley	Tailem Bend	(217) 117	(218) 96	(219) *	213
Total—Section 3		—	—	—	6,730
SECTION 4—ANY OTHER HEAVY BREEDS.					
H. Fidge	313, Cross Roads, Clarence Park (Rhode Is. Reds)	(220) 49	(221) 58	(222) 54	161
V. F. Gameau	Findon Road, Woodville (Rhode Island Reds)	(223) 109	(224) 73	(225) 88	270
V. F. Gameau	Findon Road, Woodville (Rhode Island Reds)	(226) 75	(227) 82	(228) 117	274
H. J. Mills	Edward St., Edwardstown (Rhode Island Reds)	(229) 132	(230) 129	(231) 76	337
W. R. Williams	28, Avenue Rd., Frewville (Rhode Island Reds)	(232) 83	(233) 92	(234) 68	243
W. R. Williams	28, Avenue Rd., Frewville (Rhode Island Reds)	(235) 87	(236) 37	(237) 112	236
Bruce Rowe	"St. Kevern," Two Wells (Barnevelders)	(238) 118	(239) 79	(240) 68	265
Bruce Rowe	"St. Kevern," Two Wells (Welsumers)	(241) 31	(242) 98	(243) 1	130
Total—Section 4		—	—	—	1,916

*Dead.

NOTE.—Only first grade eggs are shown above.

DAIRY AND FARM PRODUCE MARKETS.

A. W. SANDFORD & Co., LIMITED reported on January 3rd, 1934.

BUTTER.—Production of butter for the month of December showed a further decline but there is still a substantial quantity being produced over and above local requirements and consequently export to London will continue for some time. Realisations in London have been most disappointing as the market declined rapidly during the month. On December 1st values ruling in London for choicest quality butter were 72s. per cwt., but at the end of the month only 64s. to 68s. per cwt. were obtainable. This decline in values was most disheartening to manufacturers and producers as it necessitated a lowering in the purchase price of butter-fat. Owing to the State equalisation, however, local values were maintained (choicest creamy fresh butter in bulk, 1s. 0½d.; prints and delivery extra (these prices are subject to the stabilisation levies); store and collectors, 4d. to 4½d. per pound at store door, less usual selling charges.

EGGS.—Although exporting continued throughout the month, the quantities shipped overseas were considerably less than for the month of November, but this is to be expected because of the warmer weather. A large percentage of the eggs arrive in a heat affected condition and consequently are not suitable for export overseas. The quantity of poor quality eggs was very pronounced in the latter part of the month and this resulted in prices of the ordinary eggs being reduced ½d. per dozen. Ordinary country eggs, hen or duck, 3½d. per dozen; selected eggs, 1½ozs and over, 6½d. to 7½d. per dozen.

CHEESE.—Owing to the better demand on the local market and the seasonal reduction in production, the quantity packed for export by the South-Eastern factories was considerably less than during the month of November, but in order to clear the stocks, it will be necessary to continue exporting to a limited extent for some weeks to come. The London market for cheese is very weak. At the present time colored is realising from 42s. to 43s. per cwt. and white from 45s. to 46s. Owing to the weakness of the London market it was necessary to reduce values a further ½d. during the month. New makes, large and mediums, 5½d. to 6½d.; loaf, 6½d. to 6½d.; semi matured and matured, 9d. to 9½d. per pound

BACON.—The sale of bacon during the month was very satisfactory, and there was a particularly good demand for hams for the Christmas trade. Best local sides, 9½d. to 9½d.; best factory cured middles, 10½d. to 11d.; large, 9d.; rolls, 8d. to 8½d.; hams, 1s. to 1s. 0½d. per pound; cooked 1s. 2d. to 1s. 2½d. per pound.

LARD.—Sold steadily at quotations. Bulk lard, 5d. per pound; prints, 6d. per pound.

ALMONDS.—There was a particularly good demand for both shell and kernels during the early part of the month when traders were buying their requirements for the Christmas trade. In addition to the local sales, substantial quantities were shipped interstate. Buyers now having obtained their full requirements, the market is quiet and only limited business is being done. Softshells and Brandis, 8d. to 8½d.; Hardshells, 4½d. to 5d.; kernels, 1s. 11d. to 1s. 11½d. per pound.

HONEY.—Interstate buyers are only operating to a limited extent and the local market is dull. Although supplies of the new season's "take" are plentiful, the market is steady. Prime clear extracted in liquid condition, 3d. to 3½d. per pound; lower grades, 1d. to 2d. per pound.

BEE SWAX.—All supplies coming to hand are being readily cleared for manufacturing purposes and values are unchanged. 1s. 0½d. to 1s. 1d. per pound, according to sample.

LIVE POULTRY.—As is customary during the month of December, large quantities of poultry reached our market, and during the fortnight prior to Christmas daily auction sales were held. Very strong demand continued throughout the month, especially for quality lots, and high prices were realised. All poulterers report having experienced a very strong demand for poultry and that the Christmas demand cleared the whole of their stocks. Good prices therefore will continue to be obtained, and we advise consigning. Our sales are held every Tuesday, Thursday, and Friday, and crates will be loaned free of charge on application. Prime roosters, 4s. to 5s.; nice conditioned cockerels, 3s. 5d. to 3s. 10d.; fair conditioned cockerels, 2s. 10d. to 3s. 4d.; chickens lower; heavy-weight hens, 2s. 2d. to 3s.; medium hens, 1s. 6d. to 2s. 1d.; light hens, 1s. to 1s. 5d.; couple of pens of weedy sorts, lower; geese, 4s. to 5s. 9d.; goslings, 2s. 8d. to 3s.; prime young Muscovy drakes, 4s. 9d. to 5s. 6d.; young Muscovy ducks, 3s. to 4s.; ordinary ducks, 1s. 6d. to 2s. 9d.; ducklings, lower; turkeys, good to prime condition, 11d. to 1s. 3d. per pound live weight; turkeys, fair condition, 8d. to 10d. per pound live weight; turkeys, poor and crooked breasted, lower; pigeons, 3½d. each.

POTATOES.—New season's, 7s. 6d. per cwt.

ONIONS.—New season's white, 4s. per cwt.

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., EXAMINED DURING THE MONTHS OF OCTOBER AND NOVEMBER, 1933.

IMPORTS.

Interstate.

	October.	November.		October.	November.
Apples (bushels)	371	211	Cucumbers (bushels)	1,158	595
Bananas (bushels)	12,546	11,400	Garlic (bag)	—	1
Citrus—			Marrows (bags)	11	—
Grape Fruit (bushels) ..	2	3	Potatoes (bags)	663	3,161
Lemons (bushels)	3	—	Bulbs (packages)	42	59
Oranges (bushels)	12	7	Plants (packages)	108	84
Passion Fruit (bushels) ...	199	42	Roots, Grass (packages) ..	2	—
Paw Paws (bushels)	17	10	Seeds (packages)	58	59
Pineapples (bushels)	270	985	Wine Casks (No.)	2,787	2,473
Strawberries (package) ...	—	1			
Tomatoes (bushel)	1	—	<i>Fumigated—</i>		
Nuts—			Wine Casks (No.)	32	10
Almonds (bag)	—	1			
Cocoanuts (bags)	2	2	<i>Rejected—</i>		
Mixed (bag)	—	1	Bananas (bushels)	6	14
Peanuts (bags)	96	134	Paw Paws (bushel) ...	1	—
Peanut Kernels (bags) ..	20	10	Pineapples (bushels) ...	—	6
Popple (bag)	1	—	Plants (package)	1	—
Beans (bushels)	86	—	Second-hand cases (No.) ..	2	—
Carrots (bags)	147	—			

Overseas.

(State Law.)

Wine casks (No.)	816	1,384
Scalded.—Wine casks (No.)	50	—
Fumigated.—Wine casks (No.)	—	25

Federal Quarantine Act.

	October.		November.	
	Packages.	Lbs.	Packages.	Lbs.
Seeds, &c.	4,638	863,421	5,778	866,221
Canes	306	—	198	—
Chests, Coconut	200	—	602	—
Chests, Tea	2,939	—	1,637	—
Plants	2	80 (No.)	—	—
		Super Ft.		Sup. Ft.
Timber	151,172	3,134,198	84,317	1,046,963

EXPORTS.

Federal Commerce Act.

	Packages.			Packages.	
Colombo	Cherries.....	— 25	Singapore ...	Citrus—Oranges	5 155
	Tomatoes	— 80		Potatoes	5 5
	Vegetables	16 73		Other Vegetables	102 37
France	Citrus—Oranges	6 —	Straits Settle-	Apples	10 —
Netherlands,	Citrus—Oranges	— 68	ments	Citrus—Lemons	2 2
East Indies	Celery	— 3		Oranges	— 3
New Zealand .	Citrus—Oranges	29,684 20,796		Gooseberries ..	— 5
Singapore ...	Apples	10 —		Potatoes	15 —
	Citrus—Lemons	11 2		Other Vegetables	8 3

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of, and to the end of December, 1933 also the average precipitation to the end of December, and the average annual rainfall.

Station.	For Dec., 1933.	Av'ge. for Dec.	For Year 1933.	Av'ge. Annual Rain-fal.	Station.	For Dec., 1933.	Av'ge. for Dec.	For Year 1933.	Av'ge. Annual Rain-fal.
FAR NORTH AND UPPER NORTH.					LOWER NORTH—continued.				
Oodnadatta	0.57	0.47	3.67	4.69	Brinkworth	0.92	0.92	15.34	15.83
Marree	0.19	0.76	3.82	5.93	Blyth	0.77	0.94	15.94	16.80
Farina	0.05	0.60	3.61	6.48	Clare	0.90	1.15	20.89	24.66
Copley	0.20	0.78	4.87	7.93	Mintaro	0.62	1.19	21.65	23.47
Beltana	1.17	0.80	5.71	8.53	Watervale	0.93	1.29	21.22	26.91
Blinman	0.89	0.91	7.33	11.92	Auburn	0.96	1.08	22.25	24.00
Hookina	0.24	1.14	5.72	11.46	Hoyleton	0.40	0.90	16.08	17.35
Hawker	0.36	0.89	9.37	12.31	Balaklava	0.40	0.82	13.73	15.49
Wilson	0.62	0.95	10.40	11.82	Port Wakefield ..	0.47	0.63	12.01	12.06
Gordon	0.42	0.91	8.53	10.59	Terowie	0.37	1.08	10.69	13.40
Quorn	0.36	0.78	9.30	13.29	Yarcowie	0.28	0.89	11.50	13.63
Port Augusta	0.32	0.60	8.34	9.46	Hallett	0.65	1.02	15.13	16.48
Bruce	0.20	0.88	6.89	9.95	Mount Bryan	0.56	1.07	17.47	16.81
Hammond	0.71	0.87	8.60	11.27	Koorunga	0.97	0.97	12.98	17.92
Wilmington	0.51	0.90	11.62	17.43	Farrell's Flat ...	1.00	1.00	15.12	18.63
Willowie	0.94	0.88	11.35	12.28	WEST OF MURRAY RANGE.				
Melrose	1.03	1.03	19.59	22.94	Manoora	0.62	1.11	18.31	18.93
Booleroo Centre	0.83	0.99	14.10	15.23	Saddleworth	1.01	1.00	18.90	19.61
Port German	0.45	0.82	11.61	12.55	Marrabel	0.69	1.00	20.89	19.94
Wirrabara	0.77	1.03	16.78	19.34	Riverton	0.98	0.95	20.71	20.81
Appila	0.68	1.00	11.59	14.66	Tarlee	0.95	0.95	16.62	18.13
Cradock	2.57	0.87	10.51	10.83	Stockport	1.24	0.94	14.04	16.97
Carrieton	1.59	0.99	9.11	12.29	Hamley Bridge ..	1.00	0.94	13.40	16.61
Johnburg	2.08	0.93	9.68	10.59	Kapunda	0.78	1.02	17.90	19.82
Eurelia	1.29	0.92	9.70	12.85	Freeling	0.95	0.94	15.37	17.88
Ororoo	0.59	0.86	11.20	13.23	Greenock	1.52	1.08	19.54	21.57
Naackara	0.67	0.97	10.17	11.18	Truro	0.67	0.94	16.44	19.95
Black Rock	0.45	0.86	9.41	12.43	Stockwell	0.88	1.04	18.71	20.17
Oodlawirra	1.35	1.32	11.84	11.67	Nuriootpa	1.19	1.10	21.02	20.72
Peterborough	0.78	1.03	10.81	13.27	Angaston	0.84	1.10	20.24	22.47
Yongala	0.65	1.08	12.87	14.47	Tanunda	0.90	1.00	21.34	22.03
NORTH EAST.					Lyndoch	0.85	1.04	20.62	23.46
Yunta	0.95	0.74	9.08	8.54	Williamstown ..	0.90	1.09	27.81	27.77
Waukaringa	0.25	0.70	6.45	7.97	ADELAIDE PLAINS.				
Mannahill	0.24	0.75	7.55	8.21	Owen	0.57	0.73	15.65	14.53
Cockburn	0.02	0.67	7.17	7.98	Mallala	2.26	0.83	14.79	16.59
Broken Hill, N.S.W.	1.28	0.81	8.92	9.57	Roseworthy	1.57	0.84	17.73	17.39
LOWER NORTH.					Gawler	0.81	0.89	14.31	18.97
Port Pirie	0.38	0.79	10.38	13.26	Two Wells	1.00	0.83	15.35	15.75
Port Broughton ..	0.38	0.67	12.03	13.92	Virginia	1.41	0.91	17.44	17.18
Bute	1.15	0.73	14.82	15.49	Smithfield	0.95	0.89	17.34	17.65
Laura	0.83	0.89	15.62	17.99	Salisbury	0.95	0.87	17.17	18.59
Caltowie	1.44	0.96	16.01	16.75	Adelaide	0.83	1.00	22.12	21.15
Jamestown	0.68	1.09	14.26	17.75	Glen Osmond	0.38	1.20	26.64	26.03
Gladstone	0.84	0.88	13.98	16.33	Magill	0.28	1.25	22.64	25.60
Crystal Brook ...	0.50	0.90	13.70	15.82	MOUNT LOFTY RANGES.				
Georgetown	0.95	0.97	16.55	18.41	Teatree Gully ...	0.69	1.29	22.63	27.33
Narridy	1.34	0.86	12.65	15.88	Stirling West	0.94	1.88	48.54	47.05
Redhill	0.73	0.86	15.67	16.61	Uraidla	0.56	1.79	44.17	44.19
Spalding	0.84	1.19	15.71	18.99	Clarendon	1.20	1.39	32.30	32.89
Gulnare	1.04	1.04	17.79	18.71	Morphett Vale ...	0.84	0.97	21.73	22.68
Yacka	0.77	0.91	14.88	15.40	Noarlunga	0.27	0.78	18.44	20.41
Koolunga	1.00	0.93	13.21	15.43	Willunga	0.92	0.92	25.73	26.03
Snowtown	1.22	0.74	17.57	15.71	Aldinga	0.69	0.81	19.73	20.28

RAINFALL—continued.

Station.	For Dec., 1933.	Av'ge. for Dec.	For Year 1933.	Av'ge. Annual Rain- fall.	Station.	For Dec., 1933.	Av'ge. for Dec.	For Year 1933.	Av'ge. Annual Rain- fall.
MOUNT LOFTY RANGES—continued.					WEST OF SPENCER'S GULF—continued.				
Myponga	0.80	1.08	26.62	29.68	Rudall	0.36	0.58	13.66	13.12
Normanville	0.60	0.80	18.47	20.73	Cleve	0.73	0.68	17.50	14.79
Yankahilla	0.59	0.87	20.23	22.90	Cowell	0.29	0.53	8.61	11.12
Mount Pleasant ..	0.38	1.07	26.63	27.24	Miltalie	0.59	0.61	15.08	13.64
Birdwood	0.39	1.22	27.70	29.24	Darke's Peak ...	0.43	0.80	14.11	15.23
Gumeracha	0.45	1.37	31.80	33.44	Kimba	0.16	0.56	11.58	11.84
Millbrook Res....	0.45	1.67	32.28	34.82					
Tweedvale	0.46	1.38	36.80	35.97					
Woodside	0.66	1.28	32.75	32.30	YORKE PENINSULA.				
Ambleside	0.65	1.38	35.21	34.90	Walleroo	0.91	0.59	13.39	13.99
Nairne	1.35	1.15	30.70	28.17	Kadina	0.75	0.66	12.94	15.60
Mount Barker ..	1.43	1.29	31.43	31.97	Moonta	0.49	0.68	12.75	15.10
Echunga	1.82	1.28	35.31	33.26	Paskeville	1.13	0.67	13.94	15.52
Macclesfield	1.73	1.21	29.96	30.44	Maitland	0.61	0.78	16.44	19.97
Meadows	1.13	1.40	34.03	36.21	Ardrossan	0.51	0.57	13.29	13.98
Strathalbyn	0.80	0.86	18.62	19.32	Port Victoria ...	0.38	0.69	12.82	15.49
					Curramulka	0.60	0.74	14.30	17.95
MURRAY FLATS AND VALLEY.					Minlaton	0.48	0.63	14.58	17.85
Meningie	0.61	0.81	14.85	18.42	Port Vincent ...	0.25	0.69	12.30	14.50
Milang	0.62	0.70	11.57	14.97	Brentwood	0.41	0.62	14.69	15.58
Langhorne's Ck. .	0.66	0.80	13.69	14.90	Stansbury	0.29	0.60	15.59	16.84
Wellington	0.36	0.81	12.37	14.70	Warooka	0.26	0.55	14.50	17.53
Tailem Bend	0.42	0.97	14.59	15.08	Yorketown	0.30	0.60	13.87	16.94
Murray Bridge ..	0.33	0.78	9.40	13.64	Edithburgh	0.36	0.62	14.71	16.40
Callington	1.09	0.80	13.63	15.22					
Mannum	0.44	0.63	9.17	11.53	SOUTH AND SOUTH-EAST.				
Palmer	0.58	0.85	18.34	15.55	Cape Borda	0.82	0.78	22.35	24.86
Sedan	0.30	0.65	12.45	12.11	Kingscote	0.63	0.74	18.00	19.16
Swan Reach	1.17	0.71	11.44	10.62	Penneshaw	0.63	0.82	16.96	19.02
Blanchetown ...	1.50	0.71	10.12	11.03	Victor Harbor ..	0.96	0.85	19.21	21.42
Eudunda	0.53	0.96	16.32	17.18	Port Elliot	0.88	0.82	18.50	19.95
Sutherlands	0.43	0.73	9.51	10.88	Goolwa	0.68	0.78	16.11	17.87
Morgan	1.27	0.77	7.22	9.21	Copeville	0.47	0.87	10.31	11.57
Waikerie	0.53	0.78	8.14	9.70	Meribah	0.72	0.81	9.51	11.46
Overland Corner	0.26	0.78	7.19	10.37	Alawoona	0.75	0.74	11.05	10.29
Loxton	0.54	0.84	8.91	11.65	Mindarie	0.82	0.82	11.48	12.22
Renmark	0.22	0.81	7.13	10.49	Sandalwood	0.81	0.94	12.27	13.73
					Karoonda	0.47	1.02	12.42	14.48
WEST OF SPENCER'S GULF					Pinnaroo	1.17	0.84	10.94	14.57
Eucla	0.41	0.51	8.52	9.98	Parilla	0.23	0.81	9.83	14.01
Nullarbor	0.19	0.43	7.77	8.84	Lameroo	0.56	0.94	11.95	16.10
Fowler's Bay ...	0.12	0.31	12.55	11.93	Parrakie	0.97	0.87	14.07	14.64
Penong	0.14	0.47	12.76	12.23	Geranium	1.30	0.98	15.92	16.53
Koonibba	0.30	0.53	12.60	12.11	Peake	0.11	0.97	13.05	16.13
Denial Bay	0.21	0.39	9.43	11.52	Cooke's Plains ...	0.35	0.84	9.83	15.43
Ceduna	0.07	0.44	10.28	10.16	Coomandook	0.41	0.82	13.66	17.20
Smoky Bay	0.08	0.47	11.28	10.51	Coonalpyn	0.51	0.91	21.16	17.53
Wirrulla	0.08	0.49	10.98	10.50	Tintinara	0.48	1.07	18.24	18.73
Streaky Bay	0.28	0.43	14.67	14.88	Keith	0.47	0.99	16.67	17.96
Chandada	0.16	—	14.44	—	Bordertown	0.45	1.04	16.54	19.26
Minnipa	0.22	0.65	16.17	13.87	Wolsley	0.68	0.95	17.12	18.52
Kyancutta	0.43	—	12.34	—	Frances	1.12	1.19	24.48	20.01
Talia	0.13	0.60	15.14	14.63	Naracoorte	0.98	1.14	24.42	22.63
Port Elliston ...	0.13	0.50	18.45	16.50	Penola	1.69	1.32	23.65	26.05
Yeelanna	0.22	0.57	14.53	16.02	Lucindale	1.48	1.14	25.77	23.29
Cummins	0.21	0.64	17.31	17.61	Kingston	0.66	1.11	19.26	24.37
Port Lincoln	0.15	0.69	18.27	19.43	Robe	1.07	1.02	23.91	24.68
Tumby	0.30	0.77	13.63	14.14	Beachport	1.81	1.12	27.95	27.07
Ungarra	0.21	0.77	15.86	16.87	Millicent	1.38	1.29	28.75	29.81
Carrow	0.19	0.80	11.53	13.16	Kalangadoo	1.35	1.47	30.58	32.38
Arno Bay	0.37	0.66	13.28	12.63	Mount Gambier ..	0.78	1.63	23.36	30.55

AGRICULTURAL BUREAU REPORTS.

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Branch.	Report on Page.	Dates of Meetings.		Branch.	Report on Page.	Dates of Meetings.	
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Allandale East	†	26	23	Gladstone Women's ..	†	16	20
Alma	*	—	—	Glencoe	*	9	13
Appila-Yarrowie ...	*	R	2	Goode	*	—	—
Arthurton	†	—	—	Goode Women's....	*	—	—
Ashbourne	*	24	28	Greenock	722	8	5
Auburn Women's ..	752	26	23	Green Patch . . .	738	25	22
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Balumbah	†	R	—	Hartley	*	31	28
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Balumbah Women's	*	3	7	Hope Forest	†	1	5
Beetaloo Valley ...	719	29	26	Hoyleton	*	15	19
Belahe Women's ...	752	9	13	Inman Valley ...	*	18	15
Berri	*	22	—	Jamestown	*	17	21
Belvidere	745	—	—	Jervois	*	11	8
Blackheath	†	4	1	Kalangadoo Women's	*	13	10
Black Rock	*	R	6	Kalangadoo	*	13	10
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Blackwood	*	8	12	Kangarilla Women's	*	18	15
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Booborowie	*	29	26	Kapinnie	*	—	—
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Boor's Plains	732	R	4	Keith	*	25	22
Borrika	*	—	—	Kelly	*	27	24
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Brentwood	*	4	1	Kilkerran	733	25	22
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Cleve	*	6	2	Laura Bay Women's	*	9	13
Collie	*	3	7	Lenswood and Forest	*	—	—
Coomandook	*	26	23	Range	750	—	—
Coonawarra	*	25	22	Light's Pass	725	—	—
Coonawarra Women's	753	17	21	Lipson	739	27	24
Cummins	736	12	9	Lone Gum and	*	—	—
Cungena	*	4	1	Monash	743	31	28
Currency Creek ...	747	29	26	Lone Pine	727	29	26
Dudley	*	—	—	Lowbank	*	31	28
Elbow Hill	737	25	22	Loxton	*	12	9
Eudunda	*	1	5	Lyndoch	*	30	27
Eurelia	*	13	10	McLaren Flat	*	—	—
Eurelia Women's ..	*	3	7	McLaren Flat Wm's	755	4	1
Farrell's Flat	*	26	23	Macclesfield	*	18	15
Finnis	*	—	—	MacGillivray	†	30	27
Frances	†	—	—	Mallala	*	15	19
Frayville	720	—	—	Maltee	739	25	22
Gawler River	*	—	—	Mangalo	*	—	—
Georgetown	*	27	24	Mangalo Women's .	*	R	R

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Milang	750	27	24	Roseworthy	*	—	—
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Miltalie	†	—	24	Saddleworth Women's	*	2	6
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Morchard Women's ..	†	R	2	Snowtown	*	12	9
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Mount Gambier	*	12	9	Stookport	*	—	—
Mount Hope	740	30	27	Strathalbyn	*	10	14
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Murraytown	720	—	—	Tantanoola Women's	†	3	7
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Nantawarra	728	25	22	Tarlee	*	—	—
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Nelshaby	*	—	—	Tweedvale	*	18	15
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* No reports received during the month of December. † Held over. R In recess. ‡ Formal.

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

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[Branch Secretaries are reminded that the following are exempt from payment of the Annual Bureau subscription:—Life members, Branch Secretaries, members appointed before August 1st, 1930, and new members who reside in the same house as (a) a life member, (b) Secretary, or (c) another member who already subscribes.

The subscription for all other members is 2s. 6d., commencing from August 1st in each year, provided that—subject to the above exemptions—nominations forwarded during the months of January to June must be accompanied by a payment of 1s. 6d. each nomination for that period.]

MEN'S BRANCHES.

SOUTH-EASTERN DISTRICT.



Kybybolite Visiting Day. An address by Mr. Spafford at the sheep yard.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Allandale East .	27/10/33	9	Inspection of Grass Plots.	J. Laslett
Mundalla	30/11/33	21	Address—S. D. Garrett ..	A. Ross
Millicent	30/10/33	50	Address—A. G. Edquist .	L. Hutchesson
Millicent	24/11/33	6	Paper from <i>Journal</i>	L. Hutchesson
Allandale East	1/12/33	10	Paper from <i>Journal</i>	J. Laslett
Penola	8/12/33	12	Address—E. S. Alcock ..	F. Hinze

UPPER NORTH DISTRICT. (PETERBOROUGH AND NORTHWARD.)

WARCOWIE (Average annual rainfall, 11.42in.).

October 31st.—Attendance, 20.

COWS AS A SIDE-LINE.—Mr. R. Pampa contributed the following paper:—"In times of depression the farmer has to consider other ways of making a living besides wheat-growing and sheep-raising. One of the best ways is to run a few good cows, which should help to pay the store bill. I favor the Shorthorn for farmers. The cows are good milkers; the young cattle develop more quickly than most breeds, and realise better prices. The sire plays an important part in production. New blood should be introduced into the herd every few years, because as a rule there is too much in-breeding practised in most districts. There should be a change of bull every three or four years if farmers are to maintain a good class of cattle. This could be done by several farmers co-operating and purchasing a suitable bull. This would be cheaper for all concerned, and farmers would always have a good class of heifers as well. By these methods the class of cattle would always be improving, even if the foundation of the herd were not pure-bred."

FARM HINTS.—Mr. A. Crossman (Hon. Secretary) read the following paper:—"To make a cheap sandpaper spread hot glue over thick wrapping paper; then sprinkle with sharp selected sand. To keep eggs fresh a long while, dip them in melted fat before storing. Worn-out car tyres or machinery belting of rubber and fibre composition can be used to make hobble straps. Saw them into strips with a handsaw under water. Weather will never shrink or harden them, and they are always easy to undo. They will not chafe horses' fetlocks, and will last longer than leather. When grinding tools turn the stone towards the blade; if turned the other way it drags on the edge. Narrow blades such as chisels, &c., should be ground more on the edge of the stone. If held in the centre the face of the stone soon wears hollow, and is spoilt for grinding wide blades. Where grass seeds have been troublesome it will pay fat lamb breeders to shear the belly wool off all the rams. This can be done when the ewes go to the shed for crutching. The cost will be covered by the sale of the crutchings. Kerosene or castor oil is a soothing remedy for the eyes after grass seeds have been removed. When setting out trees for the nursery in land with a clay subsoil, do not dig out basins in the clay. In wet seasons these become waterlogged, and the roots rot. See that any holes made in clayey country have drainage. Fill the hole with decayed grass and leaves. Fruit trees will not do well if their "feet" are in a mudhole. Never hang gates on the posts of a fence; they will either lift or fall. If a couple of stout posts are sunk alongside, and the gates hung thereon, they will last twice as long as if attached to the fence. If obliged to strain to a splitty strainer, have two ends on the wire to be strained, and bring them both through the hole in the strainer. Attach the straining fork to one of these, and strain the wire. Then, without driving the plug, take the loose end and tie around the post in the usual way. The end used for straining can be tied round the other side."

WILMINGTON (Average annual rainfall, 17.43in.).

August 8th.—Attendance, 12.

STATION BRED HORSES FOR FARM WORK.—Mr. J. Moroney read the following paper:—"It is not economical to breed horses for farm work on small holdings in the upper northern wheat-growing districts if a suitable type can be purchased at a reasonable figure from far northern stations. It takes practically 3½ years from the time service of the horse is paid for until the colt is fit to work. For the first few weeks of the foal's life (which is generally fallowing time) the mother has to be spelled, then if the team is not of sufficient strength, some of the work is left undone. Owing to the frequency with which drought conditions prevail, it is not uncommon to have to hand-feed the colt for long periods, and at times the fodder is very costly. If a few cows are run on the pasture required for the growing colt, the profit from the former go a long way towards paying for the full-grown station horse, with which there would be no foaling risk or injury during its growing period." Mr. J. Modystach, in support, said a northern horse was just as easy to break in as a farm-bred horse. The station horse—medium draught—would stand as much work as any other horse. (Secretary, C. Cole.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Wilmington	31/10/33	18	Field Day, and Address— E. L. Orchard	C. Cole
Eurelia	25/10/33	9	Discussion	E. Wall

MIDDLE-NORTH DISTRICT.**(PETERBOROUGH TO FARRELL'S FLAT.)**

BEETALOO VALLEY (Average annual rainfall, 23.50in.).

September 4th.—Attendance, 11.

HORSES VERSUS TRACTOR.—Mr. P. Curtin read the following paper:—"In making a comparison of these two methods of working a farm of 600 acres over a period of 10 years, in that time there would be seasons when one and then the other method would be more payable. To work a farm of this area the following plant would be required:—12 horses at £25, £300; harness, chains, &c., £4 per horse, £48; total, £348. At the present time a good tractor can be purchased for that amount. Working expenses with the tractor during the year would be:—Ploughing once, harrowing and cultivating three times, including combining:—For kerosene ploughing, 300 acres at 2s., £30; cultivation, 900 acres at 1s., £45; harrowing 900 acres at 6d., £22 10s.; harvesting 300 acres at 1s. 3d., £17 10s.; petrol and grease, £10; oil, £15; depreciation and repairs, £100; total, £240. The cost of working horses can be set down as:—80 tons hay at £2 10s., £200; chaff-cutting same, £10; depreciation on horses, £25; harness repairs, £10; total, £245. To this must be added depreciation on stables, engine and cutter, chaff-house, &c., and also insurance. To start farming on an unimproved farm the tractor at the present time is cheaper than horses." (Secretary, B. Giddings.)

BLYTH (Average annual rainfall, 16.77in.).

October 27th.—Attendance, 16.

THE HORSE, PAST AND PRESENT.—Mr. A. Webber read the following paper:—"The draught horses that are being bred to-day are inferior to those of a quarter of a century ago. The horse of a few years ago was a big, upstanding, big-boned gelding that would work all day, make no fuss about pulling big loads and was never sick or sorry; the big roomy mare that could do her work, carry a foal, and deliver it without trouble; the magnificent stallions and the wonderful horses that used to shunt railway trucks at sidings or on the wharfs. Can anyone say the present-day horse is the equal of those referred to? Which horse does a buyer—be he a farmer or a dealer who comes on to a farm—look for? the big horse. Again, which horse do you point out with pride to a visitor? the big gelding or the big mare, not the light-boned, big-footed horse that is typical of the horses of to-day. The only point to which exception could be taken to the old type of horse was that they had too much hair on the legs. There were not many horses that could be condemned for that, and they could have been plucked, as was done with the new type. Previously, girth and cannon bone measurements were taken, and the bigger the measurement the more proud was the owner. *The New Type of Clydesdale—The Big Footed, Big Bodied, Light Legged Horses.*—The greatest praise the old type receives comes from the very people who are advocating the breeding of the light type, when they advocate two classes at shows; one for the draught and another for the Clydesdale. Will anyone say that the man who takes a size 12 boot has a more perfect foot than the man who takes a size 6 boot? The same applies to a horse's foot; it has no need to be big to be perfect. The big foot is a fault, especially on fallow ground. The long pastern that allows a horse's fetlock to touch the ground is a weakness. No wonder it is said "those horses push a load not pull it." *The small Cannon Bone:* A big man with spindle legs cannot be said to be well built. The legs have to do the work and carry the weight of the body, and a big topped horse with a very small cannon bone and a long and small pastern bone cannot be expected to stand up to his work or last as long as the horse with the big bones. Even the men with the new type horses agree that they cannot get the bone, and use the small boned stallion on big mares to try and bolster up the breed. They will soon have to get back to the big boned stallion, and with small boned mares put to a big boned stallion no end of foaling trouble will result. If you have a big boned, roomy mare, put her to the big stallion and produce a big boned roomy filly that can be safely bred from when this new fashion passes out and the true draught comes into his own again." (Secretary, R. Eime.)

MURRAYTOWN.

September 30th.—Attendance, 17.

The meeting took the form of a debate on the subject “Bags *versus* Bulk Handling of Wheat in South Australia.” The leader of the argument in favor of the bulk system, Mr. N. Scholz, was supported by Messrs. Pitman and Borgas. The debaters in favor of the bag system were Messrs. D. Bleischke, W. Joppich, and O. Reichstein. At the conclusion of a very spirited debate the judge gave a decision in favor of the old system 85 points, bulk handling 82 points. The Hon. Secretary also gave a report of the Annual Congress. (Secretary, E. Pitman.)

Other Report Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Appila	3/11/33	14	“Ignition Devices,” G. Wurst	E. Wurst

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

BROWNLOW.

August 2nd.—Attendance, 13.

FODDER CONSERVATION.—Mr. R. Steinborner contributed the following paper:—“Conservation of fodder is a farm essential which applies to every farmer that owns stock. Of the many fodders conserved the most important is hay. Care must be taken that this is not carted in too early after it has been cut, otherwise it will deteriorate. Sheaved hay should be left to dry for about three weeks; loose hay about one week. Stacks should be made with a good bed of straw. When building a stack keep the middle higher than the sides to prevent water running into the stack. After the stack is completed a good covering of straw is necessary to keep out the rain. This must be kept down with netting and weights hung on the sides. The only way to prevent mice from getting into a stack is to make it mice proof. Cocky chaff is also a valuable fodder in this district. A good bed of straw is also necessary for chaff heaps. Straw can be made into good fodder, and will keep for years, especially in times of drought. In the discussion that followed Mr. N. Brook said cocky chaff was better fodder than straw chaff as the twine was bad for horses. Mr. H. Roocke said mouldy hay should not be used for horses. (Secretary, F. Roocke.)

FRAYVILLE.

September 28th.—Attendance, 12.

BULK HANDLING.—Mr. H. Ramm read the following paper:—“Bulk handling has been adopted in New South Wales. This State is suitably adapted for the successful working of this system, as it has only one outlet port for exporting wheat. All this wheat flows into this one port or terminal, and is shipped overseas. Farmers have expressed entire satisfaction with this system, claiming that expenses have been considerably reduced, while others express dissatisfaction. Western Australia has also tried this scheme with the same results. Victoria has not yet adopted this system, but recently the Victorian Government decided on a bulk handling system for wheat-growing districts. South Australia has not yet definitely decided whether it should adopt this system, but it is a much discussed and debated question to-day. Geographically South Australia is not suitable for bulk handling. It has a greater number of overseas wheat shipping ports than are used by all the other wheatgrowing States of Australia put together. Wheat steamers are loaded at the wharveside of seven major ports in addition to 45 smaller places dotted along the South Australian coast. These are natural outlets for wheat exported from this State. The huge cost for the installation of terminals at these ports would be prohibitive when one considers that a scheme outlined by the Government embracing two of the major ports will cost approximately £720,000. Two zones will be formed—Wallaroo and Port Adelaide zones. Stations which are connected to these ports and have an average export of 30,000bush. will have elevators and silos erected. Silos are constructed of concrete or galvanized iron—the latter system being the cheaper. Railway trucks have to be made to haul the wheat from the stations to the ports. One of the primary considerations



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is that of cost to the wheatgrower. Would bulk handling be cheaper than the present system? Corn sacks are a great expense that the wheatgrower has to face at harvest time, and thousands of pounds go out of Australia for these necessities, but the money is kept in the Empire, but by bulk handling there will be an enormous saving to the wheatgrower. Wheat is carted in secondhand bags or specially constructed vehicles. The bags are either tied up or fastened with a skewer, thus doing away with the sewing and ramming bags. The wheat can be transported from paddock to silo without further treatment. Time is also saved at the silo, where the load is weighed on a weighbridge, and with the assistance of another man in charge of the elevator the grain is dumped into a shoot of the silo. The vehicle is then re-weighed, and a certificate issued to the seller on which is given the number of bushels. This certificate is transferable. This would be a much better way of storing wheat than that in vogue at the present time. It would be as good as free wheat, and could be sold to any miller or merchant at full market rates. The wheat at the silo.—In this case the only saving to the producer would be cornsacks and labor. In considering freight rate charges it is obvious that freight must be cheaper than that of bagged wheat. Who will benefit by the cheaper freight, the producer or buyer? The latter because when the wheat is sold at the silo the farmer ceases to be the owner of such wheat. The wheat is transported to the seaport in railway trucks, and then elevated into ships. Here again saving is effected, because grain ships cart wheat in bulk from 2s. 6d. to 3s. 6d. per ton cheaper than bagged. Will bulk wheat bring the same prices as bagged wheat? The containers are worth something to the purchaser. In Sydney at a certain date the estimated f.o.b. price for bagged wheat was 3s. 5½d., representing an approximate return to the growers of 2s. 8½d. Bulk wheat scrip on the same day was 3s. 5½d., with a return to the grower of 2s. 9½d., giving an advantage for bulk wheat over bagged wheat of 1d. per bushel. Does this penny saving warrant the erection of silos? The Farmers' Union has outlined a trial scheme for handling pooled and bought wheat in bulk, and has undertaken to pay all costs in connection with the scheme. Last year they made a trial shipment, and although they had to cut open the bags and tip them into the hold of the ship they loaded nearly 2,000 tons a day, the loading charter being 1,000 tons. The wheat was then sold at 3/16ths of a penny less than that of bagged wheat. If bulk handling comes to South Australia there will be a huge army of men thrown on the labor market. Lumpers would be done away with, wharf laborers and office clerks would be thrown out of work, and at Wallaroo 1,500 men would be thrown on the dole. Cornsacks are made within the British Empire in India. As the unemployment problem is a national one the increase in the unemployed must be considered. Jute farmers would go bankrupt and companies insolvent. India imports some of our wheat, and if we do not buy cornsacks India will look to other sources for her wheat. Bagged wheat will always have a demand, because certain countries are better suited to it. If all the other States adopt bulk handling and South Australia does not, cornsacks will be cheaper, and the price of bagged wheat in excess of that for bulk. If bulk handling is economically justifiable private enterprise would have invaded it long ago. Wherever there is a certain profit the enterprising business man is fairly certain to appear, but so far he has been content to leave this system alone. The present bulk handling scheme may be a good one, but if any scheme is to originate in South Australia let it be controlled by private enterprise." (Secretary, V. Eichler.)

GREENOCK (Average annual rainfall, 21.56in.).

October 9th.—Attendance, 35.

MONEY AND CREDIT.—Mr. E. B. Heysen read the following paper:—"In olden times goods were obtained by a system of barter or exchange, but this system did not always prove satisfactory, and to overcome many difficulties that arose various coins or tokens were evolved. In civilised countries they are usually manufactured from copper, silver, and gold, because these basic metals have a reasonably consistent value. For many years these tokens were the only means of purchasing anything. With the advent of banking institutions a system of credit was begun, when treasury bonds and bank notes were brought into use. At first these bank notes were made only for large amounts for the convenience of customers who wished to transport easily large amounts of money. However, successive Governments gradually increased their use and decreased their value until to-day we have notes of low face value and still lower cash value. At present there is an idea that credit of all descriptions can be obtained to an unlimited extent, but this is erroneous. A bank cannot create credit in the sense of bringing it into existence out of nothing; it cannot lend nearly so much as it can borrow. To quote from 'Banking' by an English authority, Dr. Walter Seaf, 'The banker's business is founded on his deposits, and limited by them.' Messrs. Mills and

Benham, in their book 'Banking and Foreign Exchange,' emphasise that there is one feat that a bank does not and cannot perform—it cannot lend more purchasing power than it receives. H. T. Easton, the author of another volume on credit, says, 'A banker cannot use more than 60 per cent. of his capital and deposits in making loans or discounting bills.' Still the idea exists that the banks can create unlimited credit, that somewhere, locked away in the strongest safe of a bank is some mysterious power which can supply credit without end. Another important limit to the lending capacity of a bank is the necessity for keeping a certain ratio between advances and cash reserves. In Australia the practice is to keep a cash reserve of about 15 per cent. of the total deposits, and this, together with the general trading conditions of the country, fixes a fairly rigid limit to a bank's capacity to lend safely. When lending, it must be borne in mind that the amount of credit is definitely limited to the value of a security the value of which is strictly based on what that security would bring as a result of a forced sale in depression periods. The following is an example. A property is for sale, this property is naturally of greatest value to the owner of the adjacent block, who, to enlarge his own property, will offer more for it than a man further away. This larger price immediately enhances the value of neighboring properties, but does *not* reflect the true value of the land. The purchaser then attempts to raise money on the newly acquired land, but finds that in the banker's mind the value is considerably less than that which he gave for it. The banker knows the purchase price as the "sentimental value" and cannot use that as a basis for a loan. Another point which tends to perplex a man is that when he places money in the bank he obtains only 3½ per cent., whereas, when he borrows it he has to pay 5½ per cent. on his overdraft. This extra 2 per cent. is used by the bank to pay expenses such as salaries, &c., and to cover any losses that might accrue. The bank is only a depot, as is a store, and is entitled to its just profits. It might be interesting to note that 2 years ago the rates were 5½ per cent. for fixed deposits and 7½ per cent. for overdrafts. The Commonwealth was, at that time paying 6 to 6½ per cent. for its Treasury bonds and loans, whereas since the compulsory conversion of all bonds it pays approximately 4 per cent. Why does the Commonwealth pay ½ per cent. more than trading banks? It is well known that the more desperately one needs money the larger the interest rate that has to be paid. The Commonwealth Government, therefore, tried to make its proposition more attractive by offering a larger rate of interest in order to encourage the investor to assist them.

CHANNELS THROUGH WHICH CREDIT CAN BE OBTAINED.

Money is required for expansion, renewal of plant, or some other purpose. The bank manager is approached and the matter discussed. He will want to know what security is offered and, on the value of that, will decide the amount of overdraft. This overdraft is rarely for any stipulated period and the borrower can at any time be called upon to reduce it. However, it is not intended to convey the idea that if working on an overdraft a forced sale may be held at any time. So long as interest is met and reasonable use of the money is made the banker knows that it is to his interest to allow matters to stand. He, however, likes the borrower to meet him occasionally and discuss his position. The overdraft is really the best form of obtaining credit, for each time a transaction takes place the interest is calculated so that one only pays for the money on loan. In other forms of loans, however, certain interest dates are fixed, and even if reduction is made before the due date, the full amount of interest must be paid.

MORTGAGES.

Another mode of obtaining money is by means of a mortgage. Here, too, a security must be given, but the difference between this and an overdraft is that payment cannot be demanded until the date on which it is due. Bank mortgages, however, like overdrafts, are payable in demand. In the event of a mortgage not being paid when it falls due, a forced sale can be made. Once it falls due, unless it is renewed, the mortgagee can cause the sale to take place at any time he wishes. For safeguard, therefore, it is wise to make application for renewal before the time expires. A mortgage will be accepted as security by a bank for overdraft. The law regarding second mortgages is interesting. A second mortgagee, may, when the first mortgage falls due, compel the first mortgagee to foreclose and accept the amount due to him. When foreclosure is made, the security must be sold by auction and the balance, after the creditors have been paid, is paid to the unfortunate who has been sold up.

BILL OF SALE.

Another form of security is the bill of sale. Here the articles are nominally sold to the lender, and unless the amount borrowed is repaid, become his absolute property, the borrower having no more interest in them. As with mortgages, a bill of sale should be registered in the interests of both parties. A bill of sale is usually given

on some moveable property such as stock, implements, and furniture. A man wishes to borrow money. He has a harvester and as it is winter time does not need it for some time. He therefore goes to someone with money to lend and signs a document which states that his harvester has been sold for a certain sum of money. This document is held by the lender while the borrower keeps the machine until such time as the borrowed money and interest is repaid. If this is not done, the lender has full legal rights to take possession of the machine and to regard it as his own. Should the borrower at any time prior to repaying the lender attempt to dispose of the harvester, he can be charged and convicted of larceny.

HIRE-PURCHASE.

The hire-purchase system appears at first glance an admirable method of obtaining goods on credit. By this means practically anything can be obtained, but the system has its drawbacks. The article does not become ones property until the final payment is made. The purchaser contracts to hire the car for a stipulated sum at certain periods. Should he fall in arrears with these payments the seller can take possession of the car. The matter, however, does not end there. The hirer can be sued for all arrears of payments besides losing all interest in the car. Should he be able to make up arrears, once the car is repossessed, he still has no claim on the car, for those arrears constitute a breaking of the agreement, losing for him all his rights. Here again a chat with the seller of the car will often prove advantageous, and an extension of time obtained which, if put in writing, safeguards the buyer.

PROMISSORY NOTES.

The worst form of security however is the promissory note. Here the borrower pledges himself. By means of a document, very often in the form of a post-dated cheque, he contracts on a certain date to pay the specified amount. Should this not be met, the creditor, by means of the court, can obtain an order to sell sufficient of the debtor's goods and chattels to cover the amount payable.

According to the law there is no obligation whatever for a lender to ask for either his principal or interest when it falls due. The onus is on the borrower, who cannot claim that he had no notification, and unless he pays the lender can claim a breach of contract." (Secretary, A. Schubert.)

November 6th.

WINE MAKING FOR THE GROWER.—In the course of an address on this subject Mr. C. Pollitt, of Tanunda, dealt almost entirely with the sherry type of wine, saying that sherry was almost the only wine that a grower could manufacture successfully without having an elaborate plant, and it could be successfully stored for maturing in any shed. He maintained that a high class sherry could only be made in small quantities, and for that reason a grower would have a decided advantage over the big wine maker. The grower could more readily give the small attentions necessary for manufacturing a really high class sherry type wine than a wholesale manufacturer, and there was always a keen demand for a high class sherry. Mr. Pollitt said suitable varieties for making sherry were Riesling, Pali Mena Blanco, Sherry, and Pedro. Wine for making sherry should not be fermented on skins, but made into vinegar or spirits. On being asked whether Tokay and Madeira made a good sherry Mr. Pollitt replied that those grapes make a good Tokay and Madeira type. Here again the small maker could produce a much better class of wine than the big wine maker, because those wines also required little attentions that the larger maker could not give. Mr. Pollitt insisted that all grapes should be allowed to develop a big Baumé on the vines, or the grapes picked and allowed to lie and dry from a day to a week; grapes treated in that manner for wine would not require so much spirits and would produce a better type of wine. Frontignac made a good wine and was drinkable at the age of 12 months, but it did not sell so readily as Sherry or Tokay. White Hermitage, said Mr. Pollitt, was a very hard wine to handle, and was considered of very little value in the Greenock district. It was possible to make sherry from Doradillo grapes, but it was a low class wine, with a Doradillo flavor and required a large quantity of spirits, which made it an expensive wine to manufacture. The very best was only second class wine, sometimes it was used for blending, but the speaker strongly recommended that this should not be done because it was far better to have a small quantity of good sherry than to have a larger quantity of second class wine. On being asked why Grenache had evidently gone out of favor with wine makers in the district, Mr. Pollitt replied that he could not say, it was possible to handle large quantities very successfully and make wonderful ports from this grape, but it did not last much longer than 5 years. It did not make the same class of wine as Shiraz. One member asked what would happen if 50 per cent. of the growers processed their own grapes, the reply was that the big wine

makers would become their best customers once they became used to that, and they probably would find that they could buy better wine and cheaper wine that way than they could produce themselves. An intelligent small wine maker, using common sense could always produce a higher and better type of wine than the wholesale manufacturers. White and Red Malaga made fine wines. The White Malaga especially made a very pleasant and full bodied wine which had a very good sale. Red Malaga made a good pale port. Would it be possible to make a good unfermented wine, suitable for non-alcohol drinkers, which would be tasty and attract the taste of the public? Mr. Pollitt's reply to this question was that as yet the manufacture of unfermented wines was not a success, they had a poor flavor and no keeping qualities and often it was found that they became an intoxicating drink after some time. The Pure Foods Act only allowed sulphate compounds in manufacturing unfermented wines, and those compounds did not appear to be a success. (Secretary, A. Schubert.)

LIGHT'S PASS.

October 24th.—Attendance, 24.

BOWEL DISORDERS OF HORSES.—Mr. J. Baum read the following paper:—*Stoppage of the Bowels.*—This is a common condition among hard working and well fed horses. Usually is it not a fatal disease if the proper treatment for it is undertaken without delay. *Causes:* Improper feeding, irregular work, bad food, bad teeth, and insufficient water. *Symptoms:* Dullness, loss of appetite, and a disposition to lie down. Even while the other animals are at their midday meal the affected one will sometimes be found lying in his stall. As time goes on there is a slight increase of pain indicated by the animal pawing and looking around to his flank. He now lies more than he did at first, and is often found lying flat on his side with his head on the ground. He may lie in this position for half an hour at a time, then he may get up, walk a little, and lie down again. When on his feet he sometimes strains as if trying to pass water, but without relief. He does this so often that the owner is led to think that the horse is suffering from a spasm at the neck of the bladder or some kidney disease, and as a rule treats him accordingly. The cause of straining is due to pressure on the bladder by an overloaded loop of bowel. There is usually little pain and no fever at the outset. *Treatment:* Give at once linseed oil 1 pint, turpentine $\frac{1}{2}$ oz. Follow this with the following as soon as it can be made ready:—Powdered aloes 1 oz., linseed meal 1 oz., belladonna extract 1 dram. Mix the whole in 1 pint of boiling water, stir together, and give dose when cool enough. If the stoppage is due to large quantities of dry food it may be 48 hours before the medicine operates, and then it is not likely to cause scouring. It will be observed that the horse will begin to eat a little many hours before the medicine acts. While waiting give an occasional injection of warm water and soap. Do not be tempted to give pain-killing medicine unless the animal is in pain. About 80 per cent. of those cases which are thought to be water troubles are bowel troubles, and should be treated as such.

INFLAMMATION OF THE BOWELS.

This is a very serious condition, and one that will prove fatal unless promptly and skilfully handled. *Causes:* Irritant food, chills, drinking frosty water, eating frosty grass, exposure to inclement weather, fording streams in cold water when the animal is in a heated condition, and the giving of too violent purgative or irritant medicines.

Symptoms: When first seen to be ill the animal shows more or less distinct signs of pain. He lies and rises just as when affected with gripes; hence most farmers mistakenly treat such cases as gripes or colic and give only a soothing or pain-killing drench. In doing so they run a great risk of losing their horses. At first small quantities of dung are passed, and the owner is likely to reason from this that the bowels are all right and the water must be the trouble. These first pellets of dung are of a brownish color, later pellets are smeared or streaked with blood. After this no more dung is passed, but if an odd pellet is found in the rectum it is likely to be coated with a mucous lining. The pulse is increased in rapidity, and may go up as high as 100 per minute, but it runs about 80 on an average. In some cases the horse has a habit of turning up his upper lip, but too much reliance should not be placed on this as a symptom of this disease. The chief indications of inflammation of the bowels are constant pain with no intervals of ease as in colic or gripes, rapid pulse, blood-stained dung, and the fact that gripe drenches have little effect in easing the pain or of slowing the pulse. *Treatment:* Give at the outset linseed oil 1 pint, follow as soon as possible with Barbados aloes 4 drams, linseed meal 1 oz., belladonna extract 2 drams. Melt and mix the whole in 1 pint of boiling water, and when cool give as a drench. If the animal is indoors, or if he can be protected from cold winds, wring a blanket out of boiling water, making it as dry as possible, place it around the belly, and cover over with a dry horse rug. Change the blanket every hour or two, and take great care

that the horse is not chilled when changing it. If pain becomes excessive during the above treatment try to control it with a dram of belladonna extract every two hours, or give the following drench every two or three hours:—Laudanum 1oz., sweet spirits of nitre 1oz., linseed oil 4ozs. This is all that a farmer should do in a case of this kind, and in many cases it is quite sufficient, but whenever possible the services of a veterinarian should be obtained, because treatment should be modified to suit changes that take place during the progress of the disease.

COLIC OR GRIPES.

This is probably the disease best known to the horse owner. It is of very frequent occurrence, and almost every farmer is familiar with the symptoms which accompany it. It consists of spasm or cramp of one or many portions of the bowel. *Causes:* Feeding at irregular intervals, allowing horses to bolt their food, irritants in the bowels such as worms, and indigestible food, bulky food, frosty water, sudden changes of temperature, and over driving. *Symptoms:* Pawing and scraping with the fore feet, looking around to the flank, attempting to lie down, lying and rising, rolling, sweating, groaning, and then an interval of ease. During attacks of the spasms the pulse beats are increased in number, going as high as 70 or 80 per minute, but when relief comes it gradually falls back to normal. When soothing or pain-killing doses are given the symptoms become greatly modified. *Treatment:* Give the following as a drench:—Powdered aloes, 1oz.; treacle, syrup, or sugar, 2 tablespoons; linseed meal, 1oz.; boiling water, 1 pint. Mix, and when cool add laudanum, 2ozs.; sweet spirits of nitre, 2ozs. If aloes are not at hand use 1 pint of raw linseed oil instead. The linseed meal is used to prevent the aloes from knotting when the water is added, and it may be dispensed with when linseed oil is used instead of aloes. If pain returns some time after the above dose has been given repeat the laudanum and sweet spirits of nitre in the same quantities in a small quantity of linseed oil. If thought necessary give an injection, and apply hot blankets to the belly.

FLATULENT COLIC.

This is a condition very different from spasmodic colic, and is much more difficult to treat. It is due to fermentation of food or other matter in the bowels. *Causes:* Eating green food, frozen grass, and wet sheaves in harvest time. *Symptoms:* The animal shows all the signs of spasmodic colic, but in addition becomes greatly distended at the flanks as the disease progresses. If this bulging at the flanks is detected, and it is known that the animal has been subjected to any of the causes mentioned above, then treatment for this condition should be adopted from the start. If the distension is not observed, and the case is mistaken for one of ordinary gripes, then no harm will result if the gripes treatment is continued, because nothing seems to be of much avail in dispelling gas, although many substances are recommended for that purpose. It will generally be found that until the aloes operate no relief will be obtained. As there is aloes in the gripe dose recommended, it will be found a safe method of procedure to give that dose in doubtful cases rather than do nothing at all. *Treatment.*—Give the following as a drench:—Powdered aloes, 1oz.; linseed meal, 1oz.; hyposulphite of soda, 2ozs.; treacle, syrup, or sugar, 2 tablespoons; boiling water, 1 pint. Mix the whole together, and give when cool. If relief is not obtained continue giving every three hours:—Turpentine, ½oz.; hyposulphite of soda, 1oz.; linseed oil, 6ozs. In this disease it will be found that when all the doses known to the farmer have been given and the animal is still in pain no time should be lost in securing the assistance of a competent practitioner. (Secretary, O. Verrall.)

October 30th.—Attendance, 31.

HAYMAKING.—Paper read by Mr. A. Nitschke:—"Select a piece of ground, as free from stumps, sticks, and stones as possible, to be sure of getting the maximum cut. In many instances the crop is cut too soon, and the hay is not as good as would be the case if it had been left until the grain is full and has lost its green colour. *Stooking.*—Stooks should be of an average number of sheaves—from 20 to 25—so that the hay dries evenly. Stooking may be done directly after the binder, or the sheaves may be left to dry for a day or so. When stooking, the first sheaves should be put upright with not too much lean given the outside sheaves because if for any reason the hay is left out in the field for some time, the stooks will not go flat, and in case of heavy rain, very little damage will be caused. *Stacking.*—There are several methods of stacking, the one mostly in use being the butt out method. I favor the following method:—First, the outside layer is always laid butts out, sheaves should not be placed on the flat, but at a slight angle with the knot down. The second layer with heads out to cover the string of the first layer. Then place the next layer with the butt against the butt of the second layer, and repeat until the centre sheaves of the stack meet

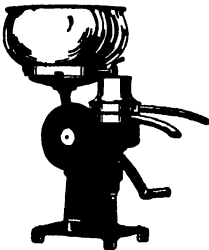
the butts on heads, &c., next or third layer from outside, heads out again and follow the same procedure, gradually getting the centre of stack about 3ft. higher than the outside. With this method there will be less damage by rats or mice, and more hay can be stacked in the same space. Vermin can only get along where the butts of sheaves meet, and to get to the grain the mice must eat their way right through the sheaves. Stacks can be built with round or square ends or corners, and if straw is not available to put on the stack when it is finished—and knowing this beforehand, a stack can be made to withstand a lot of rain without any straw covering by adopting the following method:—The sheaves for the eaves may be placed out about 6in. over the walls of the stack, and all following layers gradually brought back and tapped level with a board on the end of a stick; the end of a petrol case makes a nice handy size, nailed on to a piece of light timber. The sheaves are tapped back to make the roof of the stack level with an angle of about 75° and if no straw is put on, the stack will stand any amount of rain, none of which will penetrate to the sheaves." (Secretary, C. Verrall.)

LONE PINE.

A BACHELOR'S LIFE ON A MIXED FARM.—In the course of a paper on this subject Mr. A. B. Fromm said that in mixed farming the jobs that had to be done kept one busy from early morning until late at night, and perhaps only those striving as bachelors for a living on a small holding were in a position to appreciate the situation. One never was able to say, "To-morrow I have nothing to do," especially with 25 acres of garden, five cows, 150 to 160 sheep, two horses, pigs, and 300 to 400 white Leghorn fowls. First thing in the morning one found the cook and the fire both out, and if the need of a cup of hot coffee was felt the only answer was, "Do it yourself"—the theme of the whole day's work. After deducting 25 acres of garden, approximately 80 acres was left for grazing or cropping. He preferred the former, for the more paddocks one had the more stock could be kept. Sheep and fat lamb raising were perhaps the most profitable, especially this year with increased prices for wool and lambs by comparison with the last few years. They also required less attention than cows kept for cream and butter. With cows there was day in-day-out milking, separat-

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ing, and cleaning up. With, say, five cows, quite a few hours were required every morning and night, and another disadvantage was that one was tied down to the place. Although almost as big a tie, he preferred fowls, because while they required attention they were always handy if kept properly housed and supplied with an automatic system. They also showed slightly more profit than cows, but must be maintained under modern conditions, none being kept for more than three laying seasons at the very outside. Chickens have each year to be obtained to replace the culled fowls. And gathering, cleaning, grading, and packing eggs for market was another of the bachelor's tiresome jobs. It generally had to be done at night by lamplight, while the wife or children of a married man would have time to do it during the day. Then came the many other jobs that filled in the lonely evenings one after another. Of course the monotony would be relieved if finance permitted the securing of a radio set so that one could listen in. But in the main one heard the same echo and re-echo of the morning, "Do it yourself. (Secretary, S. Turnbull.)

NANTAWARRA (Average annual rainfall, 15in.).

November 2nd.—Attendance, 6.

THE BROOD MARE AND FOAL.—The following paper was read by Mr. L. Belling:—"In order to arouse interest in horse breeding, the farmer should encourage his son to save his money and purchase a mare rather than wait until he is old enough to start farming on his own. Procure the best mare possible, and breed from the best stallion in the district. Start breeding from a mare at three years old. A mare's period of oestrus is about 1 week, with 3 weeks between each period. If a mare proves difficult to get in foal, give her a douche of bicarbonate of soda, at the rate of 3 to 4 table-spoons to 1 gallon of warm water one or two hours before service. The brood mare should never be over-worked but kept in fairly good condition. A mare in foal needs every care to prevent abortion, which may be caused through hard work, jamming through narrow gates, kicks, falls, or serious illness. Any mares that have aborted should be kept separate from other mares for a few days. In case of abortion a mare should always be given a wash-out with weak Condy's fluid. A wide swing should be used when a mare is heavy in foal. If possible, work her on the outside of the team, if more than one, work them side by side, because mares that are in foal seldom bump each other. The mare should be kept in steady work until within a week or fortnight of foaling, and then put in a small paddock, one near the home for preference, where she can be watched and given assistance if necessary. First it is necessary to have a little carbonised string with you in case the navel cord has to be severed. If the head of the foal is not resting on its forefeet it should be turned. When working around a mare, hands should be cleaned and disinfected, a little oil is helpful, too. The work should be done as quietly and quickly as possible. If the mare foals all right, she should be left alone for a while until the foal can find the use of its legs. After it can get about it should suck and then have the use of its bowels. If the afterbirth does not leave the mare in 8 to 10 hours remove it gently by hand. The first mare that foals should not be turned into the same paddock as the other mares until the foal is about a fortnight old. After the first foal, the horses do not take so much notice of the others. To give a foal the best chance the mare should not be worked, keep her in good condition. Foals should be weaned at about 6 months old and kept in a yard or small paddock. They should also be well fed; a little Epsom salts in their feed daily is very good. Handle the foals so that when they are ready to break in this job will not cause very much inconvenience. They should be broken in to work at from 2½ to 3 years old." Mr. N. Robinson spoke on the benefits of breeding good stock. Mr. A. F. Herbert gave examples of good breeding and the care that was necessary with breeding animals. The Hon. Secretary (Mr. S. Herbert) spoke of an experience of two pregnant mares jostling in a team, one mare giving birth to a dead foal. He said a mare could be worked safely to within a day or so of foaling providing the work was constant and regular. Mr. E. Herbert mentioned that foals were weaned at 3 months in cases when fed on bran, &c., but a foal must not be made fat by hand feeding.

SUTHERLANDS (Average annual rainfall, 10.82in.).

September 7th.—Attendance, 19.

SHEEP IN LOW RAINFALL AREAS.—Paper read by Mr. N. Bahnisch:—"For this district I favor the Merino that will grow a medium wool of good quality. In addition, the Merino is more easily controlled than the English or mutton breeds. If a flock is kept for breeding, endeavor to procure the best class of sheep that finances will allow. Large-framed, plain-bodied ewes of good constitution should be kept, using rams of similar type, with soft, clean faces, and wide open horns. Shearing is a good time to class the flock, marking off any sheep that do not conform to the desired type. Quality

of wool, conformation, constitution, hairy breech, and faulty mouth should be kept in mind when classing. It is desirable to dispose of any sheep not required—especially young sheep—before grass seeds become troublesome. If possible, have the ewes lamb when a supply of green feed can be expected. Where paddocks are small, 2 to 2½ per cent. of rams should be ample. Under normal conditions, a ewe comes in season every 3 weeks, so that a joining of 6 weeks means that each ewe is in season at least twice. Ewes should be crutched 3 or 4 weeks prior to lambing, and at the same time the wool removed from around the udder to give the lamb a better chance to find the teat. Crutching and jetting help to minimise fly trouble, but any sheep that are struck should be attended to at once. Gives ewes well watered and well sheltered paddocks in which to lamb. All water supplies must be kept very clean. Sheep on fresh water readily take salt if put in a trough near the watering place. It is valuable to keep sheep healthy when no green feed is available. Maiden ewes, when possible, should be lambed down with the other ewes. The older ewes have a stealying effect on the young ones, who are usually timid and easily frightened when lambing, and will sometimes leave their lambs. Ewes should be gone through as often as possible when lambing, and any having trouble assisted. It is a good practice to sow an area with green feed for the ewes and lambs each year, thus ensuring earlier feed and a good start for the lambs. Tailing can be done when lambs are from 4 to 6 weeks old, providing the weather is not frosty. Before lambing begins, baits should be laid for foxes, and continued throughout the period of lambing. This can be done by dragging a trail and laying baits treated with strychnine; also any lambs that die can be poisoned. Sheep do not require the amount of attention that other sidelines do. They give a double return—wool and lambs. A flock of ewes is the most profitable. Merino lambs are the best for the low rainfall districts, because if unable to fatten the lambs in the lean years they are valuable as wool producers. When a lean season is experienced the surplus sheep can be disposed of, saving only the best ewes, and then the flock can be built up when favorable conditions return. Do not overstock. A few sheep well kept bring in a greater return than a large number underfed. In a late season it pays to hand-feed lambing ewes until green feed comes. Oats and hay chaff is the cheapest and most valuable feed." (Secretary, E. Schiller.)

October 5th.—Attendance, 25.

SOIL CULTIVATION IN THE SUTHERLANDS DISTRICT.—Paper read by Mr. N. Niemz:—"Much is still to be learnt concerning the correct handling of mallee soils. The matter has been further complicated during recent years by the tendency of many of the mallee soils to drift, spoiling much of the cultivation work. Theoretically, it is not correct to leave stubble residues on the surface or to plough them in, neither is it correct to sow ploughed areas lightly and graze them off instead of fallow. Farmers have learned, however, that they cannot economically plough in unrotted straw, because this gives trouble with subsequent cultivation, and also is not completely decayed before the sowing of ensuing crop, causing weakened plants and increased disease infestation. Experiments have proved that cultivation methods have mostly shown that the earlier the fallowing work is done the better will be the result. It would appear, in this district, that time of fallowing has a very important bearing on the resulting crop. During recent years in particular farmers who have completed their seeding comparatively early, and have immediately started fallowing, finish the initial operation before the end of August. It has been experienced that not later than July is the best time for fallowing, if good results are to be expected. Fallowing at any period prior to the end of July gives very similar results, but at any later date there is a definite loss. Summer fallowing has not proved as effective as early winter fallowing, so far as can be noted. Farmers in this district have learnt that it does not pay to work the soil deeply. Seed-bed consolidation is difficult to obtain, owing to mallee soils and low to moderate rainfalls, and it has proved advantageous to leave the subsurface layers undisturbed. There have been many examples of reduced yields where the fallowing has been too deep, and so the majority of successful farmers do not plough to a greater depth than 2ins. to 3ins. When winter rains are normal at fallowing time, there is a considerable growth of grass and weeds in the paddocks. No implement will destroy and bury these so effectively as the mouldboard plough. In dry seasons, with comparatively little growth of pasture, cultivators do quite effective work. The implement for fallowing will thus always be controlled by the seasons, and farmers will need to choose that which—while being the most economical—will destroy weed growth and at the same time stir up all the soil to an even regular depth. In areas liable to drift some farmers are using the tine cultivator for fallowing, the object being to leave the grass and stubble residues on the surface, instead of burying them, with the idea of preventing the displacement of surface soil by wind. This treatment makes cultivating very difficult, but any method which prevents drift is worth trying, and there have

been quite good crops grown on land treated in this manner. There is at present a wide difference of opinion between mallee farmers as to the amount of cultivation necessary on fallows. It is certainly not wise to cultivate this country to a smooth even surface during spring and summer, because wind is almost certain to spoil the work. Because of this, the use of harrows is steadily declining. It seems quite necessary that the surface be left somewhat ridged, across the direction of the prevailing wind, if possible at least until after harvest. The tine cultivator for fallow working declined in popularity for some years, owing to easier cultivation with the spring-tooth combine. It would seem that too much cultivation prior to harvest leads to drift, yet weeds must be controlled. The practice of many successful farmers during the months when winds are likely to cause damage is to control weeds by sheep, as far as possible, and when cultivation is essential, to leave the surface well ridged. Cultivation after a summer rain can always be depended upon to increase the yield, probably due very largely to the activity of nitrifying bacteria in the soil at this time. Farmers should be ready at any time after harvest to take advantage of rain which may fall. Those weeds most commonly seen in wheat crops in this district are wild mustard, iceplants, wild oats, buckbush, soursobs, &c. *Wild Mustard*.—This weed is difficult to control, because of the large amount of seed produced by the plants, and the fact that the seed lives for a long period without germinating if buried deeply in the soil, a characteristic shared by wild oat seed. Wild mustard seed near the surface does not germinate at once, and so farmers are troubled by successive germinations after each autumn rain. Fresh seed may be brought up by general cultivation at too great a depth, or by some tines of the cultivator being strained and so working too deeply. Each fallowing is a partial means of control, so portion of the seed then germinates almost immediately, and care should be taken subsequently that cultivators work to a shallow depth—less than the depth of fallowing—to avoid continually bringing other seed near the surface, where, with air and moisture, it germinates. *Iceplants*.—In a wet season this plant causes much damage to cereals. The plants when established are most tenacious of life, and often continue to grow when almost completely buried, when uprooted and lying on the surface. Under wet spring conditions, in the absence of sunny, frosty, or windy weather, this weed is impossible to kill, and is responsible for destroying quite large areas of crop. There is only one means of effective control and that is to kill the weed in the seedling stage. *Wild Oats*.—The wild oat is chiefly noted for the long period during which the seed will retain life in the subsurface soil without germinating. Even when near the surface, it fails to germinate with the first rains, appearing often after the crop is sown. This is probably due to the hairy coating of the grain, which keeps the soil moisture away from the seed itself for a time. Methods of control are similar to those for wild mustard—early fallowing with later cultivations not disturbing any seed in the subsurface layers. *Buckbush and Biennial*.—These two weeds are very easy to control. The tine cultivator is the best implement to kill these weeds. The biennial grows for a period of two years and then disappears. *Soursobs*.—The only successful method to control soursobs is to cut them with a rigid-tined cultivator every time they appear. Very little can be done towards eradicating the weed during spring and summer. The rigid-tined cultivator fitted with wide shares is the best implement to use to deal with this weed. The cultivation of fallow, particularly on the lighter soils in this district, should be as shallow as is possible with effective destruction of weeds. Good cultivation in this district is responsible for largely increased crop returns." (Secretary, E. Schiller.)

November 2nd.—Attendance, 22.

Mr. E. Boehm delivered an address, "Improvements in the Farming Practices of the District." He dealt with better methods of soil cultivation by working the land as often as possible after rain and to avoid working the land too deeply. In many instances a spring tine cultivator could be used with satisfactory results. Only varieties of wheat such as Gluyas, Nabawa, and Rancee, which were suited to the district, should be grown. Barley should be sown and used as a fodder for livestock. Farmers should also conserve more fodder in the form of chaff and straw in seasons of plenty to be able to face lean years. More attention should be paid to sidelines such as cattle, sheep, and fowls. Farmers should dispose of their present livestock and secure herds of good reputation, and then make use of well-bred sires. Linseed meal should be fed to livestock in poor seasons. One ounce of superphosphate and 10z. of salt would serve as a lick for livestock. Cream should be sold at least once a week and eggs twice a week in summer and once a week in winter to secure best returns. Implements should be kept under cover—sheds covered with straw provided a good protection against rain and sun. Bookkeeping was too often neglected by farmers; books should be kept to know how the business is progressing. (Secretary, E. Schiller.)

TRURO (Average annual rainfall, 19.96in.).

August 21st.—Attendance, 18.

HARVESTING ECONOMIES.—Paper read by Mr. T. Klemm:—"The seeding of the different varieties of wheat should be conducted in such a manner as to obtain an almost even maturing at harvest time. Sow the late kinds early and the early varieties late, so that a quick hay cut will be assured. The hay should be cut while the grain is in the doughy stage and then stooked as soon as possible after the binder, making the stooks not too big to obtain a good curing. Not more than 20 sheaves are needed to make a fair size stook, the oblong stook being the quickest to dry the hay, but requiring more time and skill to make. With good drying weather, the hay should be fit to cart in two weeks. Every effort should be made to get the hay carted before reaping commences. By the time the hay has been carted the wheat will be ready for stripping, but it should never be harvested until thoroughly ripe. All machinery should be overhauled and repairs carried out before harvesting is commenced to avoid delay. I favor reaping with the harvester or header, especially where there is only one man on the farm. The harvester can be worked on nearly every class of land unless very hilly or rough country, where it would be better to use the stripper. By taking care and a personal interest in the harvester, a good sample can be procured, just as much grain gathered as with the stripper, the chaff saved, and many years of good service obtained. With the harvester at the end of the day all the wheat is stripped, cleaned, and in bags ready to be sewn up and carted away. Further, the wheat can be carted off the fields and should a damp morning or a cold day occur the grain can be carted to market, thereby often securing a better price. There is also less risk of having it destroyed by fire. If the crop is taken off with a harvester costs will be: 8ft. harvester £160, chaffsaver (if required), £8, 168. To harvest with a stripper—8ft. stripper £110, winnower £110, engine £33, £253—a balance of £85 in favor of the harvester. In cleaning the wheat additional expenses have to be considered; extra man for cleaning and benzine for the engine plus your extra work. The man with the harvester has the easier work of letting the horses do the reaping and cleaning at the same time. Last harvest some farmers were still cleaning wheat, while others with the same acreage had their wheat carted and their paddocks cleared. Cleaning wheat is the hardest job on the farm. I do not believe in feeding much cocky chaff. A cow cannot give fair returns or a horse work if fed on cocky chaff alone; it has very little feeding value. Feed is the only reward the horse gets for its services, and mixing grain with cocky chaff to make it nutritious and palatable does not pay in normal years in this district. When a good crop of hay can be grown it simply means separating the grain from the chaff in the first place only to add it again at a later time. Yet it is a wise policy to save some cocky chaff and feed it to young cattle during winter or to dry cows and foals by mixing it with some hay chaff. A farmer should always provide an ample supply of hay to carry through in case of drought, because one year's hay buying will deprive him of several years' savings. A good supply of straw should be kept on hand—tied and loose—to chaff with hay if necessary in a drought. Straw, if properly stacked, will keep for years, while cocky chaff gets damp and mouldy. Oaten straw is preferable, because it is of more nutritive value. In prospect of a good harvest, cornsacks should be secured at an early date; the price of them is generally inclined to rise at harvest. To avoid inconvenience in case of a shortage and before using them, they should be spread out in the sun to stretch to get a chance to fill them to their utmost capacity. It is advisable to crush wheat or oats instead of using pollard or bran. Crushed wheat has a far greater feeding value. Although farmers, especially the younger ones, cannot be without long debts, they should endeavor, in most cases, to pay cash for their other purchases. Do without it or try to carry on with old things. If this had been more widely practised, many a farmer in this State would be in a better position." (Secretary, L. Davis.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Wasleys	12/10/33	17	Annual Report	C. Currie
Buchanan	18/10/33	8	Address—W. C. Johnston	L. V. Bell
Penwortham ...	2/11/33	19	Addresses—J. Victorson and J. B. Harris	A Jenner
Nantawarra	30/11/33	8	Discussion	S. Herbert
Light's Pass ...	18/12/33	19	Impromptu Speeches	C. Verrall

YORKE PENINSULA DISTRICT.

BOOR'S PLAINS (Average annual rainfall, 15.61in.).

September 7th.—Attendance, 12.

COMMON AILMENTS OF THE HORSE.—The following paper was presented by Mr. H. Queale:—"Many of the sicknesses that come under the notice of horse owners are due to ignorance, and quite often to negligence. The following gives the pulse, respirations, and temperature of the horse in a state of health—any serious departure from it is indicative of disease:—Pulse beats per minute, 30-48; respirations per minute, up to 15; temperature, 99 degrees. The usual outward signs of sickness are lack of appetite, an indifferent attitude to surroundings, and sometimes signs of pain and distress. *Strangles.*—Usually attacks young horses up to 2 or 3 years of age. It is due to a microbic poison entering the system of susceptible subjects. The symptoms are:—The animal goes off his food, and shows a difficulty in swallowing. The nose is constantly protruded, with yellow mucus discharging therefrom. The coat becomes dry and starchy, the hair appearing to stand on end. As the disease advances a swelling forms under the throat and behind the jawbone. There is considerable fever, indicated by a rapid pulse and increased temperature, and there are occasional fits of shivering. Immediate attention usually obviates any trouble. *Sore Shoulders.*—Caused chiefly by bad-fitting or dirty harness, by working horses in an unfit condition, and by bruises. A loose collar causes friction, resulting in chafing and blistering. A collar that pinches cuts off the blood flow, the skin dies and falls off, exposing the flesh to the surface of the harness. The symptoms are flinching and unwillingness to give a straight and honest pull. Continuous sores also cause a horse to lose condition. *Sidebone.*—This condition consists of calcification of the flexible cartilages, or gristles, which are attached to the upper and posterior part of the coffin bone. It is caused by concussion, treads, and other injuries, and hereditary predisposition. Many believe that shoeing with very high heels is a fruitful cause. Lameness is not always present. When the disease is suspected, lift up the foot, grip the cartilage with the finger and thumb, and if it bends backward and forward, then that cartilage is free, or, at most, the disease has just begun. If the disease is present to any extent the cartilages will feel like bone. In bad, chronic cases the hoof becomes contracted, and is more upright than normal in appearance. It is then spoken of as a boxy hoof. *Ring Bone.*—This consists of a bony growth on the pastern bone, caused by concussion and injuries and hereditary predisposition. Short, upright pasterns predispose to them, and is most common among draught horses used for road work. There is usually lameness, but not always. The enlargement can usually be seen or felt. *Septic Metritis.*—The inflammation of the womb, due to the absorption of bacterial poisons. It is met with most frequently shortly after foaling. It is due to the introduction into the womb of poison producing germs. This is accomplished very frequently through the agency of dirty hands and instruments of those who render assistance at foaling. Retention of the whole or a part of the after-birth is also a common cause. If this is not removed within 12 hours after foaling there is a danger of this disease; if retained for 24 hours trouble is almost certain; while if neglected for 48 hours there is grave danger of the mare dying from septic metritis. Symptoms are great constitutional disturbance, indicated by rapid pulse, high temperature, loss of appetite, and dullness. Breathing is fast; frequently the milk is reduced, and sometimes stopped altogether. A very sure sign is the presence of a brown-colored fluid in the womb. This fluid has a nasty, sickening odor, and is very poisonous. *Inflammation of Kidneys.*—Causes:—Chills, injuries, improper food, bad water, and parasites are among the common causes. Symptoms:—Stiffness, walking with a straddling gait, the hind legs being kept wide apart; the urine is passed in small quantities; is highly colored, and sometimes contains light, yellowish flakes. As the disease advances the urine stops altogether. This is an important symptom—the non-voidance of urine for days. *Inflammation of Bowels.*—A serious condition, which proves fatal unless promptly and skilfully treated; caused by food containing irritant matter, chills, drinking frosty water, exposure to inclement weather, and the giving of too violent purgative or irritant medicines. The chief indications are:—Constant pain, with no intervals of ease, as in colic or gripes; rapid pulse; blood-stained dung; and the fact that gripe drenches have little effect in easing the pain, or of slowing the pulse. Do not confuse this with the previous complaint. *Stoppage of Bowels.*—Common among hard working and well-fed horses, caused by improper feeding, irregular work, bad food, bad teeth, insufficient water, or water that the horse does not like. The symptoms are:—Dullness, loss of appetite, and a disposition to lie down. As time goes on there is a slight increase in pain, indicated by the animal pawing and looking round to his flank. Then he will lie down flat, with head on the ground. He may get

up, walk a little, and lie down again. When on his feet he sometimes strains, as if trying to pass water, but little or none comes. The cause of this straining is due to pressure over the bladder, of an overloaded loop of bowel, and can be felt by exploring in the rectum. *Colic, or Gripes*, is probably the most frequent ailment. It consists of spasm, or cramp of one or many portions of the bowels. Causes:—Feeding at irregular intervals; allowing horses to bolt their food; irritants in the bowels, such as worms and indigestible food; bulky food; frosty water; sudden changes of temperature; and over-driving. Symptoms are:—Pawing and scraping with the fore-feet; looking round to the flank; attempting to lie down; lying and rising; rolling, sweating, and groaning, then an interval of ease. During attacks of the spasms the pulse beats are increased to as high as 70 or 80 per minute, but, when relief comes again, it gradually falls back to normal. *Flatulent Colic*.—Very different from the previous complaint. It is due to the fermentation of food or other matter in the bowels, caused by eating green food, frozen roots, and wet sheaves in harvest time. The animal shows all the signs of spasmodic colic, and in addition becomes greatly distended at the flanks as the disease progresses. If this bulging at the flanks is detected, and if the animal has been subjected to any of the above causes, treatment for flatulent colic should be adopted from the start. *Diarrhoea* is due to irritant indigestible food lying in the bowels. Intestinal worms are a fruitful cause. In foals it is often produced by putting them to suck while the mare is in a heated condition. *Worms*.—The three chief varieties are thread worm, pin worm, and particularly the red worm. The first is about 2½ in. long, and has a ring of tiny projections round the front part of the head, and thus it sticks to the lining of the gut. The pin worm can easily be identified by its curved shape. The red worm lives in the lumen of the bowel, and burrows and coils up in the lining also; often found with the thread worm. Symptoms:—Rubbing rump, and unthriftiness. *Founder*.—This is one of the most dreadful diseases the horse suffers from, occurring in all breeds, but most common among heavy breeds. Causes are over-exertion, pounding the feet on hard roads, over-feeding with grain, drinking cold water when heated, and standing in a strained position. It also follows such diseases as inflammation of the womb after foaling, inflammation of the bowels, and inflammation of the lungs. Symptoms:—The horse is usually so lame that it is difficult to get him to move. The hind feet are pushed far forward under the belly, evidently with the intention of relieving the fore-feet of part of the weight they have to bear. There is much fever, indicated by fast breathing, sometimes sweating, a rapid pulse, and a high temperature. Generally only the fore feet are affected. When the patient is made to move forward in a case of inflammation of the feet he appears to go on his heels, and, when backed, he raises his toes. After hours of standing the sufferer will lie down for hours, which seems to give relief. *Wounds*.—Any horseman can become reasonably adept at healing wounds by being careful and clean. Wounds are of various kinds. Sometimes they are great rents, caused by kicks, or barbed wire, or other sharp objects. Sometimes they are deep punctures. Sometimes they involve important joints or organs, such as the eye, and occasionally they penetrate the abdominal wall, or enter the chest cavity. The latter and more serious kinds should be treated by a veterinary, if possible. *Blood Poisoning*.—This condition is due to the entrance into the blood stream of minute organisms, which may have been present in a wound. These germs, in the process of living, evolve a poison which is carried through the system, altering the character of the blood and rendering it unfit to support life. Symptoms:—Shivering, colicky pains, prostration, abnormal breathing. The animal has a dejected appearance and expression. In some cases he lies down, and is unable to rise, but as a rule he retains consciousness and feeds occasionally. There is no curative panacea for the ailments of the horse; but kindness and sympathy are always a very great helping factor in preventing sickness.” (Secretary, S. Chynoweth.)

KILKERRAN.

September.—Attendance, 8.

ENSILAGE.—Paper submitted by Mr. E. Koch:—“Ensiling a fodder or making silage consists in preserving green succulent plants so that they will remain green or semi-green and keep their succulence for a considerable time. Briefly, it is done by cutting the plant growth to be made into silage when very green and nutritious and storing it under pressure, usually in airtight receptacles of some kind, but sometimes in open stacks. The green forage to be preserved as silage should be cut while it is succulent and well supplied with live and active cells, and to ensure a good ‘cure’ the cut material should be put into the silo or stack whilst fresh and unwilted. The crops usually converted into silage, the cereals—wheat, oats, barley, and rye—are in the best stage for cutting from a week to a fortnight after the heads appear, and in this stage no matter how luxuriant the growth, they usually contain the correct

percentage of moisture to make good silage. The cereals can be converted into silage of good quality if cut before the heads appear, but more weight per acre is obtained by waiting, as the cereals continue to increase in weight until about three or four weeks after full bloom, although from then onwards a continuous loss takes place until maturity is reached. Two distinct kinds of silage are produced from all fodders suitable for storing as silage according to the method of manufacture followed. Anyone embarking on silage making activities must remember that only good fodder will make good silage and the better the fodder the better the silage made from it. Some weeds which are disliked by livestock because of the presence of many hairs or the possession of a disagreeable taste are considerably improved when converted into silage, particularly when they are mixed with better forage plants in the silo or stack. All farm animals which ordinarily consume pasture plants are attracted by the palatability of silage, and when it has been properly made eat it readily and in most cases do well on it. Dairy cows do very well on silage and immediately increase their milk production when fed on it. It is also a noted fact that cows fed regularly on silage remain in better health than those not receiving it, no matter what kind of feed they are provided with. Silage should never be distributed on the surface of the ground for milking cows, but fed to them in feeders of some kind. Silage can be fed to calves as soon as they start to eat foodstuffs. It is also highly recommended for ewes and also other sheep when there is a shortage of greenfeed. No matter how the silage is made no damage is done to it by birds or mice and there is no danger from fire." (Secretary, G. Heinrich.)

October 3rd.—Attendance, 15.

FIRE FIGHTING.—Paper read by Mr. L. Koch:—"The various methods of fire fighting depend entirely on the conditions under which they are to be used. As this district is immune from bush fires, attention should be directed to stubble and grass fires. On the outbreak of fire, the telephone is generally the means of raising the alarm, although the smoke generally serves on such occasions, especially in the prohibited season. Unless the fire is burning towards a good break, such as a fallow paddock or a road, attempts should be made to burn a break and the fire attacked from either flank. The beaters must make sure that every spark is out, for a change of wind may start another outbreak. If the fire is only travelling slowly it can—as a rule—be beaten right out, but if the reverse is the case, the beaters must direct their attention to the flanks and allow the front to burn itself out to the break. When the fire reaches the break, fighters must be in readiness to extinguish a fresh outbreak should sparks happen to blow across. This action may not be necessary if the break happens to be fallow, but in the case of a road with inflammable material adjoining, great care must be exercised. A shovel is an ideal tool for putting out flames, for if the leader is followed by two or three others the flames can be scraped out and the followers can put out smaller sparks, &c. Should the flames be of a fiercer nature, dirt can be thrown on them from several yards distant. Beating with a bag, besides being very tiring, is not very effective unless used correctly; the same applies to a bough. If used to their fullest advantage, very effective work can be done with both. A motor lorry fitted with a tank of water and pump and hose also play an important part in the fighting of fires. In addition to extinguishing fencing and stumps, which it does very effectively, grass and stubble can also be quenched. In reference to a burning stack, the only method is to tear the stack to pieces so that it burns out more quickly. The liquid spray pump is not very reliable, for if called for at a necessitous moment, any length of time after purchase the owner may find that it is empty (due to evaporation). Powder preparations are effective, although a limited quantity may only be available." (Secretary, G. Heinrich.)

WEAVERS (Average annual rainfall, 16.8in.).

August 7th.—Attendance, 10.

DAIRYING HINTS.—Paper read by Mr. E. Hergstrom:—"Contamination of milk starts from the time it leaves the teat of the cow and continues until the cream arrives at the factory and is pasteurised. Milk from a normal healthy cow is sterile, but immediately it comes in contact with the milk pail or bucket, bacterial contamination starts. It is not possible for the average dairy farmer to have his milk buckets sterilized, but the amount of bacterial contamination can be considerably reduced by scalding the buckets in boiling water after every milking. This is the first step towards good quality cream. It is absolutely necessary to have the separator clean and washed after every milking. The residue or sludge in the separator—if left over night—is very harmful to cream, in as much as it contains millions of germs which affect the quality of the cream and consequently the cream cheque. The most favorable temperature for the milk to be separated is from 96° to 101° F., if milk is separated at too low a temperature

there is an actual loss of butterfat which goes out in the skim milk. If milk is allowed to cool and then heated above 101° without direct cooling, the quality of the cream suffers, as it has the tendency to stimulate the bacterial growth and results in a loss in grade. Cream freshly separated should be kept by itself until it has cooled. A quick and effective way to cool cream, when a supply of water is plentiful, is to place the utensil in cold water and give it a few stirs. This is a very effective way of checking extensive bacterial growth. The cream should be frequently stirred from the bottom upwards to ensure even ripening. Keep the cream in an enamel bucket or basin until the day that it is to be despatched to the factory. Under no circumstances should the cream be kept in the can for any length of time; this has the tendency to make the cream metallic. Most of the metallic cream is caused through the cream being kept in containers such as kerosene tins, honey tins, &c. It may be possible to keep the cream in a clean new tin for a short while without getting the metallic flavor, but very soon the acid in the cream affects the tinning and the cream is exposed to the iron and absorbs the metallic flavor. The thickness of the cream should not be above 50 per cent. butterfat. Too thick a cream soon goes tallowy and cheesy, and is not possible to effectively stir. All cream received at the factories is reduced to a butter fat content of from 33 per cent. to 38 per cent. by diluting with water, consequently the fat globule is affected when the cream is too thick through excessive agitation during the process of pasteurization. Use a weak solution of washing soda when cleaning dairy utensils. Send the cream to the factory as often as possible. Seal the cans when receiving them back from the factory. Do not have the thickness of the cream over 50 per cent. butterfat. Do not use cans with rusty bottoms. Choicest grade cream is cream free from all taints and foreign matter, of smooth and even texture. It should taste sweet and clean. As the acid increases beyond a point the cream becomes first and finally seconds." (Secretary, H. Cornish.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Bute	9/10/33	43	Address—W. C. Johnston	L. Simon
Paskeville	31/10/33	11	Discussion	J. Prouse

WESTERN DISTRICT.

BUTLER.

September 7th.—Attendance, 9.

CARE OF THE HORSE.—Paper read by Mr. N. Stewart:—"In this district under present conditions, with low market values and high producing costs, the farmer must look to the cheapest and most economical means of obtaining strength for the purpose of tilling the soil for the production of crops. In the past few years two means of power have been tried—mechanical and horse power—and with the results obtained the horse appears to hold superiority, for in most cases the tractor has either worn out, broken beyond repair at ruling costs, or too expensive to feed, but with the horse it carries on and our attention must be drawn to see how it can be cared for that it may give of its best. The first thing is the use of proper fitting harness. The team should never be asked to draw a load more than that which can be pulled comfortably, and it is a far better proposition to work extra time per day than to drive a team laboring under a load much too heavy. Overloading is the chief cause of sore shoulders, but in many instances a change of collar at the first sign of a sore or boil will change the position of draft on the shoulder and thus a nasty sore can often be avoided. The team must be fed and housed properly to keep it prepared for that which is expected of it. It should be fed and watered regularly, with a water trough outside the stable yard. Do not give the horses more feed than they will clean up at each meal. Little and often is a good feeding stable motto. Good Algerian oaten chaff with the addition of a little crushed oats is recommended, especially for the evening and night feeds and to turn them out to pasture during the nights and off days as soon as suitable feed is available. This can be obtained in most seasons by August by sowing during March or early April Early Burt oats with a light dressing of super on the burnt stubble land of the previous year's fallow. The horses must be provided with proper accommodation as a protection from the cold of winter and heat of summer. Tests have proved that horses do not require the same quantity

of feed if properly sheltered. The stable yards should receive such attention that the horses do not have to wade about in filth and damp to the detriment of their hoofs. A little shaping of the foot often prevents a part of the hoof breaking away, often causing lameness, especially during the hot summer months. Also attention should be given to the mane and tail, to see that no knots gather that may interfere with the comfort of the collar and harness. The tails should be drawn each year during June and July. This will give it time to gain proper length so that it will be useful to the animal to protect itself from flies. Leather fly switches should be affixed to all winkers for the summer months. The value of the hair the horse's tail produces if cut regularly each year, more than provides the costs of the switches for its face. The team should be fed $1\frac{1}{2}$ hours before being harnessed in the morning and taken to work at regular hours through the busy period. The driver should take particular care that the mouths of the horses on the reins are not jerked or to give any cause for them to jerk one another. This can easily develop into a bad habit and prove a serious detriment to the pace of the team. Use common sense when the horses are being classed for the teams; it is far better to work the steady horses in one team and the free walkers in another. The more patience the driver exercises the better teamster he proves and the animals regard him more as a **friend than a taskmaster.**" (Secretary, P. Lange.)

CUMMINS (Average annual rainfall, 17.77in.).

September 1st.—Attendance, 8.

FALLOWING.—Mr. H. Roberts read the following paper:—"These remarks are intended to apply to this district and to the older type of cleared land, but they can be applied with equal force to many of the surrounding districts. The depth of ploughing depends on the type and depth of the soil and the time of the year the fallowing is done. It is possible to plough 1in. deeper in June or July than in September or October, because the later ploughing will not consolidate. Generally the depth of ploughing in this district should range from 2in. to 4in., this being dependent at all times on some or all of the foregoing circumstances. Never plough in dry grass, the resultant crop is almost certain to be unprofitable. Do not plough sandy soils deeply. On the other hand, clay or Bay of Biscay soils may be ploughed any depth within reason, so long as the sour clay subsoil is not brought up. It does not hurt to bring a little of the clay subsoil to the surface in the loamy soils. This practice is known as 'tipping the clay' and is quite a good one if done gradually, for it slowly deepens the soil and thereby in time renders a greater quantity of plant food available. Fallowing should start as soon as seeding is completed. If seeding is late, it is generally a good paying proposition not to sow the last of it; let it remain as fallow. Try and finish fallowing by the first week in September. It may then be cross harrowed if weather permits, and it is then ready for the cultivator when weather and soil become suitable for the operation, which occurs with those first drying days in early or mid-September. If the weeds have made growth, sheep should trim them down before cultivation. The first cultivation should be completed before weeds have seeded. Give the sheep a day or two on the fallow now and then and the second working about the third week in October, and if done in the right weather it will leave the fallow in good order. Sheep should be put on fallow every two or three weeks to keep weeds in check. The second or last working should be done at a time that will kill stinkwort on fallow. It is worth an extra working to be rid of it. With fallowing done, say, in September, **only one working** will be necessary to kill weeds, but if it is desired to complete fallowing, it will be necessary to start as soon as possible after seeding. It is better to do less than the full programme of fallowing and have it properly cared for, than to do a lot of ploughing and not be able to keep weeds in check. It has been found in this district that crops as good, and in many cases better, can be grown on burned grass land ploughed up after rain and after harvest. This autumn ploughing, when it can be done, has the advantage of economy of operation, because there is not so much working to be done as on winter fallows and a certain amount of use can be made of the grazing. Autumn ploughing is dependent on rains falling at that time of the year, so that it is not a reliable way of preparing fallow. Nevertheless, in this district it is advisable to be prepared to do some autumn ploughing whenever autumnal rains give the opportunity. Autumn ploughing should be harrowed while still damp and every effort made to consolidate the soil, preferably by cultipacking. Failing this, the cultivator and harrows should be used after showers, so that a good germination of weeds will result with the first seeding rains." (Secretary, K. Trigg.)

ELBOW HILL (Average annual rainfall, 11in. to 12in.).

August 29th.—Attendance, 6.

POULTRY ON THE FARM.—Paper read by Mr. A. E. Story:—"This paper is intended to deal with the subject not from a commercial poultryman's viewpoint, but as a farm sideline. In these times of low prices for our main products, such as wheat and wool one has to look for something to assist in bringing in a little ready money, and if a little attention and time is spent on poultry raising, it will greatly assist in this direction. One of our greatest drawbacks to this sideline is our great distance from market. In starting a flock of poultry it is necessary to consider which is the best breed of fowls to keep; breeding for the table trade is practically beyond us on account of distance from market, and there is only a very limited local trade; therefore, in starting a flock preference must be given to the egg trade. In this there are two breeds that are outstanding—the White Leghorn and the Black Orpington. The former is regarded by most leading poultrymen as the best suited for the egg trade on account of the quantity as well as quality of the eggs, but is of very little favor as a table bird. The Black Orpington is a very good table bird and an excellent layer, but the eggs lack the quality of the Leghorn in that they are of the small size and not so suited for export, which at the present time is the salvation of the poultry industry. To make poultry on the farm worth while, it is necessary to run a flock of about 300 hens; that gives sufficient eggs to ship to Adelaide during practically the whole of the year and thus obtain the highest prices obtainable, which is necessary if maximum results are to be secured. In starting a flock of poultry it pays a beginner for the first year to obtain all his requirements from some well-known breeder, either in eggs or chickens. Thus, he has laid down a good foundation right from the beginning, and with proper attention to housing and feeding should get good returns in eggs as soon as the young pullets commence to lay, which should be from five to seven months of age, according to the breed, heavy breeds taking longer to mature. Poultry where allowed a free range, as on most farms, do not take so much food, nor do they need the attention to housing when confined to yards, nevertheless it is necessary to prepare shelter for them, especially during cold wet weather. This can be done fairly cheaply by erecting straw sheds with sides thatched with broom bush in which nests can be erected for laying. Unless poultry are to be run on a fairly large scale it will not pay to erect elaborate houses, although there is no doubt that better results will result from better housing methods. Feeding a flock of 300 hens will take a good deal of grain and it is a good way to market it to return much more per bushel than selling wheat on the market and with very little extra outlay in labor. In a season such as has just been experienced there was much poor quality wheat which was practically unsaleable, or only so at a high dockage. The hen will return much more per bushel than can be obtained for the very best sample, although much better results in egg numbers will be realised if only good quality grain is fed. Last year I fed only first quality grain and obtained much better results than this year, when grain, which it was impossible to sell at any price, was fed to the birds. For the first six months of the year the hens paid me f.a.q. price for this wheat; during a good portion of which time about a third of the flock had not reached the laying age. In addition eggs were used for household purposes and birds for the table, of which no account was kept. Birds running on free range obtain a great amount of their food for themselves, especially when there is plenty of green feed, the only necessary addition to the grain ration is a little mash in the morning, to which is added meat meal. For the latter boiled rabbit is a good and cheap substitute. *Hatching*.—Much of the success of poultry raising lies in the hatching of chickens, for to have pullets laying when eggs are dear—from March until about June—the chickens must be hatched during August and September; in fact, I like to see some out by the middle of July, and with proper feeding the pullets hatched during these two months should be laying by March. Hatch heavy breeds first. To get chickens during these two months in any quantities artificial incubation must be adopted, because the well bred modern hen is a very poor sitter, especially the Leghorn, and to a lesser degree the Orpington, until she is in the second and third year. Keep a very few third year hens for best results. If it is decided to purchase an incubator, obtain one of a size considered suitable and of a proved make and design. I prefer the hot water tank to the hot air; it carries a more even temperature and is not readily affected by changes in the weather. If breeding pens are to be started for them select only birds that lay eggs 20zs. and over, and do not use eggs more than 10 days old; the fresher the egg the better the results; three or four days old is the ideal for hatching. The incubator needs very little attention. The main thing is to fill and trim the lamp once a day and turn the eggs once or twice a day; 10 dozen eggs take about five minutes to turn. When the hatch

is about to come out, it may be necessary to alter the regulator a little if the temperature has a tendency to rise too high; always keep plenty of moisture in the machine. Do not feed chicks for some considerable time after they are hatched; when they need food they will let you know by the noise they make. Always provide plenty of water, dry sand, and finely ground charcoal. All commercial poultrymen provide hot brooders for the chickens when they leave the incubator. We use only the cold system which is not so convenient for the young chicks, but after they are about a week old they seem to be quite all right so long as they are not allowed in a wet and cold place. Care and foresight, combined with good housing when young, will prevent many kinds of sickness. *Marketing Eggs.*—This is the greatest and most important aspect of this sideline, because its success or failure depends to a very large extent on the price that obtained for eggs sold. Price depends on quality and quality depends very largely on care and attention to smaller details. Market only clean shelled eggs, any stained ones should be kept for household purposes. So far as possible aim at producing the best grade, because during the export season eggs are paid for on a graded basis. The greatest trouble in forwarding to Adelaide is the distance from market and the number of handlings that they receive *en route*, which to a large extent affects the quality. Some of the eggs are over a week old when they come on to the grading floor." (Secretary, J. Wildman.)

GREEN PATCH (Average annual rainfall, 26.56in.).

September 28th.—Attendance, 10.

SUMMER FODDERS.—Mr. L. Sage contributed the following paper:—"One or other of the summer fodder crops can be grown in almost any soil provided it is well prepared and manured. Where cultivation during growth is not intended the best soil is one loamy enough not to run down and set but still sufficiently dense not to drift. In districts where winter rainfall is fairly heavy—an average of about 12in. for the three winter months—there is no advantage in early ploughing. August, or after a wet winter the beginning of September, is early enough if the land is kept well worked afterwards up to sowing time, which should not be until the latter part of October, because if the seed is sown before the soil begins to get warm a poor germination will result. Work the land well prior to seeding, drill deep if the surface is dry, sow late rather than too early, but do not harrow after the drill. This district is rather on the cool side in summer, so that crops that do not take too long to mature should be grown. I have tried a number of different kinds, and so far as an all round fodder Japanese Millet is the best. It comes on early, is quite safe to cut or graze at any stage of growth, if grazed judiciously will give several grazings during summer, and stock are very fond of it. Early Amber Cane is not as early as Millet, but is a good summer fodder crop, either for cutting or grazing, but like all sorghums is apt to be poisonous if used in an immature condition. Another variety that has done as well as Amber Cane is White Kaffir Corn. It does not grow so tall, but has more flag and a softer stem. It is just about as early as Amber Cane, and stock eat it just as readily. When drilling use a hoe drill if possible, it leaves the land more evenly ridged than the disc, and catches any light rain that falls. The seed must be mixed with the manure, but only as it is used; if mixed beforehand or left in the drill germination will be affected. A bag of high grade super to two acres will be sufficient on well-worked land. The drill box may be partitioned off, sowing seed through every third or fourth hoe, but run the super through all the hoes. If cut with the binder the machine should be run the same way as the drill; if only wide-spaced rows have been sown cutting across the rows would be rough on the machine. Japanese Millet is the best to sow for grazing; it can be grazed at any stage without fear of forage poisoning. Any of the sorghums should be allowed to just come into head, and when fed off or cut will keep on growing until the autumn. Millet seed is very small, and if a good germinating sample 4lbs. to the acre should be ample. Amber Cane, Kaffir Corn, and Sudan Grass seeds are much larger, and 7lbs. or 8lbs. of seed per acre will be needed. Any of these seeds can be tested for germination by placing seeds between flannel in a saucer, kept in a warm place, and moistened regularly. In less than a week germination should show out." (Secretary, C. Whillas, Port Lincoln.)

LAURA BAY.

September 5th.—Attendance, 18.

THE COST OF FARMING.—Paper presented by Mr. W. Edson:—"In this paper it is my intention to regard the farm as a sound business, and endeavor to prove that interest and depreciation must be fully charged on every item, and a sufficient reserve fund placed annually to meet adverse times which are inevitable. The total cost is somewhat surprising. I have taken our two farms of 903 and 734 acres respectively

as an example:—Capital expenditure—Land, £2,450 10s.; machinery, £890; 12 horses and 200 sheep, £350; total capital expenditure, £3,690 10d. Interest on capital, £179 10s. 6d.; depreciation on plant, £89; depreciation on 17½ miles of fencing, £35; wages for farmer, £300; wages for man and boy (keep included), £240; reserve fund, £150; total, £993 10s. 6d. Add £116 for super and £80 for bags, £1,189 10s. 6d., which, with 600 acres under wheat, would have to produce 12bush. to the acre to pay at 10s. per bag. As the district average is far below 12bush. per acre it is no wonder that farmers are finding it hard to make ends meet.” (Secretary, W. Edson.)

LIPSON.

November 4th.—Attendance, 10.

RABBIT DESTRUCTION.—Paper read by Mr. E. L. Barraud:—“It is everyone’s duty to do his share and thus reduce the heavy expenditure annually incurred in fighting this pest, and I submit the following methods as being cheaper and eventually having the effect of reducing the rabbits to impotency or wiping them out altogether in a few years. After harvest, say, February or March, a date should be fixed by the local authority, and the rabbit inspector should see that all start on that date, because simultaneous action is essential if success is to be obtained. Rabbits at this time take baits more readily, food and water are scarce, and one rabbit killed then is equal to many killed later on. Rabbits take moist baits better than any other at this time of the year and the use of raspberry jam and strychnine with changes to fruit or vegetable baits are recommended. A level teaspoonful of powdered strychnine to 2lbs. of raspberry jam is the best amount to use. More makes the bait unpalatable and less is not enough. Baits should be placed about 12ft. apart on a flat stone or piece of wood in a newly-drawn furrow and should be about the size of a 3d. piece. Phosphorus poisons for summer use are not favored; they dry quickly and there is a danger of fire, but where grass is very scarce and this poison is used, it is well to rub a little oil of aniseed on the hands before handling the baits. When green feed is available, poisons are of little use and smokers or cynogas can be used in the burrows. After being smoked out the burrow is dug or ploughed out the next day; that does away with it, as the rains will set it down hard again, when no attempt will be made to open it up for a long time. Should an attempt be made to open a hole, a trap set in the opening soon puts a stop to this. About 60 traps can be used with good effect on an averaged-sized farm. Where a creek runs through a section this makes matters more difficult, but, if after a heavy rain all burrows in the vicinity are gassed or smoked out, a lot will be killed as they go there when washed out of the waterways. In summer a few spoonfuls of shale cynogas thrown into the worst cracks in the creek bank will cause the rabbits to move temporarily elsewhere, and a couple of men with crowbars for a day or so can smother a lot in the cracks when the ground is dry. Where the ground is of a sandy nature, ploughing in can be done in summer time with good effect. Trapping from the farmer’s viewpoint is not successful; it leaves the small rabbits and continues the pest. In conjunction with the other methods it is good. If the foregoing methods are used there is little doubt that in the course of a season or two it will not be necessary to spend the large amount of money which is now being spent in spasmodic efforts to rid farms of rabbits. The keynote of success is simultaneous action, and in no case should a person relax his efforts when rabbits have ceased to be an active danger to feed and crops.” (Secretary, M. Barraud.)

MALTEE.

October 5th.—Attendance, 8.

DESTRUCTION OF FOXES.—Paper contributed by Messrs. V. and P. Schwarz:—“During lambing season the careful farmer is ever on the alert to guard against losses incurred by foxes. *Poisons.*—Strychnine in two forms can be used. The crystal form is to be recommended, but the soluble form may also be used with good results. The correct amount of crystals to be used for a bait may be described as being sufficient to cover a 3d. piece. *Preparation of Bait.*—The parrot is a favorite bird for the fox and makes a very attractive meal. Other baits can be prepared from rabbit, liver or heart of sheep, or a thick clot of blood from sheep killing. A satisfactory size of the bait is about 1in. square. If the bait is too large only a harmless portion may be eaten. A dead sheep or lamb can be made a tempting meal for the fox when poison has been added, but in this case it is quite likely that birds may carry baited pieces over the paddocks, making it unsafe for dogs. When preparing baits, avoid handling them. An old fork often proves very handy in assisting in the preparation of the baits. *Laying the Bait.*—The best time to make a trail is immediately following a shower of rain. In laying the trail, a carcass of a sheep is very suitable. Poisoned baits should be placed at regular intervals along this trail, and to facilitate checking up next morning

" mark should be made indicating the location of each bait. It is advisable to cover them with a little soil to detract the attention of birds during the day. *Other Methods of Catching.*—Fasten a schnapper hook to a piece of rope and tie to a branch of a tree so that the hook is situated about 4ft. above the ground. Place a parrot firmly on the hook so that when the fox jumps for the bird he is caught like a fish. *Snaring.*—Rabbit traps can also be used, but results are not very encouraging. Do not fasten the traps very firmly, because foxes are quite capable of pulling off their toes, enabling them to escape. A better way is to tie a weight to the trap so that it can be dragged by the fox without his parting company with the trap, because once a fox escapes in this manner it has been said that you would need a very salty method to again make him your victim. *Preparing Skins.*—Commence by slitting the back of the hind legs down to the top of the tail and skin them. Hang up similar, to a sheep and continue cutting along the centre of the tail and pull off. Take care not to tear or damage the skin. There are two methods of skinning: (1) by slitting the belly, and the other of making a sleeve, which is practically the same practice adopted in skinning a rabbit. The sleeve method is easier and quicker. When the tail is finished, the skin only has to be pulled down over the body to the front legs, which are pulled out. Proceed further to the lips, cutting them and taking off completely. *Pegging Out.*—First, a nail is inserted through the nose and firmly driven into a door, which serves the purpose quite well. Next the bottom lips are stretched and firmly fastened—sloping upwards—after having pulled both sides evenly. If the skin is needed for a fur, it should be stretched as long as possible. For sending to market the skin should be stretched as square as possible. If the skin is wanted for a fur, hammer a few nails in the top of the tail stretching it tight. Afterwards stretch the back legs slightly sideways, fasten the front one straight out, and finish by tightening the remainder of the loose places, such as the back, brisket, and widening the front legs to complete it. To make a square skin—after nailing the bottom lips, nail the back legs, then the front ones; next, the back, going down to the tail, and finishing as before. *Marketing.*—When the skins have dried sufficiently during a period of one or two weeks, the next problem is that of finding the best market. They may be sent to the auction sales or direct to the fur companies. The auction sales should be better, because the skins are sold under competition between the various fur companies, and this always tends to ensure bright prices." (Secretary, P. Schwarz.)

MOUNT HOPE.

October 9th.—Attendance, 7.

FENCING.—Mr. W. Vigar read the following paper:—"The best time of the year to fence is just after seeding. This is generally a fairly slack period, and in the light coastal soils one does not have any trouble with sand running into the post holes and half filling them before the posts can be put in position. Also the rains that follow will consolidate the earth around the post so that by summer time it will be quite firm. The boundary fence is the most important fence on a farm. The law with regard to boundary fences is important. Under the Act one is required to erect a fence capable of resisting the trespass of cattle. This fence may be either of plain or barbed wire. Unfortunately the Act does not compel any landholder to erect a rabbit proof fence, although the Vermin Act compels him to destroy all vermin on his holding. If all boundary fences were rabbit proof there would not be so much trouble with rabbits. The liability of adjoining landholders with regard to boundary fences is also dealt with in the Fences Act. Where two properties join without a road between them both owners are liable for the cost of the erection of such a fence in equal part. One point is worthy of particular notice. Should one owner desire to erect an elaborate fence which the other owner does not believe to be justified under the circumstances, the first owner may erect the fence, but cannot claim for one-half of the value of it, but only one half of the value of a "sufficient fence" within the meaning of the Act, or one-half of the cost of the type of fence mostly erected in the locality. If a fence of five plain wires and one barbed wire is the usual type of fence for boundary fence purposes, and one farmer wished to erect a rabbit-proof fence, he could only claim for half cost of the six-wire fence above specified. At the same time, if both owners agree to erect a rabbit-proof fence there is nothing to stop them from so doing. As most places in this district are surrounded by roads a perusal of the section of the Act dealing with the liability of persons using the fence on the further side is worth while. While the law does not expect the owner on the further side of the road to contribute to the cost of the erection of the fence he has to pay the owner of the fence interest at the rate of 8 per cent. per annum on the value of the fence for so long as he shall use it, and to contribute to half the cost of any repairs. The value of the fence means the value at the time the adjoining owner first uses

it, and not the cost of the fence when first erected unless, of course, the adjoining owner uses it. Since, from the farmer's point of view, the law is not interested in any other than the boundary fence, all other subdividing fences are left entirely to the discretion of the farmer. All permanent fences should, if possible follow section lines. If a good rabbit-proof fence is erected around the boundary it is not necessary to have any netting on any subdivision. These could be ordinary sheep proof fences of five plain wires and one barbed. This method of fencing would be cheaper than the usual haphazard method of putting netting around part of the boundary and on some subdividing fences and sheep-proofing other parts. A few small paddocks close around the homestead could be netted even if the boundary was, too. This would keep rabbits and poultry away from any special fodders or trees. *Height of Fences.*—The height of a fence is of considerable importance and, like the type, varies with its uses. For a good type of netting fence 3ft. 10in. or 4ft. is much better than one 3ft. 6in. high. With a barbed wire strained tight on top of the posts—not tied alongside—stock will not reach over and damage a fence to anything like the extent they will if the fence was 6in. lower. Even for a sheep proof fence it should be as high as possible without getting the wires too far apart or using more than six wires. With a high fence one would have to sink the post holes a bit deeper where there was no rock. *Barbed Wire.*—Although barbed wire is condemned by some people it is a very real necessity for fences. The more barbed wire one can use within reason around the homestead the better for all outside fences. Stock soon get to know that it hurts, and as they undersand that they cannot go just were they like about the place they do not get the habit of breaking down fences, with the result that when they are turned out into the bigger paddocks they do not worry the fences. An ideal fence for small paddocks is one with two barbed wires above netting and two plain wires to tie the netting to, and one to be put about half way between that and the ground. This type of fence is easier to keep tight than a six-wire fence. All fences should always be kept strained tight. This keeps them stock-proof, and takes a big load off each individual post, besides keeping the much neater in appearance. If good gum strainers are used local ti-tree and sheoak posts will last half as long again. It is not necessary to have posts too close together; about 12ft. apart for small paddocks and 15ft. or 18ft. for larger paddocks should be satisfactory. All fences should be carefully lined out before starting, and straight, sound posts used. A medium-sized post is preferable to either a thin, spindly one or a heavy one. Holes should be bored with care, otherwise a neat lot of posts will look very ragged when the wires are pulled in. Care should also be taken to keep the tops of all posts level. Neat, well put up fences improve the appearance of the farm, and it pays in more ways than one to keep all fences in as perfect a state of repair as possible. (Secretary, A Myers).

PINBONG,

September 2nd.—Attendance, 12.

SELECTION AND CARE OF SHEEP.—The following paper was read by Mr. E. Kammermann:—"Select ewes that are clean faced and without tail wrinkles, and large frames with long roomy bariels. The wool should be of a fine bright texture. Dingy yellow and heavy woolled sheep are more liable to blowfly strike than the former. The next task is to select the sire. Again avoid face and tail wrinkles. It is admitted that a sacrifice of a certain amount of wool is made by breeding away from wrinkles, but the object is to avoid more serious trouble in the form of grass seeds and blowfly strike. If sheep—and particularly lambs—are badly affected with grass seeds—and this frequently happens with the face-wrinkled ones—their growth is retarded, the constitution weakened, and they become a prey of the blowfly. Having selected the type, the next point is to decide the number that can be successfully fed. Always remember that half the breeding goes down the neck, and that two well-fed sheep will possibly produce more wool in value than double the number of ill-fed animals. The blowfly pest has been engaging the attention of scientists for some time, but up to the present no effective method has been evolved to deal satisfactorily with the pest. I have tried many oils and antiseptics, and the only solution that has proved in anyway successful has been phenyl. If a sheep is struck, take the shears and clean away the affected parts, and then treat with phenyl—1 part to 5 parts water. This is a cheap and effective remedy. The sheep will immediately recover and the wool will not be damaged. Prevention is better than cure, and a general practice should be made of inspecting the flock at least once each week. Do not wait until the damage has been done, but clean up any that appear dirty and stained. If a sheep is badly struck, shear it completely and treat the affected parts as stated before. A sheep will rarely get badly struck until half-woolled and another short fleece will have grown by shearing time. The two sound

short-staple fleeces will be worth more than the one of broken dead wool which would have resulted if only the affected parts were shown. By this method it is possible to prevent another strike and minimise the danger of having others struck." (Secretary, C. Scholz.)

WALLALIA.

September 20th.—Attendance, 8.

HAY MAKING.—Paper read by Mr. D. Coxon:—"Hay should be cut early enough to be stacked before reaping begins, which means that an early wheat must be sown as early as possible. Early oats are better for hay, but a mixture of these two cereals makes an excellent fodder. Wheat for hay should be cut when it starts to turn a brown color. Oats should be cut for hay when the straw turns purple. If a large area is to be cut start slightly earlier, because oats ripen very quickly, and then much grain is lost by shaking out. The binder is the best machine for cutting; it saves much time and labor, and it is easier to work in good years. In this district there are many seasons when a grass mower and hay rake can be used to advantage. In good years it is a good plan to cut an extra stack. Hay can be stooked almost any time after binding. The stooks should stand at least nine days after being cut before being carted to the stack. When ready to build the stack use plenty of dun nage for the foundation. In some rough country it is an advantage to cut with the mower, because it has a better clearance than the binder. If the hay is not to be chaffed loose hay is better on account of it being mixed; the binder places the heads all one way, and this fed loose means more waste. When building the stack the main object is to keep out the wet, so that the middle must be kept higher than the edges." (Secretary, C. Zippell.)

YADNARIE (Average annual rainfall, 14.09in.).

October 3rd.—Attendance, 5.

THE PERCHERON HORSE.—Paper read by Mr. M. H. Way:—"The Percheron is about the oldest heavy horse known and it is difficult to understand why this breed has not obtained a better footing in Australia. In other parts of the world it is in the ascendancy. France is recognised as the home of the Percheron, and 90 per cent. of the heavy horses there are Percherons, about 50 per cent. in Belgium, and the same in Denmark. Two-thirds of the horses in the United States of America are Percherons. These countries are considerably older than Australia, and have paid attention to procuring a horse for heavy work that thrives under their climatic conditions. There is no horse that can do the same amount of work on the same amount of feed as the Percheron and the breed is very tractable and intelligent. The champion heavy gelding of the world is a Percheron. In America there are six Percheron horses owned by the Armour Company. After winning the American International Championship they were sent to the International Horse Show, Olympia, England, where they took everything before them. Apart from this, one of this team of six was selected as a perfect specimen of a heavy gelding. He was 15 years of age and had been working on the streets of Chicago for nine years. I predict that in the future most of our horses will be Percherons, because they will stand up to droughty seasons, more especially on the West Coast." (Secretary, E. Spriggs.)

Other Reports Received.

Branch.	Date of	Attendance. Meeting.	Subject.	Secretary.
Balumbah.....	4/10/33	16	Congress Reports	A. Jericho, Bunora
Balumbah.....	28/11/33	14	Formal	A. Jericho, Bunora
Chilpuddie Rock	10/10/33	7	Congress Reports	H. Brown
Butler	10/10/33	18	Congress Reports	P. Lange
Green Patch ...	2/11/33	12	Congress Reports	C. Whillas
Warramboos ...	31/10/33	9	Congress Reports	F. Chilman
Mangalo	25/10/33	All members	Congress Reports	R. Turner
Pygery	31/10/33	9	Congress Reports	A. Day
Miltalie	25/11/33	13	"Training a Sheep Dog," R. Smith	G. Smith

EASTERN DISTRICT.**(EAST OF MOUNT LOFTY RANGES.)****BOOLGUN.**

September 28th.—Attendance, 10 members.

CARE OF THE FARM PLANT.—Mr. T. Stoeckel read the following paper:—"Every care should be taken of the horses. Do not expect six horses to do an eight-horse job. See that all harness fits perfectly, and give it at least two oilings per year. Ill fitting harness is the main cause of sore shoulders. Feed liberally and regularly, as a horse cannot do a day's work on insufficient feed. Groom them every morning, and examine the shoulders. Sores can often be prevented if attended to in time. When starting any implements see that everything is in order and all parts and bolts tight. Use a good oil, and see that bearings and wearing parts are properly lubricated. If a bolt breaks replace it with one of the right size. When finished with an implement put it under a shed and clean off all grease and grit. Any worn parts should be replaced so that the machine will be in order when next wanted. A small blacksmith's shop on the farm, and a few handy tools will prove a great saving of time and expense." (Secretary, G. Spencer.)

October 26th.—Attendance, 13.

MICE PROOFING A HAY STACK.—Paper read by Mr. R. Schultz—"Dig a trench 9in. to 1ft. deep and 4in. wide 2ft. away from the stack. Fill it with cement concrete, and while the concrete is still wet drive iron droppers into the centre on which to bolt the iron. The iron should be of the flat galvanized type, 3ft. high, and have a slant outwards of 45 deg. This will stop mice from crawling up, and should there be any in the stack they have a way of getting out. When not in use, the iron may be taken off and stored until wanted again. The concrete is to save putting the iron in the ground, and at the same time stops the mice from digging through. If desired, a toe may be put on the bottom of the concrete on the outside." (Secretary, G. Spencer.)

KI KI.

August 12th.—Attendance, 14

POULTRY BREEDING.—Mr. Griffiths read the following paper:—"Poultry keeping continues to expand in country districts, but there is need for the adoption of better methods in the housing of the birds. In many districts the birds are allowed to roost on fences and trees, and this practice encourages diseases and parasites. Adequate housing in which the birds can be locked at night should be the first essential, and nests should be arranged in the houses and the birds induced to make use of them; this will facilitate the gathering of eggs. While the pullets are growing it is advisable to grade them so that only the most promising are brought into the laying houses. Any bird that shows signs of weak constitution, or is lacking in the points necessary in the layer, should be discarded. The following points should be observed:—None but sound healthy stock should be bred from; regular and proper feeding; sanitation in houses and yards; no chicken should be fed until 60 hours after being hatched. Chickens should remain 24 hours in the incubator before being removed to the brooder, which should be heated to 100° and after a few hours lowered to 90°, then gradually to 70°. Any sudden change to cold or heat is fatal. All chickens should have access to plenty of fresh water and all vessels boiled once a week. Green feed is also essential. To go in for poultry in a big way means money for wire, iron, and wood, and one person's labor. Green food is as essential as clean water. Every endeavor should be made in penning the future layers to secure sufficient pullets of the one hatch or age to make up a unit. A week or two difference in age will not prove a drawback, but a matter of several weeks will affect both classes. Heavy and light breeds should not be housed together if it can possibly be avoided, because the light breeds will be bullied and will not obtain the quantity of food essential for their bodily upkeep and egg production." (Secretary, R. Cooley.)

LONE GUM AND MONASH.

September 5th.

FROST PREVENTION.—A special meeting of the Branch was held to discuss arrangements for preventive measures against frost. Reports of the work of the central committee were given by Messrs. R. Nixon and M. Nicholas. It was decided to adopt the suggestions of the central committee, and a local committee, comprising Messrs. Traeger, Telfer, Ellis, Cocks, Maddern, Soderberg, Elleway, Whitelaw, Thomas, Brown,

L. Bollenhagen, McLaren, Barnes, and Lock, was appointed. At a subsequent meeting of the committee, to which Mr. Maddern was elected chairman, arrangements for carrying out the scheme were made. Definite data will be kept throughout the frost danger period, and "smudging" will be tried out on a systematic scale. Wet and dry bulb thermometers have been provided, from the readings of which early warnings of danger will be given at 9 o'clock at night. The committeemen who represent the groups of settlers in the various low-lying hollows of the district will be notified of the danger, and, having a roster made out, two growers will then keep watch on their dry bulb thermometers. Should the temperature drop to 31 degrees, all growers in the group will be called out to stand by, and then should it drop to 30 the signal would be given to light the smudge fires and so create a dense blanket of smoke, with the idea of preventing the radiation of further heat, and so it is hoped prevent or minimise frost damage. Various methods of creating the smoke will be adopted, chief being the use of residue from the Cobdogla pumps mixed with old stems, &c., and the use of oil pots which will burn crude oil or tar. A definite set of observations will be kept, from which it is hoped quite a lot of useful information as regards the efficacy of the idea of smudging will be obtained. It is known that some people have consistently carried out this method of frost prevention to their own satisfaction, but no detailed collective records have been kept, so the scheme will, in the case of a frost season, be properly tried out on a community method, from which definite results one way or the other may be expected. (Secretary, R. Telfer.)

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

August 19th.—Attendance, 29.

RECREATION ON THE FARM.—Mr. H. Kempe read the following paper:—"Recreation is the reanimation and revival of a person's exhausted strength and spirit, and the refreshing from physical weariness, and any relaxation that will serve to enliven, amuse, entertain, divert, and cheer an individual. A man's form of recreation is—apart from climatic influence—governed to a great extent by the nature of employment that he follows. A person of sedentary work and habits naturally indulges in vigorous outdoor games, such as tennis, football, &c. The person, on the other hand, whose work takes him constantly into the open spaces, one might expect to seek diversion indoors, by visiting theatres, playing billiards, cards, &c. It behoves the farmer, as well as any householder, to make his home as attractive as possible for his family. He naturally wishes to keep the boys and girls on the farm, and he will find little difficulty in doing this if the home is sufficiently inviting to the young folk. Suggestions to make the home attractive would be such acquisitions as a good and comfortable home, motor car, wireless, some other form of music, *e.g.*, piano, violin, &c., games of cards, and a variety of wholesome reading. One often observes that rural boys and girls are keen on tennis and cricket, and the erection, therefore, of tennis courts and cricket pitches should receive due consideration. The practical and systematic arrangements of out-houses, stables, and sheds, the modernness of implements and utensils, also play an important part in making the farm more alluring to the young. The cultivation of an interesting hobby gives no end of pleasure and recreation. This form of relaxation and enjoyment is open to everybody, and also to all members on the farm. The father, for instance, may be devoted to wireless; the mother to the raising of prize flowers; the son addicted to electricity or the rearing of show poultry or animals; the daughter may develop a fancy for intricate needlework, confectionery-making, baking, &c. Without hobbies I should think life hardly worth while, and I can honestly recommend a good hobby as one of the finest and purest sources of lasting recreation." (Secretary, C. Altmann.)

October 28th.—Attendance, 23.

TANK CONSTRUCTION.—Mr. O. Aesche read the following paper:—"In selecting a site for the tank be careful not to choose a place on the lowest part of the watercourse, otherwise when the tank is full the water will not be able to escape. If possible the site for the tank should be hard ground. Only the best material should be used in construction work, and all mixing done on clean, hard ground. The walls should be made about 2ft. higher than the surrounding ground and backed up with the earth that has been thrown out of the tank. This will keep the water away from the walls. A good material is concrete, made of 8 parts rubble to 1 of cement, making the walls 4in. thick, using hoop iron or old wire all around every foot or so of the walls and hooking it at the corners to prevent it cracking. For the plastering use 6 of coarse sand to 1 of cement, finishing off with a fairly thick cement wash that can be applied with a whitewash brush. For the roof, pines covered with broom bush will be much

cheaper than timber and iron. In a waterless district more tanks should be built because long dry spells and droughts recur and water carting is the job for the day once more. It is also advisable to make provision for a water supply near the homestead to be able to grow vegetables and fruit and flowers. A tank holding 8,000galls. will cost approximately £12 in cement in addition to labor." (Secretary, C. Altmann.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Parrakie	20/10/33	22	Congress Reports	A. Afford

SOUTH AND HILLS DISTRICT.

BELVIDERE.

August —th.—Attendance, 15.

DAIRY COW JUDGING.—The following papers were read by students of the Strathalbyn High School:—(L. Oakley):—"The most commonly used cows for dairying purposes are the Jersey, Australian Illawarra, Milking Shorthorn, Friesian, Ayrshire, Guernsey, and Red Poll. The following points are looked for in judging a dairy cow:—1. Forehead: broad; this indicates brains and intelligence. 2. Horns: fine and shapely, which indicate good appearance. 3. Eyes: large, with a placid expression, which show alertness and happiness. 4. Muzzle: broad, strong and deep. 5. Neck: fine, shapely, and neatly joined to head and shoulder, which adds to general appearance, and shows lack of fat. 6. Jaws: wide and strong, which shows good feeding powers. 7. Shoulders: broad, flat bone, and blending into body. 8. Foreleg: fine bone, straight and short, indicates good appearance and strength. 9. Brisket: light, as there should be no extra meat. 10. Ribs: long, broad, wide apart, and well sprung; these show good digestion and breathing powers. 11. Barrel: long, well hooped and deep, shows plenty of room for digestion. 12. Flank: thin and arching. 13. Milk veins: large and prominent; these show a good dairy cow, because if the veins are large it shows that the cow can produce a good quantity of milk. 14. Teats: evenly placed, pointing down, convenient size, fairly square at bottom, and should give a free flow of milk when squeezed; if they give a free flow of milk they are easier to milk. 15. Udder: it must be capacious, well balanced, carrying well forward evenly, full at rear, not fleshy, firmly attached to body, and udder veins well developed, and plainly visible; this shows a good milker. 16. Tail: long, fine, set on level with back, and tapering, which adds to general appearance. 17. Thighs: thin and long. 18. Escutcheon: wide on thighs and distinctly defined, which shows richness. 19. Pin bones: prominent and wide apart. 20. Rump: long, broad, and level; these show general appearance. 21. Hip bones: prominent, level and wide apart, indicate easy ability to calve. 22. Back: broad, strong, and straight. 23. Style: alert and mild; this indicates a good appearance and good temperament. 24. Withers: fine, thin, sloping out to shoulders. 25. Skin: thin, loose and mellow, which shows good health. The judge also looks for a free walk, and a docile animal. The cow should be of a calm nature, not easily upset, or it will vary in health and milk yield, due to over-excitement. The general appearance of the animal denotes a high class and economical dairy cow. To judge a cow, begin at the head, from there to the forequarters and body, and then on to the hindquarters. The importance of comparison is to find out a good and bad cow, to ascertain which cows to keep and which to get rid of."

OBSERVATION ON CALF PROJECT (Lewis Thring):—"In February I began my project, intending to feed some calves on skim milk, and others with the same amount of milk, with a concentrate added. I am rearing seven calves. The first pair were born in February, one a few days later than the other. I fed one on plain separated milk, the other on the same amount of milk, which was about 1½galls., and in it I put, on the average, about 4ozs. daily of meal mixture, which consisted of 1 of linseed meal, 2 of crushed barley, and 2 of crushed wheat. The calves were fed twice daily. I found in this pair that the meal did not make much difference until the calves were about 2 months old, but after this time the calf receiving the meal is growing away from the other calf. The calf evidently liked the meal, because he always ate the meal that was left in the bottom of the bucket after he had finished his milk. When they were about 4-6 weeks old I began feeding them on chaff and 3 double handfuls of crushed barley to every kerosene bucket of wheaten chaff. This they ate readily till I let them out on the grass at 3 months old, when I stopped giving it to them. I

bought 3 more calves at the end of June. Two I fed on meal mixture, and one on the plain separated milk, and I gave them all the same amount of milk. These I let run in a paddock, with a shelter shed for them. I found these did better than those before, which had been penned. However, they scoured slightly, due to the green feed. In this trio those fed on the meal went ahead straight away. I have secured another pair of calves, but as I have only had these for a short time I cannot see the difference. It has cost me £2 19s. 2d. to feed the calves with milk at 1d. per gallon, the meal at 1d. a lb., and the linseed at 2d. a lb. So far my project leads me to think that housing is no advantage, provided they have a shelter when it is cold and wet, and that a concentrate should be added to separated milk to give them a complete food."

PEA GROWING (Colin Stacey):—"The pea plant, or plants with pods, have the power of putting nitrogen into the soil by means of their roots. The roots have nodules on them, caused by the bacteria which fix the nitrogen. The plant has an irregular stem, compound leaves, and large stipules, and the stem usually breaks down under the weight of the plant. The flowers are white or purple, and occur singly or in clusters at the ends of the stems or branches. There are not many varieties of field peas, the Early Dunn and White Brunswick are the most commonly known. Other varieties are White Elephant (large white peas), Blue Prussian (blue peas, and irregular shapes), Black-eyed Susans (white, with black spots), and Partridges (black mottled skin). The climate for peas is a fairly heavy rainfall, not much less than 20in., cool spring weather, and warm weather to harvest them in. The climate is more important to peas than soil, but peas like soil with plenty of lime and loamy soils of high fertility. A good rotation for peas is fallow, wheat, peas, and wheat—that is, in a place of 20in. rainfall. Unless much care is shown in cultivation, peas leave the land in a weedy condition. Peas should not be grown on fallow, because they put on too much growth and not enough peas. The soil should be ploughed in autumn, and cultivated and harrowed twice before seeding, and will also do well ploughed up and sown immediately. Seeding should be done in June with about 1½ bush. to the acre. Super should be sown at about 180lbs. per acre in 20in. rainfall districts. The best way to harvest peas is with an ordinary header harvester, fitted with a pea-attachment in front. It is almost not worth the labor to tramp them out and put them through the winnower. Pea stubble is of great use for producing fat sheep."

At the September meeting of the Branch, which was attended by 8 members, Mr. J. Bradford presented a paper, "Sheep Husbandry." (Secretary, M. Pearce.)

CLARENDON (Average annual rainfall, 32.89in.).

October 2nd.—Attendance, 12.

THE LIVE PIG TO BACON.—Mr. L. C. Spencer read the following paper:—"The pig 1 favor for bacon for home consumption is secured from a Tamworth-Berkshire sow crossed with the Large White Boar. This class of pig will give a good distribution of fat and lean. The pig that is required to-day for export trade and also for the home market is one of this type. The pig should be reared on the farm, and from produce grown on the farm. The man on the land must economise, and a pound saved is a pound made. The Tamworth-Berkshire has a nice bright skin, and, when dressed and crossed with the large White, the carcass always cleans easily, which makes it possible for amateur butchers to make a nice job of slaughtering and dressing. The pig should not be fed on the day of slaughter. The pig should be caught, placed on his back, front legs held back tight, straddled by the holder, with his feet close in to the sides of the pig. The sticker takes hold of the lower jaw, inserts cut, turns over the knife, and makes a straight line to the tail. **Scalding.**—Take 3 buckets of boiling water to 1 of cold in a convenient tub. First immerse the head, which is the most difficult part to clean, and keep it moving until the skin and rough pieces peel off in the tub. The meat is then taken on to a stool, cleaned thoroughly, hung up, and dressed, and left overnight to set. In the morning cut the carcass down the centre, and joint to suit requirements and the curing tub. The brine is prepared just strong enough to float an egg:—½lb. salt petre is added to 100lbs. pork, one-third of the amount of salt being used as a guide to the quantity of sugar. The pork should be shifted from the top of the tub to the bottom several times, each time sprinkling a little salt over the visible meat. It is left here for 14 days, then taken out, placed in a tub of water for 24 hours, and then hung up to dry. If conveniences are on hand to cure in full sides, it is necessary to use a brine pump, and inject the solution into the thickest places and around the bones. To prevent the skin and flesh from drying hard, the application of a little olive oil will help; it also improves the appearance if smoking is required. Many prefer the smoked meat after they have acquired the taste. That is hardly necessary for home consumption." (Secretary, T. Brooks.)

CURRENCY CREEK.

September 4th.—Attendance, 8.

CLASSING THE FARMER'S CLIP.—The Hon. Secretary (Mr. D. Jeff. Gordon) read the following paper:—"The farmer owning 500 to .600 sheep should pay just as much attention to the "get-up" of his clip as the station owner. It is not necessary to make as many classes, but he must be as careful, for farmers' clips, being small, do not bring as much competition as the stations', and if badly got up are only taken by speculators at very low prices. Shearing should be done on a clean floor, the fleece picked up carefully, thrown on the rolling table, and skirted regularly. Where the sheep have been breeched only the burry and dirty edges need be taken off; the sides should then be turned in, one slightly more than the other, and the fleeces rolled from breech to shoulder. In Merino, the extra heavy, matted, or discolored fleeces should be kept separate. In Crossbreds the extra coarse wool should be removed and put with the Lincoln or whatever breed was used in the crossing. It is advisable to pack

Roseworthy Agricultural College.

JERSEY BULLS FOR SALE

ROSEWORTHY PRETTY DUKE 7589.

Born, May 19th, 1929. Tattoo Ry. 032.

Sire—King Solomon of Dalebank 1699 by Makarini (Imp.) 995.

Dam—Pretty May of Dalebank 23560 by Duke of Dalebank 2642.

G.Dam—May 3rd of Dalebank 13845 by You'll Do of Dalebank 1711.

G.G.Dam—May 2nd of Dalebank 6626 by Pretty Mike 787.

Record of Dam.—As Junior 4 years old—Milk, 5,845½lbs.; average test, 5.30 per cent.; butterfat, 31.02lbs.

ROSEWORTHY SPRITE—Entered in Herd Book, Vol. 20

Born April 15th, 1930. Tattoo Ry. 041.

Sire—King Solomon of Dalebank 1699 by Makarini (Imp.) 995.

Dam—Roseworthy Fairy 19077 by King Solomon of Dalebank 1699.

G.Dam—Fairy Queen III. of Linden 7525 by The Chief of Linden 1065.

G.G. Dam—Fairy Queen II. 5528 by Admiral 1062.

Record of Dam.—	Lbs.	Per cent.	Lbs.
As Junior 2 years old . . .	6,000	5.24	314.18
Junior 3 years old . . .	7,270½	5.44	395.56
Junior 4 years old . . .	8,098½	5.40	437.87
At 5 years	10,108½	5.64	570.68

Both bulls are eligible for sale under Government Subsidy. Bull calves also available.

SOUTHDOWN EWES FOR SALE.

A number of Stud Southdown Ewes for sale. Prices according to age and quality.

For further particulars apply to—

The PRINCIPAL,
Agricultural College,
Roseworthy, S.A.

pieces, bellies, stains, and locks separately, even if they have to be put in bags, for mixed lots never bring their full values. As regards lambs' wool, anyone owning a hundred or so should take the clean wool from the fleece and pack it separately. The farmer should keep as near to one kind of sheep as possible, for by so doing he does away with so many small lots and receives better results."

CURRENCY CREEK.

November 6th.—Attendance, 9.

FIRST AID TO THE INJURED.—Mr. L. Collett^{1st} read the following paper:—"A first-aid man's work is not to take charge of serious cases and expect to carry them through without medical assistance; his work ends where the doctor's begins, i.e., his job is to do what he can for the patient until a doctor arrives. It is first necessary to know something of the structure of the body and the functions of the more important organs or systems. (1) *The Skeleton*, or bony framework of the body, gives the body its shape and firmness, affords attachments for the muscles, and protects the internal organs. (i) The skull holds the cranium, jawbones, and eyesockets. (ii.) The backbone, spine, or vertebral column, with the muscles or ribs attached, gives the power to straighten, or bend and twist, and contains the spinal column or cord. Between the bones of the vertebrae are cushions of tough cartilage or thickly packed gristle giving the power to land from a jump without jarring the base of the brain. (iii.) The ribs, of which there are 12 pairs, are terminated at the front by cartilage, the upper seven pairs being joined to form the breastbone. (iv.) *The Upper Limbs.*—(1) The shoulders are the collarbones and shoulderblades. (2) The arm is hinged at the shoulder by a ball and socket joint, at the elbow by a perfect hinge, and at the wrist and fingers by a series of small hinged bones, 27 in number. (v.) *The Lower Limbs.*—(1) The pelvis is a basin-like mass of bone attached to the lower part of the spine. (2) The leg consists of the thighbone, kneecap, and shinbone, with the ankle and foot at the far end. (2) *Muscles* are the red flesh of the body, classified into two groups—voluntary and involuntary. The voluntary muscles are found chiefly in the arms, legs, neck, and on the trunk surface. They are moved by will power. The involuntary muscles are found in the heart, lungs, stomach, and intestines, &c. They keep on with their work whether we are waking or sleeping. *Fractures and How to Mend Them.*—The most common form of fracture is by direct violence as in a broken leg, arm, or rib, &c. But very often a person fractures a bone by indirect violence, such as alighting on the feet from a jump and fracturing a thighbone or knee. Again, muscular action might break in two the kneecap or arm bone. A fracture may be simple, where a clean break has occurred, compound where a bone has been splintered and protrudes through the skin, or complicated where a broken rib may enter into a lung—essentially a job for a doctor. If the bone of the upper arm has been broken midway between the shoulder and elbow, first make a set of three splints—one to fit from the armpit to the elbow (inside), the others from the shoulder to the elbow (outside). Next take the elbow in one hand and the broken place in the other, and pull until the two arms are of equal length, press the break firmly into place, put on the splints, and bind securely with two bandages, one above and one below the break. This will cause some pain, so be as gentle as possible. The same method should be adopted for all breakages of the limb bones. The two bones in the forearm are straightened by turning the palm upwards, and the shinbones are straightened by holding the two feet together. To make a sling for the arm, take a piece of cloth about 1yd. square, and make a triangular bandage by placing together the two far corners. Place one point up the arm at the back, the second around the neck from the far shoulder, passing the cloth under the elbow and forearm across the chest. Take the third point and carry it to the shoulder nearest the break, and tie a reef knot on the shoulder. If a rib be broken, place two broad bandages around the body and tie firmly with the centre of each immediately above and below the fracture. The lower bandage should overlap the upper, with the knots on the opposite side of the break. To make a broad bandage, take the apex of the triangular bandage and fold it to the centre of its base, and then fold again. To make a narrow bandage fold the broad bandage again. If a collarbone be broken, place a thick pad under the armpit to act as a fulcrum. Sling the arm with the ordinary sling, but with the hand drawn up towards the far shoulder, and bind the elbow firmly to the side. *Pressure Points for Blood Stopping in Cases of Cut Arteries, &c.*—The blood systems are carried out by arteries and veins. The arteries, carrying a pulsating, crimson flow of blood direct from the heart, when cut spurt blood in pulsating gushes, as they

are forced by the action of the heart. The veins when cut give forth a steady, even flow of blood of a darker color than the arteries. They are bearing blood back to the heart, which pumps it through the lungs, to be refilled with oxygen and again forced through the arteries by the heart action. If an artery in the wrist is cut there would be a pulsating spurt of crimson blood that would carry perhaps a yard away. It would be practically useless to attempt to stop this flow by binding the forearm. The pressure point is just in the bend of the elbow. Take a small block of stone, wood, or whatever it may be, and wrap this in a handkerchief to avoid cutting the skin. Place the pad in the hollow of the elbow, and bind the wrist up to the shoulder, thus forcing the block hard against the artery, and stopping the flow. The same method applies to the upper arm, the pressure point being in the hollow under the arm. The pressure points of the body are 15 on either side, i.e., 30 in all. A small chart is the best from which to learn these. If a vein is cut, stop the blood flow on the side away from the heart. The flow is not nearly so strong, as the vein contains a series of valves that allow the blood through but stop it from falling back again. The best method when a vein is cut is to place a pad over the wound and bind tightly. If this does not stop the flow apply pressure on the vein just on the opposite side of the wound from the heart. In all serious cases of artery or vein cutting, broken bones, &c., the first-aid man's job is to apply what aid he can, and send for a doctor. If possible, do not leave the patient any longer than is necessary. *Common Forms of Wounds, Etc., Experienced on a Farm.*—A burn or scald is treated by first removing the clothing by cutting it off, and applying oil. Olive oil is in common use, and is very good. Then bind to keep away the air. Common cuts from which the blood oozes through capillary tubes from the blood vessels in the normal person will congeal in a short time. With snake bite it is necessary to stop the blood between the heart and the bite by a ligature, because the small capillary tubes carry poison. Then lacerate the wound through the two points where the teeth have marked it, about $\frac{1}{2}$ in. deep, and suck. Then rub into the wound a few grains of permanganate of potash—Condy's crystals. Insect stings, though not often dangerous, are seldom anything less than painful. A few drops of eucalyptus or ammonia on the bite will prove beneficial. Sunstroke is more or less common. Take the patient to a cool place, and strip to the waist. Raise the head and shoulders, and fan vigorously to supply a cooling draught of fresh air. Also apply anything cold—ice, water, or anything handy—to the head, neck, and spine. With

1933

CALENDAR

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nearly all accidents treat for shock. Keep the patient quiet and warm. Give fresh air, but not a draught. Water or warm tea with milk is common as a stimulant." (Secretary, D. Jeff. Gordon.)

LENSWOOD AND FOREST RANGE (Annual average rainfall, 35in. to 36in.).

August 28th.—Attendance, 20.

DRAINAGE.—M. J. Vickers read a paper which dealt with all phases of draining orchard land. A number of questions were asked and a discussion took place on the cost of draining tiles which at present is considered excessive. He considered tile drains were the best in the long run because when properly installed they were trouble-free and would last indefinitely. He thought that apple growers were not fully aware of the importance of well drained land.

QUESTION BOX.—The meeting held on September 25 took the form of a Question Box and was attended by 14 members. The questions which had been submitted previously were dealt with by Messrs. H. Schultz and F. Rowley (sen.) who alternately answered a question, and was followed by the discussion of the meeting. The latest spray outfits operate up to 300 and 400lbs. pressure. Is this justified considering the extra wear and tear on engine, pump, hose, &c.? *Ans.*:—From 200 to 300lbs. pressure is ample to obtain a good and efficient spray. What is the best type of coulter for ploughing in a green crop in the orchard? *Ans.*: A disc coulter was preferred, although for burying green crop or rubbish a heavy disc plough was thought best. In view of the fact that approximately 120 tons of raspberries were grown in this district years ago and all sold, why is it that the few we grow now are not more easily disposed of? *Ans.*: Due perhaps to a number of reasons—(1) The sugar bounty making a prohibitive price for the housewife to buy sugar to make jam with. (2) The general depression. (3) Competition of Tasmanian pulp. (4) Negligence of certain growers who sell fruit in the market in improperly painted tins, which when emptied have a black appearance on the fruit. The highest grade of paint obtainable was not too good for protecting the tin from the acid of the fruit and the consequent dark color. Is this Branch of the Bureau doing enough to justify its existence? *Ans.*: Yes. The long time of its existence bears evidence of its justification. Also, being the means of disseminating valuable knowledge from time to time it is well justified. Is a winter oil spray payable, and if so would you apply one every year? *Ans.*: It pays the first year and perhaps the second, but not every year. Another member was of the opinion that a dressing of bone dust each year would do far more good than any amount of oil spray. What variety of pear is recommended for present planting? *Ans.*: Not advisable to plant any, but for general use Duchesse is as good as any. When is the best time to plant strawberries; autumn or spring? *Ans.*: If on clean ground, plant early in autumn and there will be a chance of getting a fair crop first year. If on dirty ground as late in the spring as possible.

At the meeting held on October 30 which was attended by 14 members and 11 visitors Dr. Jungfer gave an address on the subject, "Medical Progress in the Last 15 Years." He gave reports of doctors who inspected immigrant boats of the early settlers, and compared conditions with the present time. In those days there were no antiseptics, anaesthetics, vaccines, or knowledge of surgical cleanliness. A large percentage of cases of fever or smallpox were fatal. Due to ignorance of surgical cleanliness 8 cases out of 10 when operated on died of blood poisoning. There was much controversy over chloroform when first introduced, it being the belief that pain was natural to man and should be borne. Pasteur's work was described how by his researches he discovered how to control and prevent different germs. The system of pasteurization was thus named after him. The efficient work of the Quarantine Service was mentioned, it being said that little was heard of it because of its efficiency. With air services growing and the consequent rapid travel of passengers it was at present one of the problems of the Quarantine Authorities. Although much progress had been made, there was still much to be done, and the work of doctors in the future would be along lines of prevention, rather than treatment. (Secretary, B. Lawrence.)

MILANG (Average annual rainfall, 14.92in.).

August 5th.

CARE OF DAIRY PRODUCE.—Mr. J. Daniels read the following paper:—"The district in which we live is perhaps one of the most suitable dairying areas in the State; it has a suitable climate and rainfall, and natural feeding facilities. The first considera-

tion must be given to milking. Milk when first drawn is immediately affected by bacteria from the air, and may cause great harm if the hands and udders are not continually washed throughout milking. If these points are not adhered to the bacteria thrives and multiplies with alarming rapidity. Keep the separator and milking machine scrupulously clean. It is impossible to make a thorough job with a cloth and hot water; preferably use a good stiff brush. The use of a straining cloth tends to taint the milk. When cans are received from the factory scald before refilling, because the cans are washed and steamed in bore water, which is highly mineralised. Metallic taint is brought about by the use of bad and rusty cream cans caused by the tinned surface coming off the can. The chief defects in cream are:—Weedy, unclean, metallic, absorbed flavors, and fermenty, and are due to:—Unclean: Dirty methods on the farm, unwashed separators, buckets, &c. Weedy: Cows pastured on rape, lucerne, and dandelion at irregular intervals. Metallic: Using utensils that are not properly tinned and holding cream in kerosene tins. Absorbed flavors: To avoid this defect cool the cream, clean the dairy, and keep the cream away from odors. Fermenty: Mixing warm cream with cold. Cream under the Dairy Act is classified into three grades—choicest, first, and second. Choicest is a cream free from taints, of clean aroma, and suitable for making a first-class butter. First grade: Slightly tainted and slightly unclean. Second grade: Unclean, weedy, metallic, and fermenty. The points set out are:—Second grade, 36, 37, and 38 points; first grade, 39, 40, and 41 points; and choicest, 42 points and over. After the cream is taken delivery of it is weighed and entered into a weight book and sampled. After grading the cream is tipped into a sieve, and from there to a neutralising vat to which water is added, because the butter fat content is too high for churning purposes. A test is then taken to determine the amount of lactic acid in the cream. A sample (9c.c.) is put into a small dish, and a few drops of phenolphthalein indicator are dropped into the cream. A graduated burette containing a 1/10th solution of caustic soda is filled to the '0' mark, and then allowed to drip into the cream. When these reagents neutralise, the cream turns a faint pink. The dripping is stopped, and the reading taken to ascertain the per centage of acid in the cream. A chart is used to work out how much bicarbonate of soda is wanted to neutralise to a certain extent the acid that is in the cream. The whole of the acid is not neutralised, as this would affect the flavor of the butter. From this the cream is pasteurised. Pasteurising consists of heating the cream to 140° F. for at least 19 minutes, thus destroying bacterial life. Heating is followed by quick cooling to check spore formation. In the local factory the cream is heated to 190° to 200° F. Most food flavors are vaporised and pass off in steam, and most bacteria are destroyed. Care is taken not to scald the cream, and so avoid a cooked flavor. The cream is then subjected to rapid cooling, done by gravitating it over coils containing water first, and then brine at a temperature of 20° F., and finally ammonia expansion coils, and finally pumped into receiving vats to ripen. Heating and cooling takes less than a minute. After ripening the cream is churned at 45° F., the churn being previously cooled and scalded. The cream is churned until it changes into butter granules about the size of corn. The buttermilk is run off because its retention may leave mottles in the finished article. The butter is then washed in water at a temperature of 40° F. Two per cent. of salt is then added, and the butter finally worked to incorporate the salt and moisture." (Secretary, L. Yelland.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Adelaide	2/11/33	16	Address—H. B. Barlow	J. R. Newland
Milang	1/11/33	19	Address—W. J. Spafford	L. Yelland
Blackheath	2/11/33	10	Congress Reports	E. Paech
Blackheath	7/12/33	9	Paper from <i>Journal</i>	E. Paech
Hope Forest ...	6/11/33	22	Annual Meeting	A. Eve
Murray Bridge .	22/11/33	66	Cinema Lecture—H. N. Wicks	F. Burr
Mount Pleasant	17/11/33	5	Discussion	T. Philps
Cherry Gardens	25/11/33	100	Annual Social	A. Stone

WOMEN'S BRANCHES.

In the report of the Women's sessions of the 1933 Annual Congress, which appeared on page 349 of the October, 1933, issue, the following resolution was omitted:—"That where farmers come under the Farmers Relief Act, their wives and daughters who do work on the farm should receive under that Act portion of the crop for their own exclusive use, as a recognition of their labors and services to the community."

AUBURN (Average annual rainfall, 23.98in.).

October 27th.—Attendance, 24.

USES OF THE CITRON.—Mrs. C. Sandow, in the course of an address on this subject, said if the citron was better known housewives would use it in preference to orange for marmalade. She recommended the following recipes:—*Citron Peel*—Cut the citron into quarters, take out pulp, put into a jar with salt water—a handful of salt to 1 gall. of water; leave for three days, then put in fresh water for two days, changing each day, drain well. Boil in a large saucepan of water until tender enough to pierce with head of a pin, drain for 24 hours. Make a syrup by boiling for five minutes 1 pint of water to 1 lb. of sugar; place the peel in the syrup and boil quickly until a clear amber color or nearly all the syrup has disappeared. Take out the peel and sprinkle well with fine sugar and put in a dish to dry in a cool oven for an hour or so two or three days in succession, or dry in the sun. *Citron Ginger*—Cut citrons into eight or more pieces and take out pulp, boil for two hours and throw water away. Boil for two hours in fresh water, drain for 24 hours. Weigh, and to every 1 lb. of citron add 1½ lbs. of sugar and half pint water. Make a syrup of sugar and water; when boiling, add the citron and 2 ozs. of green ginger in a bag and 2 ozs. preserved ginger, cut in small pieces, to the pound. Boil until quite clear or when it jells—20 to 30 minutes. *Citron Conserve*—Treat citrons as for citron ginger, only use all the fruit and add 1 pint of water to every 1 lb. of citron and 1½ lbs. of sugar. Proceed as for citron ginger; this is done when clear, but the liquid does not set. *Sweet Citron Marmalade*—Boil citrons, drain, cut fine, and to every 1 lb. of fruit add 1½ lbs. of sugar and half pint water. Boil until clear. *Mixed Marmalade*.—To one small citron, allow two oranges and two lemons; weigh, cut up very fine, and to every 1 lb. of fruit allow 3 pints of water. Cover and leave overnight. Boil next day until tender, weigh, and to every 1 lb. of mixture put 1½ lbs. of sugar. Boil until it sets. Citrons must be ripe for all except the marmalade. (Secretary, Miss L. Dennison.)

BELALIE (Average annual rainfall, 17.71in.).

October 17th.—Attendance, 14.

JAM MAKING.—Paper contributed by Mrs. Fife.—“Fruit for jam making should be firm, sound, and just ripe—the fresher the better. If fruit is unripe the pectin or jellying power is absent. If overripe fruit is used, fermentation and moulds develop and the jam is wasted. Use a shallow, broad pan for preference, which allows the water to evaporate better than a deep preserving pan. Butter the bottom of the pan to prevent the jam from burning and avoid the need for skimming. Sugar acts as a preservative and for good results use only the best sugar. Most fruits require 1 lb. of sugar to each 1 lb. of fruit, the two exceptions being fig or melon, these requiring ½ lb. sugar to 1 lb. fruit, being deficient in acid. The addition of lemon juice or tartaric acid is needed to flavor—the quantity may be varied to suit individual tastes. Berry fruits do not need overnight preparation, but should be lightly bruised to start the juice flavoring. They require quick boiling to retain the color. The quicker jam is boiled after the sugar is added the better the result—about one hour is generally sufficient. Pears, apples, and quinces require steady, slow cooking to soften the fruit and long boiling if a rich color is desired after the addition of the sugar. Apricots and most varieties of plum should be halved, stoned, and covered overnight with half of the required amount of sugar. Moorpark Medium is a good jam apricot, Satsuma Plum a nice red table jam and Damson or Purple Gage Plums for jams, tarts or puddings. The addition of 1 lb. mulberries to 4 lbs. plums adds a distinctive flavor. Raspberries being poor in pectin are improved by the use of equal quantities of red currants and raspberries. Black cherries cooked half an hour before being added to gooseberry are an improvement, in the proportion of 3 lbs. cherries to 6 lbs. of gooseberries. Rounds of paper an inch larger than jars should be dipped in warm milk and when dry will be like parchment. I prefer jam bottled quite hot, pasted down, and left to cool before being stored in a dry, dark cupboard.”

RECIPES.—*Orange Jelly*—Slice six large Poorman oranges and two lemons thinly, add 6 pints water, stand all night, and then boil rapidly for one hour until it becomes pulpy. Strain through a jelly bag, measure liquid, and allow to every cup of juice

one cup of sugar. Boil for one hour until it jells, then skim well. *Preserved Figs*—6lbs. figs, three cups water, boil until soft, then add 6lbs. sugar, one teaspoon each of tartaric acid and ground cloves and $\frac{1}{2}$ lb. preserved ginger, sliced thinly. Boil three to four hours briskly, then bottle and seal. Will keep indefinitely. Use the small brown sugar fig and do not remove the stalk. *Peach Conserve*—6lbs. peaches, 6lbs. sugar, 1 cup cold water. Slice peaches to the thickness of $\frac{1}{4}$ in. and strew with all the sugar, add water, and allow to stand overnight. Bring quickly to the boil and cook until a rich wine color. The Elberta or other preserving peaches only are suitable for this delicious preserve, which must be sealed hot. *Quince Marmalade*—Cut quinces into dice and to every 1lb. of fruit allow 1 pint of water and 1lb. of sugar. Boil cores and peel separately in water and pour over sugar. Boil syrup 30 minutes, then add fruit and continue boiling until a deep rich red and the liquid jells when tested (Secretary, Mrs. A. Cummings.)

CLARE (Average annual rainfall, 24.53in.).

October 7th.—Attendance, 31.

BUTTER MAKING.—Paper read by Mrs. J. Miller:—"The making of butter is an historic art. It was as necessary to the health of the ancient Greeks as art was to their sense of the beautiful. It is hardly necessary to stress the fact that butter has a high vitamin content as well as food value, and that it is false economy to stint butter at the table, especially where growing children are concerned. Cleanliness is essential in all stages of butter production. The cows should be well housed besides being well and properly fed. Pasture-fed cows produce butter richer in vitamins than stall-fed animals do. Care must be taken to prevent butter being tainted by weeds or other unsuitable food. All dairy utensils must be kept properly clean with scalding water. A sunbath for separator and churn after being washed is an excellent germ killer. Scald wooden pats likewise. Separator cream should be cool before being mixed with other cream and must be kept cool. A home-made cool safe under a shady tree or in a draught is ideal for the summer. Cream should be made up into butter while fresh, allowing for weather conditions. If cream is kept cool it may be made up three times a week in summer and twice a week in winter. For quick and easy churning, the cream should be fairly thick. It should be worked until the buttermilk runs off the shiny surfaces of the solid mass of butter. Pour off the buttermilk and pour cold water over the butter, pressing and stirring the butter with a scalded wooden pat, and then strain off the milky water. This washing is repeated three or more times until the water pours off in a clear stream, and is very necessary, for if milky particles are left, the butter will be streaky and will not keep well. Press all the water out with the wooden pats, weigh, and allow about 1 tablespoon of salt and 1 teaspoon of sugar to each pound. The sugar counteracts the salt flavor and brings out the butter flavor better. It is a good plan to roll the salt so that it will mix evenly. Work the sugar and salt well into the butter. The butter is then weighed into pounds, patted into shape, and neatly covered with butter paper. Allow 1oz. over for shrinkage if the butter is to be kept." (Secretary, Mrs. W. McKendrick.)

COONAWARRA.

October 25th.—Attendance, 32.

PUDDING RECIPES.—*Twenty Minute Puddings* (Mrs. W. L. Redman)—Beat well 1 egg and 2 tablespoons sugar. Add 1 tablespoon melted butter, then $\frac{1}{2}$ cup milk and 1 cup flour, to which has been added 1 teaspoon cream tartar and $\frac{1}{2}$ teaspoon soda. Butter 5 cups, put currants, jam, rhubarb, or brown sugar at bottom. Pour in batter, cover with greased paper, and steam. Serve with sauce. *Carrot Pudding* (Mrs. O. Skinner)—4ozs. each butter or dripping, flour, and breadcrumbs, 1 teaspoon soda, 1 cup each grated carrots, sugar, currants, and milk. Mix all well together, pour into basin. Boil or steam $3\frac{1}{2}$ hours. *Cold Shape* (Miss O. Lear)—Dissolve $\frac{1}{2}$ oz. gelatine in cup hot water, let cool; beat in $\frac{1}{2}$ lb. sugar. Beat well the yolks of 2 or 3 eggs and add juice of 2 lemons; mix eggs and lemon juice in gelatine. Whip whites, add to mixture, and beat all together. Put aside to set. *Fruity Snow* (Mrs. O. Skinner)—Place alternate layers of "snow" and sliced mandarins (or any stewed or fresh fruit) with a sprinkle of cocoanut and chopped nuts in dish until full. Decorate top and serve cold. "Snow"—Boil 2 cups water and 1 cup sugar, add 2 tablespoons cornflour mixed with water, stir and cook 5 minutes. Add juice of 2 or 3 lemons (or any other flavoring), and when cool pour over stiffly beaten whites of 3 eggs. Beat until light. *Cocoanut Pudding* (Mrs. Lear)—One pint milk, 2 tablespoons each cornflour, sugar (crystals), 3 tablespoons cocoanut, 2 eggs, 2 tablespoons castor sugar, 1 tablespoon

butter, grated rind of lemon. Put milk and butter on to boil. Mix flour smoothly with a little of the cold milk. When milk boils, add flour and cook 2 minutes. Add cocoanut, lemon rind, and egg yolks well beaten with (crystals) sugar. Put in buttered piedish and stand in water in a moderate oven until set. Beat whites of eggs to stiff froth, stir in castor sugar lightly, spread on top of pudding. Put back in oven for a few minutes until set and a pale fawn color. *Sultana Baskets* (Mrs. Alder)—3ozs. sultanas, 1½ozs. butter, 2ozs. sugar, 2 tablespoons stewed apples, ½lb. short or flaky pastry, 2ozs. cake crumbs, 1oz. ground almonds, almond essence, 1 egg. Roll and cut pastry into rounds, line six deep tins; roll trimmings into a long, narrow strip, cut it into six pieces, twist, and form horseshoe of each; cream butter and sugar and well beaten egg; beat well and add other ingredients. Half fill each tart and bake 20 minutes in hot oven; take out handles after 10 minutes. Place handles upright on each tart to make basket. *Passion Fruit Pudding* (Mrs. Pounsett)—One cup sugar, 2 tablespoons flour, 2 eggs, 1 tablespoon butter, 4 passion fruits, 2 cups milk. Cream sugar and butter, add well beaten yolks, flour, milk, passion fruit pulp, and lastly stiffly beaten egg whites. Pour into piedish and place in large one containing hot water. Bake 1 hour in moderate oven and serve with boiled custard or cream. This sets with thick custard on bottom, a layer of passion fruit, and sponge on top. This mixture makes a nice lemon pudding, also if juice and grated rind of 2 lemons is substituted for passion fruit. *Boiled Puddings* (Mrs. Mitchell)—When possible, make puddings in a mould. Grease mould well and put butterpaper over top before putting on lid. A billycan makes a good mould. Steamed puddings are lighter than boiled because they do not come in contact with the water. The water should be boiling in which to put the pudding and kept boiling until the specified time for same to be served. Water should be replenished as it evaporates. There are many ways of preventing the mixture from sticking to the cloth, such as dipping cloth in boiling water, greasing or flouring it. Another plan is to line the cloth with grease proof paper. Always use good suet or butter; rancid fats will spoil a pudding. Plum pudding should not be served after a poultry dinner; a light dessert such as salads and jellies is preferable. When depended upon for their food value most boiled puddings have the necessary vitamins, but excessive cooking spoils all vitamins. Boiled puddings must have much cooking to turn out successfully. If it is desired to keep Christmas puddings for some time, dip in paraffin wax and hang in an airy place. Many boiled puddings can be prepared overnight, which saves time in the morning. *Sago Date Pudding*—One cup each breadcrumbs and dates or raisins, ½ cup sugar, 2 tablespoons sago soaked in cup of milk all night, ½ teaspoon carb. soda in a little milk, 2ozs. melted butter. Mix all ingredients, butter last. Steam in a greased mould for 2½ hours. *Marguerite Pudding*—2ozs. each dripping or butter and moist sugar, ½lb. S.R. flour, 1 egg, and a very little milk. Line mould with any kind of jam, or a layer of stewed fruit. Steam 1 hour. *Raisin and Orange Roll*—Crust: ½lb. flour, ½lb. suet, 2 teaspoons baking powder, water to make a medium dough. Filling: 2 cups seeded raisins, rind and juice of 2 oranges, golden syrup. Sift flour, baking powder, salt. Rub in shredded suet and add water. Roll out ½in. thick. Spread with syrup, cover with raisins and sprinkle with rind and juice of oranges. Put in floured cloth and boil 2½ hours. *Plum Pudding* (1)—½lb. each suet, moist sugar, raisins, sultanas, ½lb. each mixed peel and breadcrumbs, 4 eggs, 1 wine glass brandy, 2ozs. almonds, half nutmeg, and a little salt. Mix the beaten eggs and brandy together before adding other ingredients. Rub the flour and suet well together before adding fruit, &c. Boil 6 or 7 hours. *Plum Pudding* (2)—½lb. each sugar, raisins, currants, flour, butter, 4 eggs, 2ozs. lemon peel, half wine glass brandy, half teaspoon soda. Boil 7 hours. Beat butter and sugar, add eggs, then flour and fruits. *Meat Pies* (Mrs. Modistach)—½lb. to 1½lbs. beef or neck mutton, and 3 or 4 sheeps' kidneys. Put in layers with pepper and salt and cover each layer with flour. Fill up with cold water, cover, put in the oven, and cook slowly for 1½ hours. Cover with short crust, bake 15 to 20 minutes. If liked, onion and carrot can be added. Meat can be put through mincer instead of being cut, as is usually done. *Chicken or Rabbit Pie*—Take one medium sized or two young rabbits, bone, and cut up, stand in salt and water for 1½ to 2 hours. Arrange joints of rabbit in piedish with thin slices of ham or bacon and some yolks of hard boiled eggs. Cover with stock or water, add pepper and salt to taste and little nutmeg. Cover with puff paste. Bake 1½ hours. *Apple or Rhubarb Pie*—Stew apples with sugar, one or two cloves, and pinch of cinnamon, turn into piedish. Cover with puff pastry, or mix together 1 cup breadcrumbs, half cup sugar, 1 cup cocoanut. Moisten with a little apple or rhubarb juice. Put on top of fruit, whip the whites of two eggs, drop in spoonful on top, and bake until golden brown in moderate oven.

(Secretary, Mrs. F. Skinner.)

LAURA BAY.

September 5th.—Attendance, 8.

HOUSEHOLD HINTS.—Paper read by Mrs. D. F. Morrison:—"Store Hunt: When using silverfros for stoves pour off oil which is floating on top of mixture and add same quantity of kerosene, it will not turn brown with heat. When out of stove polish, mix equal parts of vinegar, boiled linseed oil, and kerosene. Shake until a creamy consistency. *To Remove Rust Stains* from fuji silk rub unsalted butter well into the silk and let lie about an hour, then wash in the usual way. *A Good Mop Oil*: 3 parts kerosene to 1 of raw linseed oil, put mixture in bottle and shake before using. *Tar on a Silk Dress or White Shoes* can be cleaned off easily by rubbing with eucalyptus. *To Remove Scorch Marks*: Make paste of magnesia and water, spread on part and when dry brush off powder. *To Remove Mildew from Linen*: Rub parts with soap and sprinkle with chalk, leave for a day then wash. Two treatments may be needed. *Carron Oil for Burns*: Mix equal quantities of olive oil and lime water. Keep closely corked, shake before using until thick and milky. *When Setting a Fowl*: Make hole in ground, pour in dipper of water, let soak in, then put straw and eggs; water and warmth from fowl steams egg shells and makes them easy to hatch. *To Clean Cloths or Rugs*: Mix sheep's or bullocks' gall with equal water, scrub until it becomes soapy and until it disappears and original color returns; put in fresh air to freshen. A few drops of Condy's crystals in water will keep fowls healthy. When making a quantity of sandwiches, put mustard in butter, add a few drops of hot water, and mix well; it is easier to spread and butter goes further; this is especially good in cold weather. *Bread Making*: A cup of cold water put in the oven when baking bread makes it steam and is much lighter and moist. A sprig of wormwood put in a cup of boiling water and a small quantity of solution taken twice a day will cure boils. *Cough Mixture*: 3d. worth each of peppermint, paregoric, laudanum, and aniseed, pour 1 pint boiling water on 1lb. treacle, stir when cool, add above mixture, bottle and cork well." (Secretary, Mrs. D. Morrison.)

McLAREN FLAT.

November 2nd.—Attendance, 20.

MANUFACTURE OF BUTTERMILK POWDER.—The Hon. Secretary (Mrs. D. Elliott) presented the following paper:—"Buttermilk is generally used for feeding pigs, and most of the large manufacturers dispose of their buttermilk for that purpose. The buttermilk is run from churns into tinned steel holding vats. If the milk contains but little acid, it is often left overnight in order that acid to the proper degree may develop. The milk is then gravitated to the drying plant. This consists of two oblong steel rollers placed together and revolving at a speed of 20 revolutions per minute in opposite directions. The rollers are hollow and steam under pressure is used for heating same. Steel knives are affixed at correct angle on the roller for removal of the solids. A hood, leading through the roof of the building, is generally made of galvanized iron and is placed above the rollers in order to cope with the evaporated moisture. The live steam inside the rollers is, by the means of a pressure pump, returned to the steam boiler. The operation commences by the rollers being gradually heated and set in motion. The blades are then adjusted to the rollers. When the rollers have the required heat, buttermilk is run into the distributors above the roller, from there an even flow of milk is led over the hot rollers. There the milk starts boiling, the moisture evaporates, and the solids adhere to the rollers. The solids consist of casein, sugar, and fat. The latter in very small quantities, generally about 5 per cent. In order to recover the thin film of milk solids, sharp knives are forced on the bright polished surface of the rollers and sheets of solids resembling paper are seen leaving the roller. If the knives are blunt or the rollers too hot the solids are burnt and discolored, whereas with milk of proper acidity, with knives in good condition and carefully adjusted, the steam pressure correct, a product almost white and quite palatable is obtained. The sheets of solid milk are worked through a medium fine sieve into bags. The powder has a flaky, velvety appearance. It mixes well with other ingredients, crushed grain, &c., which, in proper balanced proportions, forms the latest idea in feeding chickens and fowls."

MILLICENT (Average annual rainfall, 29.76in.).

November 17th.—Attendance, 7.

SALAD RECIPES.—*Japanese Salad*: 2 lettuces, 1 apple, 1 large orange, 3 or 4 radishes, $\frac{1}{2}$ tin small sliced pineapple, $\frac{1}{2}$ lb. ripe tomatoes. Wash the lettuces, drain and arrange leaves in a circle in salad bowl. Cut orange sections in halves, peel the tomatoes and

apple, cut up fruit into small cubes, slice radishes thinly. Mix fruit with salad dressing. *Cream Dressing*: 2 tablespoons thick cream, $\frac{1}{2}$ tablespoon Worcester sauce, pinch castor sugar, 1 dessertspoon lemon juice, salt and pepper. Mix cream gradually with sauce, sugar, salt, and pepper; stir in lemon juice by degrees. *Cooked Salad Dressing*: 1 teaspoon mustard, 1 dessertspoon butter, 1 tablespoon sugar, 1 egg, 1 gill milk, 3 table-spoons vinegar, $\frac{1}{2}$ teaspoon salt. Mix butter, mustard, salt and sugar; break egg on to it and beat 1 minute, then add milk and vinegar. Cook until it thickens and resembles custard, stirring all the time. If put in an airtight vessel this will keep. *Fruit Salad*: 2 slices pineapple, 3 bananas, 1 orange, $\frac{1}{2}$ lemon, few strawberries, 1 apple, 1 tablespoon pineapple juice or light wine, $\frac{1}{2}$ pint whipped cream, castor sugar, 3 passion fruit. Pare and core apple and cut into small dice, also pineapple. Peel and cut bananas into rings. Peel orange, remove pith, and cut into small pieces. Put fruit in layers in small dish, sprinkling with lemon juice and sugar. Pour juice or wine over. Decorate with whipped cream and strawberries. *Cucumber, Onion, and Tomato Salad*: Scald 2 large tomatoes, peel and slice, adding 2 teaspoons of sugar. On a separate dish peel and grate cucumber, adding a teaspoon of salt. On the third dish peel and cut very finely an onion, then cover it with vinegar. Soak for an hour or two. Strain salt water from cucumber, add tomatoes and onion just as they have been soaking. *Lettuce Salad*: Wash and shred 2 heads of lettuce. Boil 2 eggs hard. Remove shells and mash the yolks fine. Mix well together the juice of 1 or 2 lemons, 2 or 3 tablespoons water, 1 dessertspoon of sugar, $\frac{1}{2}$ tablespoon of salt, 1 tablespoon sweet cream, adding this last to prevent curdling, and the yolks of the eggs, and pour over the lettuce. Cut the whites of the eggs into rings and arrange on top. *Beetroot Salad*: Boil beetroot until tender. Rub peel off and slice. Boil a level teaspoon of cloves and a piece of cinnamon bark in a cupful of vinegar with a dessertspoon of sugar added, pour over beet and then put a cupful of the liquid, in which the beet was boiled, with the beet. *Salad Dressing*: $1\frac{1}{2}$ tablespoons vinegar, 1 teaspoon mixed mustard, 1 tablespoon sugar, $\frac{1}{2}$ teaspoon salt, $\frac{1}{2}$ tablespoon butter. Yolk of raw egg. Mix above ingredients into raw paste and hold over a fire until very thick, stirring well all the time. When cold thin with milk. *Veal Brawn and Salad*: 1lb. veal, 1 part stock, $\frac{1}{2}$ lb. of bacon or ham, 2 hard-boiled eggs, 1 teaspoon chopped parsley, salt and pepper, 1oz. gelatine, $\frac{1}{2}$ teaspoon grated lemon rind. Rinse a mould with cold water and decorate with some of the eggs and bacon. Cut up veal, bacon and eggs into neat dice. Fill mould with neat layer of these, season each layer. Dissolve gelatine in stock and pour over meat. Place a greased paper over top and cook in moderate oven 2 to 3 hours. Fill up with rest of stock when cooked; when cold turn out and garnish with shredded lettuce, sliced tomato, diced carrot, cold peas, sliced cucumber, and beetroot. (Secretary, Mrs. M. Hutcheson.)

MUNDALLA (Average annual rainfall, 19.22in.).

October 27th.—Attendance, 15.

BISCUIT COMPETITION.—The Branch conducted a successful Biscuit Making Competition. The Misses D. Carson and M. Knowing were awarded first and second prizes respectively for the best six varieties made from one economical recipe. The following are the winning recipes:—*Mixture, Cream Biscuits*.—Beat 1 cup sugar and 1 cup butter to a cream. Add 1 cup sweet cream, then 4 cups plain flour and 1 teaspoon cream tartar, half teaspoon soda. (1) Roll out thin and bake in moderate oven. (2) *Cocoanut Biscuits*.—Take piece of mixture and add cocoanut. (3) *Mushroom Biscuits*.—Roll out piece mixture, cut into rounds, and bake. When cold, ice bottom with chocolate icing and when dry ice top with white icing (mix with white of egg). Make remainder of icing very stiff and mould into shape of stems. (4) *Almond Fingers*.—Roll out dough very thin. Spread with icing sugar mixed with white of egg. Sprinkle with chopped almonds, cut in fingers, and bake light brown. (5) *Raspberry Fingers*.—Roll out piece of mixture and spread with raspberry jam. Have ready 1 egg, half cup sugar, and 1 cup cocoanut mixed together. Sprinkle on top of jam and bake a light brown. (6) *Fairy Rings*.—Roll out piece of mixture, cut in rings, half having smaller ring cut from centre. Bake, and when cold fill with jam and ice with lemon icing.

Drying Woollen Caravans, &c.—Draw old silk stockings through sleeves and peg stockings to line. Articles retain shape and dry quickly.

Ants.—Paint edges of doors and shelves with carbolic acid.

Questions.—Should bread tins be washed after every baking? *Ans.*: As bread takes longer to rise in fresh tins, most people only wash after every other baking. Which is the correct way to season poultry? *Ans.*: Parsley for fowls, sage for ducks, thyme

for mutton. Use an egg to bind ingredients, and if cut up onion is placed in basin with pinch of soda and boiling water over it, seasoning does not repeat. Which is correct way to place pastry in Napoleon cake? *Ans.*: Put the pastry top and bottom, sponge in centre. What will create an appetite? *Ans.*: Place pinch hops in tumbler of boiling water. Take before meals. (Secretary, Miss M. Kemp.)

WARCOWIE (Average annual rainfall, 11.42in.).

October 31st.—Attendance, 14.

INFANT NURSING.—Mrs. G. Hilder read the following paper:—"The following methods gained from personal experience have proved beneficial to both mother and baby. From the time the baby leaves the hospital regular hours for bathing, sleeping, and feeding are essential. This promotes regular habits and lightens the burden of the daily routine of the mother where the housework is concerned. Let the baby commence the day by having the first feed about 6 a.m., and after changing the clothes allow him to lie in the cot until about 8.30 a.m., which is bath time. After doing this, if the baby is at all constipated, a teaspoonful of orange juice every morning is advisable. Child should be ready for a second feed about 9 a.m. Providing the baby is properly bathed and fed he should sleep until the next feed about 12 noon, and care must be taken to see that the child has as much fresh air and sunshine as possible. The baby's next feeding time is about 3 p.m., and then towards evening time, about 5.30 p.m., give another bath and feed and put him to bed. The last feed, of course, for the night should be about 10 p.m. After this final feed, change him, put him in a warm, dry bed, so made that he cannot kick off the clothes. He should sleep until morning without stirring. Sometimes it is necessary to give a drink of water between feeds. This method of baby caring is good until the child is up to six months old, and then a change of diet can be made by feeding on arrowroot biscuits soaked in boiling water to which has been added a little sugar. When cutting the teeth, it will be found of considerable assistance if the baby is allowed to bite on bones and crusts. A healthy baby should commence to crawl at 10 months and walk at 12 months. Remember that for a healthy, happy baby and a contented mother regularity, plenty of fresh air and good food and exercise are essential." (Secretary, Mrs. Crossman.)

WASLEYS.

October 4th.

The meeting took the form of a flower show, the adjudicators being Mr. and Mrs. F. Gilbert, of Roseworthy College, who awarded the prizes as follows:—Twelve cut flowers—Miss E. Fagg, first; Mrs. J. Hancock, second. Six cut flowers—Miss E. Fagg, first; Mrs. W. C. Toll, second. Six roses—Mrs. Sanders, first. Table decorations—Miss E. Fagg, first; Mrs. E. Day, second. Posies—Mrs. W. C. Toll, first; Mrs. J. Hancock, second. Shoulder sprays—Miss G. George, first and second. (Secretary, Miss J. Braun.)

DRESSMAKING.

Paper read by Miss R. Heffernan at the October Meeting of the Kybybolite Branch.]

In dressmaking there are many things to be taken into consideration, the chief of which are:—(1) How to take measurements; (2) How to draft a pattern; (3) placing and cutting patterns. (a) In cutting—(1) Allowing fullness; (2) flares, &c.

TAKING MEASUREMENTS.

Not knowing how to take measurements correctly often results in wasting good material. Again, should one send away for a frock ready made, the exact measurements should be given to ensure a good fit.

The person to be measured must stand erect. Tie a piece of tape around the waist and pull gently into position to make a waist line, for a number of measurements are taken either to or from that line.

Neck.—The neck measurement is taken firmly, but not tightly, around neck, midway between base of neck and chin.

Bust.—This is taken loosely with the tape measure well up over the shoulder blades at back and around over the fullest part of the bust.

Across Chest.—Take this in line, 2in. below the base of the neck, from where the arm joins the body at one side across to the other.

Across Back.—Is taken in line with and 4in. below the nape of the neck from where the arm joins the body at one side across to the other.

Bust Rule.—Some people would think that by halving the bust measurement the back and front patterns should naturally fit. That is not so. A separate measurement is needed for the bust because it is necessary to allow for the fullness in front and the side seam towards the back. Therefore, this bust rule is necessary. Take half across the back plus 1in. and subtract from half bust measurement.

Under Arm.—From well into the armpit to waist line. There is a standard shoulder measurement. For adult 5in., for a child 3in.

Sleeve.—Three measurements are necessary:—(1) Full length; (2) around top; (3) around elbow. Full length is taken with arm outstretched from well into the armpit to the bone at the wrist. Around top of sleeve is taken with the arm hanging to the side around top of armhole over the point of the shoulder blade. To be done tightly. Around elbow is taken firmly, but not tightly, with the arm well bent and taken well over the point.

Skirt.—(1) Waist is taken tightly around the waist line. (2) Hips in line with and 6in. below the waist line loosely around the hips.

These are the most essential measurements. There are others of minor importance that are easily taken, such as front length, back length, ordinary length, &c.

Miss Heffernan here demonstrated the drafting of a pattern.

PLACING AND CUTTING PATTERNS.

In placing patterns, place centre front straight down fold of material. On velvet, place all patterns the same way—with the pile running from bottom upwards—so that the pile will fall out and show the full depth of color. All other cloths with a nap or sheen must run from top downwards.

After placing patterns, always allow ½in. for seams all round. After finished cutting out the pattern and it is desired to make it about 1in. wider, allow 1in. down the centre front by moving it back from the fold the required distance. If it is allowed around the outside of the pattern it will spoil the shape and cut of the frock.

To allow fullness in front by tucks or gathers, split up the pattern and spread it apart about 3in. Then place on the material, cut out, and make two or three small rows of gathering or about four ½in. tucks. The same applies to children's clothes. One can make a little yolk and cut open the bottom in four places—two in front and two at the back and allow 2in. or so for smocking or pleats or gathers.

For flared coat, skirt, or flared frills, it is necessary to cut out a foundation pattern. Draw a line from top to bottom every 2in. or 3in. apart. Cut up a flare. Frills are done in a similar manner.

HINTS ON MACHINE.

Heavy Running of Machine may be Caused by.—(1) Being clogged by fibres of material, dust, &c.; (2) being choked by bad oil; (3) not having been oiled regularly; (4) various oil holes being overlooked; (5) the driving belt too tight or too loose.

The Breaking of Upper Threading may be Caused by.—(1) The upper tension being too tight; (2) by machine being wrongly tested; (3) the needle being too fine for material or cotton; (4) the needle being set too low; (5) the needle being blunt; (6) the eye not being sufficiently polished, leaving sharp edges which will cut the thread as it passes through; (7) Another make of needle being used that does not suit the machine; (8) the shuttle worn roughly or sharply in places through lack of oil.

The Breaking of Shuttle Thread may be Caused by.—(1) The shuttle tension being screwed in too tightly or shuttle incorrectly threaded; (2) the hole in stitch plate becoming rough or jagged through a badly set needle touching it occasionally; (3) the shuttle becoming worn by constant use.

Irregular Stitches may be Caused by.—(1) Too thick a material being used for needle; (2) the shuttle thread being thicker than upper thread; (3) the upper tension too tight or slack; (4) the tension of shuttle too tight or too loose.

Missed Stitches may be Caused by.—(1) The needle being set too high; (2) the needle being set too low; (3) the needle being too blunt; (4) the needle being bent; (5) the needle being too fine for thread.

Stitches Puckering may be Caused by.—(1) Too long a stitch; (2) top tension too tight; (3) machine threaded incorrectly.

A FEW USEFUL HINTS.

When binding flares, collars, &c., cut the binding as narrow as possible and on the true cross, otherwise it will not set correctly.

An easy way of finding out how much material is required to make a pleated skirt with 2in. pleats is to take three times the hip measurement.

Do not have iron over hot for pressing silk. Heat causes silk to cut.

One way of finishing off a garment is to nick small V-shaped pieces out along the edges of seams; it will prevent it from fraying.

A Few Suitable Styles and Colors to suit Different People.—A stout person should never wear trimmings or bright stripes running around the figure; have them running straight up and down. For a tall, thin person, trimming running round is most suitable.

Suitable Colors.—The blonde with blue eyes, reddish, yellow hair, and pink cheeks has the easiest task in choosing becoming colors. Violet and blue to tone with her eyes; pink, grey, black, and white would become this type. The girl with auburn hair would look well in deep plum, dark blues, dark green, and also brown that would tone with her hair. The lady with grey hair, who wishes to look much younger, must wear a dark toning under her chin and grey to match her hair. Black and white would look well on this type. A very important point about color is that a color that suits in daylight will often dishearten under gaslight.

To Remove Shine.—Steaming is resorted to to remove shine and restore material to its natural appearance. Place a damp cloth over the shine marks, press with a hot iron for a few seconds until steam is raised, then remove damper and slap the part affected with open hand. Brush well and all shiny patches should disappear. Another way is place damp cloth on pressing table and lay shined material on this. Place dry cloth on the wrong side and press with moderately hot iron. This draws steam from damp cloth. Velvet or jersey velour may be restored by steaming over a basin of boiling water.

How to Prevent Colors from Running and Fading.—To set blue, brown, and brownish red shades, soak material for two hours in a solution made of 1oz. of sugar of lead to every gallon of water. Take care to dissolve carefully before placing garment or material in solution. This process will set the above colors permanently. To set green, mauve, purple, or purplish red shades, soak material in alum water, using 1oz. of alum to 1gall. of water. A simple method that may prevent colors from running when washed is to add about 1oz. of salt to 1gall. of water and rinse material in this after washing.

SALADS.

[Paper presented by Mesdames Quirk and Victorson at the November meeting of the Clare Branch.]

Attendance, 35.

Salads are wholesome, appetising, and easily made, and this with their small cost renders it possible to have them daily in hot weather. There is nothing so refreshing after a hard day's work in the hot sun to find that the evening meal consists largely of fresh, cool vegetables prepared in such a way that they make an instant appeal to the most jaded appetite. This is particularly so at harvest time. At this period there is little spare time for the housewife to prepare meals that need a lot of preparation and there is such variety that can be had with easily obtained ingredients when dealing with salads that they make the exacting work of providing attractive summer meals comparatively easy.

Nearly all fresh vegetables can be used in salads. In America they associate in their raw state carrots, cabbage, turnip, and many other vegetables not generally in use with us as a main ingredient of a salad.

Lettuce is the foundation of many appealing salads and is the vegetable mostly used in this country, but many others when cooked can be used for making up dishes that when treated with a dressing are refreshing and nourishing. It is generally recognised that the iron and other minerals contained in vegetables purify the blood and act as a tonic to the system. Any cold meat, fish, or poultry left over from a previous meal may be cut into small thin pieces and mixed with salad vegetables.

Three main things are necessary in salad making:—(1) The vegetables must be fresh and young; (2) they must be dried after washing; (3) the salad dressing must not be poured over them until just before serving. (4) Oil or cream is absolutely necessary in order that a salad shall not be indigestible.

RECIPES.

Potato Salad.—Boil the required amount of potatoes in their jackets—use potatoes that do not break easily—until nearly cooked; small new potatoes are best. Peel while hot and cut in slices, and while hot add about one teaspoon of olive oil, pepper, and

salt, cut an onion up finely, a little sugar, and moisten with white vinegar. If preferred, mayonnaise dressing can be used instead of the above ingredients. Garnish with parsley.

Bean Salad.—Cut French beans either across or lengthways and boil until tender. Drain off liquid and add an onion, cut up finely, salt, pepper, and a little sugar, and moisten with vinegar.

Celery Root Salad.—Put the celery roots on to boil until tender, then drain liquid and cut in slices, add pepper, salt, and vinegar.

Salad from left over Cooked Vegetables.—A little lettuce, onion, French or haricot beans, peas, or pieces of celery chopped finely; add salad dressing.

Beetroot Salad.—Boil a bunch of beetroot until quite soft, then cut in thin slices. Place in salad bowl and between each layer of beetroot put some white pieces of uncooked celery and a few drops of vinegar. Sprinkle with a little pepper and salt and stand for a few minutes. *Dressing.*—Put 1 oz. of butter in a saucepan; when melted add one tablespoon of flour; mix well, then add one cup of milk, and stir until it boils. Put it aside to cool. Boil an egg hard. Mix a little mustard, pepper, salt, and sugar in a cup, add the yolk of the hard-boiled egg and blend all with just a little drop of milk; add this to the dressing, mix well, and pour over the beetroot. Garnish with the white of the egg and a few pieces of beetroot.

Cucumber Salad.—Cut up cucumber very fine and sprinkle with pepper and salt. Make a dressing of cream, vinegar, a little sugar, and pour over the cucumber.

Tomato Salad.—Cut up tomatoes, cucumber, and onion very fine, sprinkle sugar, pepper, and salt on it, add vinegar. Mint or parsley chopped up very fine makes an improvement to this salad.

Orange Salad.—Oranges peeled and cut in small pieces, sprinkled with sugar one hour before using, are delicious. Add cream or custard, cocoanut.

Peaches, peeled and prepared the same way, are also delicious.

Bananas in stewed fruits are an improvement. Cut the bananas up about half an hour before serving.

DRESSINGS.

(1) Hard boiled eggs, pepper, salt, sugar, mustard, cream, and vinegar must be used the same day.

(2) Put 3 eggs in a jug, add 1 small cup sugar, 1 cup milk, 2 teaspoons mustard, 1 teaspoon salt, 1½ cups vinegar. Stand in a saucepan of water and boil until dressing thickens. Bottle and cork. This will keep for about two months. If onion is disagreeable to the taste and to get the flavor into a salad, rub out the bowl with onion before putting in salad.

To make a lettuce crisp, put a steel knife in the water with the lettuce. Lemon used instead of vinegar in salads is less harmful for most people.

Other Reports received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Gladstone	24/10/33	24	Congress Report	Miss M. Sargent
Laura Bay	10/10/33	7	Congress Report	Mrs. D. Morrison
Eurelia	25/10/33	21	Congress Report	Mrs. I. Wall
Mangalo	8/11/33	12	Congress Report	Mrs. B. Coles
Wasleys	2/11/33	200	Annual Social	Miss J. Braun
Belalie	12/12/33	26	"Gift Making," Mrs. and Miss Cummings	Mrs. A. Cummings
Kybybolite	30/10/33	23	Address—Miss E. Campbell	Mrs. W. Kekwick
Parilla	16/11/33	31	Address—Mrs. H. Fewings	Mrs. R. Welden
Williamstown...	6/12/33	7	Christmas Recipes	Mrs. A. Cundy
Gladstone	19/11/33	37	Address—Miss H. Clark .	Mrs. L. J. Sargent
Wirrilla	5/10/33	10	"Sweet Making," Mrs. W. Jones and Miss N. Evans	Miss M. Jones
Wirrilla	8/12/33	12	Christmas Gifts	Miss M. Jones

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All communications to be addressed:

"The Editor, Journal of Agriculture, Education Building, Adelaide."

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A. P. BLESING,
Minister of Agriculture.

AGRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Agricultural Bureau Conferences.

District Conferences will be held as follows:—

Lower North, at Riverton, Thursday, February 22nd, O. E. Longbottom (Secretary).

Yorke Peninsula, at Port Victoria (Wauralte Branch), Wednesday, March 7th, M. Newbold (Secretary).

South-East (Upper), at Wolseley, Wednesday, March 21st, E. W. Sharraff (Secretary).

South-East (Lower), at Tantanoola, Wednesday, April 11th, H. M. Kennedy (Secretary).

Dairying, at Milang, Wednesday, May 9th, L. E. Yelland (Secretary).

Eyre's Peninsula (West), at Ceduna, Wednesday, July 4th, A. R. Maguire, Mudamuckla (Secretary).

Upper North, at Wilmington, Wednesday, July 18th, Chas. Cole (Secretary).

In each case the Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda.

Warning to Users of Sodium Chlorate.

The Director of Chemistry (Mr. W. T. Rowe) has drawn attention to the danger inherent in the use of sodium chlorate as a weed destroyer. He has made a special request that as a warning to users of this compound the following report received from the New Zealand Department of Internal Affairs on Explosives and Dangerous Goods for the year ended March 31st, 1933, should be published in this *Journal*:—

"It is desired to call attention to the dangers incidental to the handling of sodium chlorate, a compound which is finding extensive application in the farming industry for spraying noxious weeds. The chlorate is rich in oxygen and renders any organic matter with which it comes in contact highly inflammable—for instance, clothing impregnated with it will ignite readily from a spark or flame.

"A typical accident attended with fatal results occurred during the year. The victim had been spraying 'ragwort' and his clothing had become well saturated with chlorate solution and had subsequently dried out. Whilst smoking a cigarette at lunch-time, a glowing ember fell on his clothes, which burst into fierce flames.

"A further danger lies in the fact that sodium chlorate, when intimately mixed with organic matter, forms a powerful explosive which is extremely sensitive to friction and percussion, and which, under ordinary conditions of handling, is liable to explode prematurely. It is understood that at farmers' meetings such mixtures have been described as 'cheap and simple explosives' for farm use. Several accidents—at least one with serious consequences—have been recorded during the year, the mixture used being sodium chlorate and sugar. Explosives formed from such mixtures are not authorized for use in New Zealand, and the Department has issued a warning that the mixing of sodium chlorate with other materials to form explosives is illegal, and that a prosecution will be taken against any person found engaging in the practice. Irrespective of any injury which may be incurred those concerned in the matter of this class of explosive are liable to a heavy monetary penalty."

Publications Received.

The Library of the Department of Agriculture acknowledges the receipt of:—

Bulletin No. 3, "Improvement of Grass Land," 1s. net.

Bulletin No. 48, "Rations for Livestock," 1s. net.

Published by the Ministry of Agriculture, England.

AGRICULTURAL INQUIRIES.

[Replies supplied by Mr. W. J. SPAFFORD, Deputy Director of Agriculture.]

Dundee Wheat.

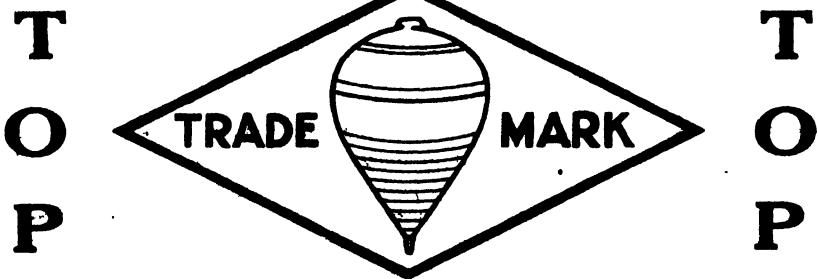
Asking for information concerning Dundee wheat, a variety that has rapidly increased in popularity in New South Wales, a subscriber to the *Journal of Agriculture* has been advised that Dundee has proved to be far superior to Federation in yield, grain quality, and disease resistance. Local baking tests have already indicated the improved quality of Dundee, and this has been corroborated by Dr. Kent Jones, England, who states that Dundee is a decided improvement in general strength (*i.e.*, baking quality) over even good commercial Australian wheat. Dundee is destined to make considerable headway in cultivation in New South Wales, and perhaps also in other States. With the development of wheats of such grain quality, the British miller will find that Australian wheat will show improvement in general strength and he will be able to use it more freely in his blend.

Baking tests have been made also with promising new wheats. Broadly speaking, these tests have shown that Dundee, Ford, and Canimbla are superior in baking quality to the present popular varieties.

The Principal of Roseworthy Agricultural College (Dr. A. R. Callaghan) says that the Pelschenke time figure of several wheats tested at the College last year was:—Florence, 86; Dundee, 68; Ford, 56; Sultan, 56; Waratah, 41; Sword, 33; Nabawa, 33; Gallipoli, 27. At the University of Sydney last year the time figure for Dundee was 120 and for Ford 70.

The sample harvested at Roseworthy Agricultural College this season is of excellent appearance, plump, hard, and heavy, and it is expected to show a very high time figure when tested out.

TOP SPECIAL SUPER (45%)



Crop with "TOP"—Its "SUPER."

The Adelaide Chemical & Fertilizer Co., Ltd.

Analysis of Chinese Cabbage.

The Department of Agriculture has had analysed a sample of Chinese cabbage for a poultry keeper at Hindmarsh. The sample of Chinese cabbage has shown up very well, and on the figures recorded should prove a first-class foodstuff for poultry. In comparison with other well-known greenfeeds it is really nutritious and being such a soft, sappy plant should be readily digestible.

Composition.

	Moisture.	Crude Protein.	Fat.	Nitrogen-free Extracts.	Fibre.	Ash.	Starch Equivalent.	Nutrient Ratio.
	%	%	%	%	%	%	%	
Chinese cabbage .	80.0	5.2	0.8	6.9	2.2	4.9	8.4	1 to 2.0
Mustard	80.0	4.0	0.6	9.4	4.0	2.0	9.6	1 to 3.4
Mangels	80.0	1.9	0.2	14.4	1.6	1.9	10.5	1 to 11.0
Lucerne	80.0	4.0	0.6	7.9	5.5	2.0	8.0	1 to 2.5
Rye	80.0	2.4	0.6	9.2	6.6	1.2	10.0	1 to 6.7

The very narrow nutrient ratio of 1 to 2.0 and the high content of ash (4.9) means that provided the Chinese cabbage does not prove to be excessively laxative, it should be a first-class greenfeed for poultry, and particularly for growing chicks and laying hens.

Deterioration of Seed Wheat.

The Secretary of the Sutherlands Branch asked: "Is it possible that, even though seed wheat is annually graded, a variety may deteriorate with loss of prolificacy?"

Reply—Careful grading of seed wheat keeps up the prolificacy of seed wheat because, other things being equal, large seeds give higher yields than small seeds, and also produce a larger proportion of large seeds than are secured from small seeds. On the other hand, grading does very little towards keeping a variety true-to-type and, as a matter of fact, may lead to its more rapid deterioration in this respect. If a variety of wheat contains as an admixture another variety of large grain, grading tends to increase the proportion of strangers, because the machine retains the larger grains. The only sure way of keeping a variety of wheat true-to-type and fully vigorous is to grow a small plot in wide-spaced rows, remove all strangers by hand, and carefully and regularly grade all seed sown. If an attempt is to be made to improve a variety of wheat, it is necessary to go a step further and hand select all heads from which the grain is to be secured to plant the small plot in wide-spaced rows.

Feeding Wheat to Sheep versus Marketing Grain.

A correspondent from Streaky Bay, in seeking advice as to the advantages of feeding wheat to sheep rather than marketing of the grain, mentions that the price for wheat at the local siding is 2s. per bushel, less 5d. dockage, for a sample below f.a.q.

Reply—The isolation of the districts which comprise Central Eyre's Peninsula and the lack of suitable markets for animal products other than wool, make the selling of wheat other than as grain a very difficult proposition. Under present conditions, even though wool prices are good and wheat prices very low, it does not appear that wheat can be economically converted into wool. With sheep averaging 12½lbs. of wool, of which 97 per cent. realised 16½d. per lb, and wheat weighing 57lbs. per bushel, only bringing 1s. 7d. per bushel at the railway, it might appear on the surface that more money would be received for the wheat if it was converted into wool instead of carting it to the railway siding, but a close investigation of the matter rather dispels this idea.

On the assumption that the number of sheep carried on the farm can be doubled if they receive wheat at the rate of 1lb. per head per day, the following calculations can be made:—If there are 400 sheep now on the farm, 800 can be carried if fed 1lb. of wheat per day. The 4,867bush. of wheat required for a year's feeding is worth at 1s. 7d. per bushel, £385 6s. 1d.

A GEAR-LIKE GRIP that keeps you **SAFE !**

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Gold Seal



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The Dunlop tyre is a product of Dunlop Perdreau Rubber Co. Ltd.---the largest manufacturing organisation in Australia, employing 5000 Australian workers and making every variety of high-class rubber goods.

The extra 400 sheep will cut, at 12½lbs. per head, 4,933½lbs. of wool, which at 16d. per lb. would be worth £328 17s. 9d.

The feeding of 1lb. of wheat per sheep per day might more than double the sheep-carrying capacity of a holding in Central Eyre's Peninsula, but taken year in and year out, the probabilities are that the increase will not be very much more than doubling the number, and if this is so wheat as cheap as 1s. 7d. per bushel cannot be economically converted into wool.

Feeding Value of Oat Varieties.

Goolwa asks: "Can you supply me with figures showing the feeding values as gram and hay of Algerian, Early Burt, Mulga, New Zealand Cape, Palestine, and Lachlan Oats?"

Reply—We have no figures showing the feeding value of Palestine oats, but the following figures, which are the averages of two separate years, should provide what you require:—

Oats as Hay.

	Algerian.	Early Burt.	Lachlan.	Mulga.	N.Z. Cape.
	%	%	%	%	%
Moisture	10.0	10.0	10.0	10.0	10.0
Ash	5.5	5.6	5.4	6.1	5.8
Crude protein	4.6	4.4	4.5	5.4	5.2
Fat	2.6	3.3	2.3	2.7	2.4
Nitrogen-free extracts . .	51.0	49.1	51.9	50.4	50.0
Fibre	26.3	27.6	25.9	25.4	26.6
Digestible protein	3.2	3.0	3.2	3.7	3.6
Digestible fat	1.7	2.1	1.5	1.8	1.6
Digestible carbohydrates . .	29.4	28.4	29.9	29.1	28.9
Digestible fibre	14.5	15.2	14.2	14.0	14.7
Starch equivalent	34.9	34.4	34.9	35.3	34.6
Nutrient ratio	1 to 14.9	1 to 16.1	1 to 14.8	1 to 12.7	1 to 13.1

Oats as Grain.

Moisture	8.0	8.0	8.0	8.0
Ash	3.6	3.6	3.2	3.2
Crude protein	10.0	8.8	9.6	10.3
Fat	5.1	7.4	4.7	5.7
Nitrogen-free extracts . .	60.2	60.7	62.9	61.8
Fibre	13.1	11.5	12.4	11.8
Digestible protein	7.2	6.5	6.6	7.0
Digestible fat	3.9	5.8	3.6	4.4
Digestible carbohydrates . .	43.2	43.9	45.5	44.6
Digestible fibre	3.1	2.7	2.9	2.8
Starch equivalent	58.3	61.8	59.1	60.1
Nutrient ratio	1 to 7.6	1 to 9.1	1 to 8.5	1 to 8.2

The summary of these figures, shown as starch equivalent and nutrient ratio, disclose that as hay there is very little difference between any of the five varieties of oats from a fattening point of view, but because of the narrower nutrient ratios Mulga and New Zealand Cape oats are better than the others for the production of milk and for promoting growth with young animals. The analysis of the samples of grain show Early Burt to have the highest starch equivalent and so is the best fattening variety, whilst Algerian is the poorest for this purpose, but on the other hand, New Zealand Cape and Algerian are better than the others for milk-producing animals and growing youngsters.

Barley for Pigs.

Alberton asks: "What is the best method of feeding barley to pigs?"

Reply—It is generally recognised that the best way to feed barley to pigs is after crushing, but it is not always economic to go to the expense of grinding the grain. The relative values of various treatments of barley for pig feeding are somewhat as follows:—About 4lbs. ground barley to produce 1lb. live weight in pigs, and about 4½lbs. soaked barley and about 5lbs. dry whole barley for similar results. Barley should never be cooked for pigs; as a matter of fact, the only ordinary pig foodstuff that is improved by cooking is potatoes.

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MALLEE FARM COSTING—FARM No. 1.

(Continued from page 648).

[By ARTHUR J. PERKINS, Director of Agriculture.]

PART III.—STUDY OF MALLEE FARMING COSTS.

A.—COSTS OF GROWING WHEAT PRECEDED BY BARE FALLOW.

1. *Introductory.*

It is fairly obvious that the average farmer, and in particular the average Mallee farmer, has neither the time nor the training to keep accounts that permit of accurate determination of the mean costs of the various operations in which he might be engaged. Indeed, the utmost that could perhaps be expected from average farm accounts would be that they should show the extent to which total farm receipts less inclusive farm expenditure would suffice for the upkeep of the farmer and his family, after meeting current farm expenditure of the same season, that is to say, whether or not what has come to be known as the Farmers' Management and Labor Income would be likely to prove adequate.

Nevertheless, accurate Costing Accounts involving detailed analysis of costs in all farming operations, have both individual and general or "political" values. To the individual farmer, working under conditions approximating fairly closely to those obtaining on the farm or farms on which mean costs have been determined, their value should be two-fold; on the one hand they should constitute a guiding standard in the matter of probable costs of production in his farming operations; and on the other, they should indicate in what direction personal economies are possible in any particular operation. It should not be forgotten, however, that "costing" accounts are only indirectly related to profits; the latter, other things being equal, are essentially controlled by seasonal conditions and current market prices. It follows that the main object of the successful farmer has always been to reduce costs of production per acre to a minimum, without impairing normal farming efficiency, whilst leaving costs per bushel to the arbitrament of cosmic and economic factors.

The general or "political" values of Costing Accounts usually relate to district, State, or even Continental questions, and would be dependent for their cogency upon the extent to which the mean data availed of painted a sufficiently accurate picture of the area of country to which they were supposed to correspond. Nor should it be forgotten that just as on one and the same farm, "costs" per unit of production, as distinct from "costs" per unit of area, vary within very wide limits from season to season, so both costs per unit of area and particularly costs per unit of production, may vary considerably from district to district in one and the same season, under the stimulus of Economic, Seasonal, or Soil variations characterising the several districts. Hence, although we are often asked to express an opinion on the matter, it is not possible to state with any degree of accuracy what are the mean costs of production of wheat per acre, or per bushel in South Australia, and still less in the Commonwealth, without taking into consideration the mean costs in all well defined wheatgrowing districts, duly weighted proportionately to the areas harvested in each district. Unfortunately, no such mean data are available, nor are they likely to be until such time as official notice be taken of a presidential address delivered by me before the Australasian Association for the Advancement of Science in 1928.* In the meanwhile, we must perforce remain satisfied with such partial instalments towards a completed scheme as the one at present under review: it is to be hoped, too, that in the course of time farmers in other districts will submit their accounts for detailed analysis over periods of not less than three years.

* *Vide Journal of Agriculture*, January, 1928, page 590: "A Plan for National Research into the Economic Position of our various Rural Industries."

2. *General Costs of Growing Wheat on Mallee Farm No. 1 contrasted with corresponding Turretfield 1922-32 Means.*

Detailed Costing Accounts were kept on the Turretfield Demonstration Farm over a period of 10 successive seasons. It should be recalled that the latter farm is situated in the Central Statistical Division of the State, and consists in the main of heavy soil, offering special tillage difficulties. It follows that working conditions on this farm are very different from those of an average Mallee Farm, and in particular of Mallee Farm No. 1.

Summarised wheat costs for the two types of farms are shown below:—

<i>Mallee Farm No. 1.</i>				
	Areas Sown.	Mean Yields	Mean Costs.	
	Acres.	per Acre.	Per Acre.	Per Bush.
		Bush.	£ s. d.	s. d.
Season 1929-30	448	14.35	2 13 6	3 9
Season 1930-31	339	16.87	2 9 9	2 11
Season 1931-32	479	19.35	2 3 4	2 3
Means 1929-32—	422	16.92	2 8 8	2 11

Turretfield Demonstration Farm.

Means 1922-32—	309	19.49	4 10 8	4 8
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As might have been anticipated, the costs of growing wheat on the lighter and cheaper Mallee country, both per acre and per bushel, are appreciably lower than corresponding Turretfield costs, namely, 46.32 and 38.36 per cent. respectively. These variations in costs will receive detailed consideration at a later stage in this report.

3. *Detailed Costs of Growing Wheat on Mallee Farm No. 1: Means of Seasons 1929-30, 1930-31, and 1931-32.*

Full details of mean costs of growing wheat on Mallee Farm No. 1 have been given in Table VII. (Parts I., II., and III.) in the Appendix; this Table consists of three parts, namely:—

Part I.—In which the mean yearly total expenditure incurred during three successive seasons of wheat growing have been given in detail for a mean area of 422 acres and a mean yield per acre of 16.92 bushels; individual costs have also been expressed as percentages of total costs.

Part II.—In which items of Part I. have been expressed as Costs per Acre.

Part III.—In which items of Part I. have been expressed as Costs per Bushel.

Part I. of Table VII. shows Total Mean Expenditure of growing 422 acres of Wheat yielding 16.92 Bushels per Acre, to have been £1,026 17s. 3d. per annum. The items of Expenditure incurred admit of grouping together in order of importance as follows:—

	Costs.			Percentages.
	£	s.	d.	%
1. Use of motive power (horses and tractor)	294	7	5	28.66
2. Miscellaneous (interest, taxes, &c.)	243	11	8	23.72
3. Materials (seed, super, bags, &c.)	235	4	7	22.91
4. Labor (direct only) and contracts	167	2	8	16.28
5. Use of implements	86	10	11	8.43
	£1,026	17	3	100.00

From the above it will be noted that on a Tractor Farm, of the five groups of items summarised, the use of motive power is the most costly.

For purposes of comparison corresponding Turretfield groups, representing the means of 10 successive seasons—1922-32—have been contrasted on a per acre basis.

	Mallee Farm No. 1. 1929-32—16.92Bush.			Turretfield Farm. 1922-32—19.49Bush.		
	Costs per Acre.		Percent- ages.	Costs per Acre.		Percent- ages.
	s.	d.	%	s.	d.	%
Use of motive power	13	11	28.7	19	1	21.1
Miscellaneous	11	7	23.7	27	9	30.6
Materials	11	2	22.9	20	1	22.1
Labor (direct only) and contracts	7	11	16.3	16	9	18.5
Use of implements	4	1	8.4	7	0	7.7
Totals	48	8	100.0	90	8	100.0

From the above it will be observed that Costs per Acre of a 19½ bush. crop at Turretfield—90s. 8d. per acre—were considerably greater—over 86 per cent.—than corresponding costs of a 16.92 acre crop on Mallee Farm No. 1; and also that the proportional relationship of the five Expenditure groups was not the same on the two Farms. Thus, on the Mallee Farm the most costly group was the use of “motive power”—namely, 28.7 per cent. of total costs—whilst at Turretfield it was “Miscellaneous,” which included Interest, &c.—namely, 30.6 per cent. But, apart altogether from the inherent differences between the two farms, it is necessary to stress the fact that the results of Mallee Farm No. 1 are the means of the 1929-32 period, and those of Turretfield of the 1922-32 decade; and that during the first seven seasons of the latter decade costs of production were appreciably greater than in the three closing years of the decade, which actually correspond to the three seasons with which the data of Mallee Farm No. 1 are concerned. In the circumstances a fairer comparison would, therefore, be obtained if the data collected for each farm had reference to the same period of years, namely, 1929-32; and accordingly the data that follow below will help to establish this comparison:—

	Mallee Farm No. 1. 1929-32 Mean Costs.			Turretfield Farm. 1929-32 Mean Costs.		
	Per Acre.	Per Bush.	Percentage	Per Acre.	Per Bush.	Percentage
	s.	d.	%	s.	d.	%
Wages (direct) and contracts	7	11	16.3	13	6	17.0
Use of Horses (and Tractor)	13	11	28.7	16	4	20.6
Use of Implements	4	1	8.4	5	2	6.5
Seed	3	2	6.4	6	9	8.5
Superphosphate	4	2	8.5	5	4	6.7
Bags and Twine	3	10	7.9	4	9	6.0
Rates and Taxes	0	5	0.8	1	4	1.7
Interest on working Capital	3	7	7.4	6	9	8.5
Interest on Land and Improvements	5	6	11.3	15	9	19.8
Balance of Expenditure	2	1	4.3	3	9	4.7
Totals	48	8	100.0	79	5	100.0

Mean Yields per Acre 16.92 Bushels.

19.20 Bushels.

The above statement shows that notwithstanding relative parity in economic conditions it cost 30s. 9d., or 63 per cent., per acre more, and 1s. 2d., or 40 per cent., per bushel more, to grow wheat at Turretfield than on Mallee Farm No. 1. The main increases per acre may be summarised under the following heads:—

	£	s.	d.
Interest on land and improvements	0	10	3
Labor	0	5	7
Interest on working capital	0	3	2
Horses and tractor	0	2	5
Implements	0	1	1
Rates and taxes	0	0	11
Total	£1	3	5

These differences are partly due to the heavy character of the Turretfield soil, which renders tillage operations more costly than in the Mallee; partly because of more difficult labor conditions on a Government managed farm; and partly because of very much higher land values. From the general point of view the comparison may be taken to show very definitely that in existing economic conditions wheat can be grown far more cheaply in the Mallee than in the Central and Lower North Divisions, notwithstanding the higher mean yields per acre of the latter.

In the statement immediately preceding the one we have just had under consideration it was shown that on a tractor farm, motive power was the most costly of five groups of items of expenditure. It must be stressed here, however, that as Interest was shown in the aggregate under Miscellaneous, those groups concerned in Interest were not debited with their interest quotas; hence they show up to greater advantage than they otherwise should. Interest quotas have been added to the groups concerned, with the following results:—

	£	s.	d.	Percentages. %
1. Motive power	318	10	7	31.02
2. Materials	241	13	4	23.53
3. Miscellaneous	184	12	6	17.98
4. Labor and contracts	167	2	8	16.28
5. Implements	114	18	2	11.19
Totals	£1,026	17	3	100.00

It will be observed that if interest be taken into consideration, the cost of Motive Power on a Mallee Tractor Farm would be 31.02 per cent. instead of 28.7 per cent. of total expenditure as previously indicated.

4. *Summarised Statements of Mean Costs of Growing Wheat on Bare Fallow on a Mallee Farm in comparison with corresponding Turretfield Data.*

Finally, mean costs of growing a 16.92bush. crop of wheat sown on Bare Fallow of Mallee Farm No. 1 have been summarised under Statements "A," "B," and "C" in comparison with corresponding data of 10 successive seasons at Turretfield.

STATEMENT "A".

From the standpoint of Seasonal Field Operations.

	Mallee Farm No. 1. Mean Costs (1929-32).				Turretfield. Mean Costs (1922-32).			
	Per Acre.	Per Bush.	Percentage.		Per Acre.	Per Bush.	Percentage.	
	£ s. d.	s. d.	%		£ s. d.	s. £.	%	
Preparation of Fallows...	0 12 1	0 9	24.9		0 19 4	1 0	21.3	
Seeding Operations	0 11 3	0 8	23.1		1 1 8	1 1	23.9	
Harvest Operations	0 11 2	0 8	22.9		0 15 2	0 9	16.7	
Balance of Expenditure .	0 14 2	0 10	29.1		1 14 6	1 10	38.1	
Totals	2 8 8	2 11	100 0		4 10 8	4 8	100.0	

STATEMENT "B".

From the standpoint of Main Individual Items.

	£	s.	d.		£	s.	d.	
*Labor (direct and indirect)	0	9	2	18.8	1	2	3	24.5
Use of Horses	0	3	11	8.1	0	15	2	16.7
Use of Tractor	0	9	0	18.5	—	—	—	—
Use of Implements	0	3	10	8.0	0	5	6	6.1
Seed	0	3	2	6.4	0	8	3	9.1
Purchase of Essential Material	0	8	0	16.5	0	11	10	13.1
Balance of Expenditure .	0	11	7	23.7	1	7	8	30.5
Totals	2	8	8	100.0	4	10	8	100.0

STATEMENT "C".

From the standpoint of Interest and Depreciation.

Depreciation on Improvements and Plant	0 10 7	0 8	21-8	0 8 7	0 5	9-5
Interest on Land and Improvements	0 5 6	0 4	11-3	0 15 11	0 10	17-6
Interest on Floating Capital	0 3 0	0 2	6-2	0 6 0	0 4	6-6
Interest on Overdraft ...	0 0 7	—	1-2	0 1 1	0 1	1-2
Interest and Depreciation Charges	0 19 8	1 2	40-5	1 11 7	1 8	34-9
Balance of Expenditure .	1 9 0	1 9	59-5	2 19 1	3 0	65-1
Totals	2 8 8	2 11	100-0	4 10 8	4 8	100-0
*Labor (direct)	0 7 6	0 6	—	0 16 9	0 10	—
Labor (indirect)	0 1 8	0 1	—	0 5 6	0 4	—
	0 9 2	0 7	—	1 2 3	1 2	—

We may note in the first place that over a period of three consecutive seasons the mean costs of growing a 16.92 bushel crop of wheat on a Mallee Farm were respectively £2 8s. 8d. per acre and 2s. 11d. per bushel; on the other hand corresponding **10 year means on the Turretfield Demonstration Farm** were £4 10s. 8d. and 4s. 8d. respectively.

In the latter connection attention may be drawn to the fact that on the Turretfield Farm interest charges were at the rate of 23s. per acre and 1s. 3d. per bushel, whereas on the Mallee Farm corresponding charges were 9s. 1d. and 6d. respectively; that is to say at Turretfield increases in interest charges above corresponding Mallee Farm No. 1 charges were 153 per cent. and 150 per cent. respectively. These facts will help to explain why wheat can be grown at less cost in the Mallee than in Central or Lower North districts.

But, it has already been stated that during the three seasons that the Mallee Farm accounts were under observation there was a general reduction in costs of production throughout the State relatively to corresponding costs incurred in the Turretfield 10-year period. A fairer comparison of costs would, therefore, be costs incurred in the same period of three years in either case; and such a comparison is given below:—

STATEMENT "A".

From the standpoint of Seasonal Operations.

1929-32 Seasons.

	Mallee Farm No. 1, 16-92 Bush.			Turretfield, 19-20 Bush.		
	Mean Costs.			Mean Costs.		
	Per Acre.	Per Bush.	Percentage.	Per Acre.	Per Bush.	Percentage.
	£ s. d.	s. d.	%	£ s. d.	s. d.	%
Preparation of Fallows ...	0 12 1	0 9	24-9	0 18 0	0 11	22-7
Seeding Operations	0 11 3	0 8	23-1	0 17 3	0 11	21-8
Harvest Operations	0 11 2	0 8	22-9	0 11 8	0 7	14-6
Balance of Expenditure .	0 14 2	0 10	29-1	1 12 6	1 8	40-9
Totals	2 8 8	2 11	100-0	3 19 5	4 1	100-0

STATEMENT "B".

From the standpoint of Main Individual Items.

*Labor (direct and indirect)	0 9 2	0 7	18-8	0 18 9	1 0	23-6
Use of Horses	0 3 11	0 3	8-1	0 12 6	0 8	15-8
Use of Tractor	0 9 0	0 6	18-5	—	—	—
Use of Implements	0 3 10	0 3	8-0	0 3 9	0 2	4-7
Seed	0 3 2	0 2	6-4	0 6 9	0 4	8-5
Purchase of Essential Material	0 8 0	0 6	16-5	0 10 1	0 6	12-7
Balance of Expenditure .	0 11 7	0 8	23-7	1 7 7	1 5	34-7
Totals	2 8 8	2 11	100-0	3 19 5	4 1	100-0

STATEMENT "C".

From the standpoint of Interest and Depreciation.

Depreciation on Improvements and Plant	0	10	7	0	8	21-8	0	8	2	0	5	10-3
Interest on Land and Improvements	0	5	6	0	4	11-3	0	15	9	0	10	19-9
Interest on Floating Capital	0	3	0	0	2	6-2	0	4	10	0	3	6-1
Interest on Overdraft ...	0	0	7	—	—	1-2	0	2	2	0	1	2-7
Interest and Depreciation Charges	0	19	8	1	2	40-5	1	10	11	1	7	39-0
Balance of Expenditure .	1	9	0	1	9	59-5	2	8	6	2	6	61-0
Totals	2	8	8	2	11	100-0	3	19	5	4	1	100-0
*Labor (direct)	0	7	6	0	6	—	0	13	6	0	9	—
Labor (indirect)	0	1	8	0	1	—	0	5	3	0	3	—
	0	9	2	0	7	—	0	18	9	1	0	—

Hence, we see that during the 1929-32 three season period the cost of growing a 19.20 bushel crop at Turretfield was reduced to £3 19s. 5d. per acre, and 4s. 1d. per bushel, as compared with £4 16s., and 4s. 11d. for the 7-year period closing on June 30th, 1929, on the same farm, and £2 8s. 8d. and 2s. 11d. on Mallee Farm No. 1. The increases above corresponding data of Mallee Farm No. 1 were £1 10s. 9d., or 63 per cent., and 1s. 2d., or 40 per cent. respectively.

Differences in Interest charges, on the other hand, remained approximately similar, namely, 13s. 8d. per acre, or an increase of 150.4 per cent., and 8d. per bushel, or an increase of 133.3 per cent.

In the matter of increases other than Interest increases the Turretfield figures were 17s. 1d. per acre, or 43 per cent., and 6d. per bushel, or 21 per cent. In other words, if Interest charges had been the same at Turretfield as on Mallee Farm No. 1, the Turretfield costs per bushel of wheat would have been 3s. 5d. only instead of 4s. 1d.

Another reason for Turretfield increased costs was greater tillage difficulties of heavy clay soils. The preparation of the Turretfield Fallows cost 18s. per acre against 12s. 1d. on Mallee Farm No. 1. Costs of Harvest Operations, on the other hand, were actually lower on a per bushel basis at Turretfield than on Mallee Farm No. 1, and only 6d. higher on a per acre basis.

5. Costs of Delivering Wheat at Country Sidings.

Figures hitherto given concerning the "costs" of growing wheat have referred to "costs" actually incurred on the farm itself; but the farmer's costs do not end with the sewing up of his bags; he still has to deliver the wheat to the nearest Railway siding. At Turretfield these costs of delivery averaged out at 2½d. per bushel; Mallee Farm No. 1, which is only two to three miles from a railway station, is more conveniently situated for the purpose. In each of the three seasons the wheat was delivered at the railway siding under contract, and with the following results:—

Seasons.	Wheat Carted. Bushels.	Costs of Delivery.	
		Total. £ s. d.	Per Bushel. d.
1929-30	5,450.62	21 15 0	0.96
1930-31	5,882.37	26 3 4	1.07
1931-32	8,040.50	25 0 0	0.75
Means	6,461.16	24 6 1	0.90

Hence, the mean "costs" of delivering wheat to the railway siding have been nine-tenths of a penny per bushel, and the inclusive cost of growing and delivering the wheat at the nearest siding 3s. per bushel. Clearly, however, the "costs"

would be proportionally greater for farms of the same district less conveniently situated for wheat marketing purposes. If, in addition, railway freight be taken into consideration, inclusive costs would be represented by 3s. 6d. per bushel, on trucks, Port Adelaide.

Wheat reserved for Seed and Feed purposes was also carted under special contract to the Farm Barn with the following results:—

Seasons.	Wheat Carted. Bushels.	Cost of Contract Carting. Total.			Per Bushel. d.
		£	s.	d.	
1929-30	806	1	13	2	0.49
1930-31	665	1	8	4	0.51
1931-32	48	0	5	0	1.25
Means	506	1	2	2	0.53

In addition to the above, in 1931-32 season 1,180 bushels of wheat were carted to the Farm Barn by the Farm's teams at a total cost of £5 4s. 11d., or 1.07d. per bushel. Hence, during the three seasons the cost of delivering wheat from the harvest field to the farm barn has been at the mean rate of $\frac{3}{4}$ d. per bushel.

6. *The Extent to which Wheat Costing Data of Mallee Farm No. 1 can be extended to the Murray Mallee District generally.*

In the immediately preceding paragraphs it has been shown that in the three successive seasons by no means above average, the mean costs of growing a 17bush. wheat crop on a Mallee Farm, were represented by 2s. 11d. per bushel on the Farm, 3s. at the railway siding, and 3s. 6d. on trucks Port Adelaide. For purposes of comparison "Costs" incurred in each individual season have been summarised below as follows:—

	Areas Reaped. Acres.	Mean Yields Per Acre. Bush.	Total.			Cost of Production. Per Acre.			Per Bush.	
			£	s.	d.	£	s.	d.	s.	d.
1929-30	448	14.35	1,198	19	11	2	13	6	3	8 $\frac{1}{2}$
1930-31	339	16.87	843	6	10	2	9	9	2	11 $\frac{1}{2}$
1931-32	479	19.35	1,038	5	0	2	3	4	2	3
Means	422	16.92	1,026	17	3	2	8	8	2	10 $\frac{1}{2}$

It will be observed that under stress of economic conditions, the owner succeeded in reducing mean "Costs of Production Per Acre" from £2 13s. 6d. in 1929-30 to £2 3s. 4d. in 1931-32; this represents reduction in "Costs Per Acre" of close on 20 per cent. in spite of progressively improving yields, and is, therefore, a notable performance.

But whilst the above data show what can be done by careful management and good farming methods on a Mallee Farm, it would be unwise to assume that they can be applied indiscriminately to all Mallee Farms in general. Indeed it is perhaps necessary to recall at this stage that however low and satisfactory these mean costs of production might appear to be, the owner's Management and Labor Incomes had negative values in two out of the three seasons, namely—£539 0s. 9d. in 1929-30, and—£639 10s. 1d. in 1930-31; and again a negative value for the mean of the three seasons, namely—£249 9s. 8d. It is scarcely necessary to add that these negative Management and Labor Incomes were not the consequences of managerial shortcomings, but in the main of the unprecedented fall in world prices of primary products, and to a less degree of unfavorable seasons.

But whilst these data can be taken to illustrate fairly well what can be done in the Mallee, they must not be assumed to be typical of what is happening to-day on the average Mallee Farm. The most glaring instance of dissimilarity between

this Farm and Mallee Farms generally is the fact that during these three years all wheat grown on Mallee Farm No. 1 was sown on well tilled bare fallow; and the costs that have been indicated are for wheat so grown. It is true that departmentally we recommend that over the greater portion of South Australia wheat should not be grown in any other manner, and particularly not in the Mallee; nevertheless, for a variety of reasons it is not yet the generally accepted conception as to how wheat should be grown in the Mallee. Hence, in County Chandos, in which Mallee Farm No. 1 is situated, we find that during the five-year period ending in 1932, out of a mean total area of 187,923 acres sown to wheat, 58,188 acres, or 31 per cent. of the total, had not been fallowed prior to seeding; and that whilst the mean yield per acre of the area that had been fallowed was 11.05 bushels, that of the land that had not been fallowed was 5.14 bushels only.

Obviously the Economics of Wheat sown on stubbles, grass land, or new land must be quite different from those of wheat sown on adequately tilled Bare Fallow; and equally dangerous would it be to generalise as to prospects in County Chandos on the basis of Wheat Costs of 2s. 11d. per bushel.

Moreover, the mean yield per acre of land treated as Bare Fallow in County Chandos, namely, 11.05 bushels, is not the mean yield per acre of Mallee Farm No. 1, namely, 16.92 bushels; and if we assume—as we may—that “costs per acre” of growing wheat on bare fallow in County Chandos generally will be approximately similar to corresponding costs on Mallee Farm No. 1, then we shall find that the lower yield per acre of the County as a whole will imply considerably higher “costs per bushel” than have been recorded for Mallee Farm No. 1. What should be the exact value of these mean County Costs per bushel it would be very difficult to state without further investigations; but if we assume “costs per acre” to remain the same as on Mallee Farm No. 1, apart from costs of harvest operations which should vary proportionally to mean yields per acre, we shall get the following results:—

	Mean 1929-32 Costs per Acre of Mallee Farm No. 1.	Estimated Mean Costs per Acre of Wheat Sown on Bare Fallow in County Chandos.
	£ s. d.	£ s. d.
Preparation of fallows	0 12 1.24	0 12 1.24.
Seeding operations	0 11 3.01	0 11 3.01
Harvest operations	0 11 1.84	0 7 3.41
Balance of expenditure	0 14 1.91	0 14 1.91
Total mean costs per acre ..	2 8 8.00	2 4 9.57
Mean yields per acre	16.92bush.	11.05bush.
Mean costs per bushel	2s. 11d.	4s. 0½d.

(*Vide* Table VII.—Part I. of Appendix.)

Hence, if we assume that apart from varying harvesting costs, “costs per acre” of growing wheat on Bare Fallow in County Chandos to be approximately similar to corresponding “costs” of Mallee Farm No. 1, then after due allowance for variation in harvest costs, the mean costs per bushel would be approximately 4s., or about 1s. more than corresponding costs of Mallee Farm No. 1.

But if we go further afield and extend our comparisons to the seven counties of the Murray Mallee Statistical Division, we shall meet with even greater dissimilarities. In these counties for the five-year period ending in 1932, the mean area under Wheat in each year was 933,592 acres, of which 530,761 acres, or 57 per cent. had not been fallowed prior to seeding; the mean yield per acre of wheat sown on fallowed land was 7.97 bushels and that of wheat sown on land that had not been fallowed 4.28 bushels only.

Obviously, therefore, the mean costs of growing wheat on nearly three-fifths of the area sown to wheat in the Murray Mallee Division must differ radically from costs recorded for Mallee Farm No. 1; on the other hand, costs per acre on the remaining two-fifths of the area sown which would have been fallowed prior to seeding, would approximate to corresponding costs of Mallee Farm No. 1, subject to due allowance for variation in harvest costs. The latter costs have been summarised below:—

	Mean 1929-32 Costs per Acre of Mallee Farm No. 1.	Estimated Mean Costs per Acre of Wheat Sown on Bare Fallow in Murray Mallee Statistical Division.
	£ s. d.	£ s. d.
Preparation of fallows	0 12 1.24	0 12 1.24
Seeding operations	0 11 3.01	0 11 3.01
Harvest operations	0 11 1.84	0 5 3.04
Balance of expenditure	0 14 1.91	0 14 1.91
Total mean costs per acre	2 8 8.00	2 2 9.20
Mean yields per acre	16.92bush.	7.97bush.
Mean costs per bushel	2s. 11d.	5s. 4½d.

From the above it will be observed that whereas the mean costs of growing a 17bush. crop on Mallee Farm No. 1 were £2 8s. 8d. per acre and 2s. 11d. per bushel respectively, it was calculated that the average Mallee Crop of 8 bushels to the acre should cost about £2 2s. 9d. per acre and 5s. 4½d. per bushel respectively.

Such an estimate of Mean Costs for Mallee Farms will at first sight seem high; but it may be justified on the following grounds. It can be stated in the first place that if we take into consideration all interest and depreciation charges it is difficult to imagine that land could be adequately prepared for wheat over nine successive months, appropriately sown to wheat and dressed with superphosphate, and that eventually the crop should be reaped and bagged for less than £2 per acre; and for a mean crop of 8 bushels, £2 per acre means 5s. per bushel. Moreover, 8 bushels per acre represents the average wheat yield of land treated as bare fallow in the Murray Mallee Division; and it follows that in the same division there must be many farmers, who sow wheat on bare fallow, and reap less than 8 bushels to the acre, and whose costs per bushel would, therefore, be greater than 5s. The Government Statist's data for 1931-32—a by no means unfavorable season—show that out of 2,367 farmers in the Murray Mallee Division, 1,011 or over 42 per cent., reaped less than 6 bushels to the acre. It is true that many of the latter—possibly the majority—sowed their wheat crops on stubble, grass, or new land; but a fair proportion must have sown their wheat on bare fallow; and if we make allowance for probable slovenly and defective treatment, and reduce the mean costs of the latter to 30s. per acre, 5 bushels per acre would still represent mean costs of 6s. per bushel, and lower yields proportionally more.

In summary, it can be said that in the absence of violent economic upheavals, and apart from harvest variations, mean costs per acre will usually remain fairly constant in any given district for a definite period of years, say 5 to 10; whereas costs per bushel, on the other hand, must necessarily vary with every rise or fall in mean yields of grain per acre, and the latter would, in the main, be controlled by seasonal conditions and the incidence of disease. Hence, whilst we can probably safely accept the mean costs per acre of Mallee Farm No. 1 for growing wheat on bare fallow, namely, £2 8s. 8d., as applicable to Mallee Farms generally, the same cannot be said of the mean yield per acre, namely, 17 bushels, and the mean costs per bushel, namely, 2s. 11d., which two items are in reality typical of no

more than 3 per cent. to 4 per cent. of present day farmers in the Murray Mallee Division. In the circumstances, it can be said that mean costs per bushel of growing wheat in the Mallee are nearer 5s. than 3s.

7. Comparison of Mean Costs of Growing Wheat on Mallee Farm No. 1 and at Turretfield respectively, in Seasons in which Mean Costs Per Bushel were approximately similar.

From the comparisons that have already been made, it is fairly obvious that the cheaper and more easily worked Mallee Lands can grow wheat at lower costs than the dearer and heavier lands of the Central and Northern Areas. It remains to be seen to what limits Central and Northern Mean Yields per acre must be raised in order to approximate Mallee Mean Costs per bushel. In the records of the 10 Turretfield seasons there was one season in which "costs per bushel" approached very closely to corresponding "costs" for 1929-30 season on Mallee Farm No. 1. I refer to 1924-25, when Turretfield crops averaging 23.91 bushels per acre cost 3s. 10d. per bushel to grow; similarly, on Mallee Farm No. 1 the mean crop yield for 1929-30 was 14.35 bushels, and the mean cost per bushel 3s. 9d.

For purposes of comparison these mean data have been summarised under Statements "A," "B," and "C" respectively:—

Contrasting Mean Costs of Growing 23.91bush. of Wheat at Turretfield with corresponding Costs of Growing 14.35bush. on Mallee Farm No. 1.

Mean Costs Per Bushel.		Turretfield Differences.	
Mallee Farm			
No. 1.	Turretfield.	Increase.	Decrease.
14.35bush.	23.91bush.		

STATEMENT "A".

From the standpoint of Seasonal Field Operations.

	s. d.	s. d.	s. d.	s. d.
Tillage of Fallow	0 10	0 10	—	—
Seeding Operations	1 0	0 10	—	0 2
Harvest Operations	0 10	0 10	—	—
Balance of Expenditure	1 1	1 4	0 3	—
Totals	3 9	3 10	+0 3 net+1d.	0 2

STATEMENT "B"

From the standpoint of Main Costing Items.

Labor (direct and indirect	0 8	1 0	0 4	—
Use of Horses	0 6	0 9	—	0 3
Use of Tractor	0 6			
Use of Implements	0 3	0 3	—	—
Seed	0 4	0 3	—	0 1
Purchase of Essential Material	0 7	0 7	—	—
Balance of Expenditure	0 11	1 0	0 1	—
Totals	3 9	3 10	0 5 net+1d.	0 4

STATEMENT "C".

From the standpoint of Interest and Depreciation.

Depreciation on Improvements and Plant	0 10	0 4	—	0 6
Interest on Land and Improvements....	0 5	0 3	—	0 2
Interest on Floating Capital	0 4	0 8	0 4	—
Interest on Overdraft				
Total Interest and Depreciation Charges	1 7	1 3	—	0 4
Balance of Expenditure	2 2	2 7	5 5	—
Totals	3 9	3 10	net+1d.	—

To all intents and purposes we have here the costs per bushel of a 14bush. Mallee Crop contrasted with corresponding costs of a 24bush. Central District Crop, and notwithstanding a difference in mean yields of 10 bushels between the two, these mean costs were practically identical, namely, 3s. 9d. and 3s. 10d. per bushel respectively; in fact, if we make allowance for the fact that costs of production in 1924-25 were higher than in 1929-30, the 1d. which separates the two mean costs would be more than accounted for. If we assume mean costs per bushel to be identical in each case, namely, 3s. 9d., then the costs per acre of the 14bush. Mallee Crop would be £2 12s. 6d., and that of the 24bush. Central Division crop £4 10s. We may conclude, therefore, that whilst in Mallee Areas mean yields of grain per acre are usually lower than in our Central and Northern Areas, this disadvantage is usually set off by lower land values and less costly tillage operations, with the result that on parity of yields, inclusive costs per bushel are very appreciably lower in the Mallee than in the Central and Northern Areas. The data given above show that whereas in the Mallee Areas 3s. 9d. per bushel for wheat on the farm would balance expenditure on a 14bush. crop, a similar position could not be expected in the Central and Northern Divisions except from crops yielding from 9 to 10 bushels more than the Mallee Crops.

If from the latter standpoint we take one of the best of our Lower North Counties—Stanley—on the one hand, and one of the best Mallee Counties—Chandos—on the other, and compare their respective mean yields of wheat per acre for the most recently recorded decade, namely, 1922-32, we shall find 15½ bushels for Stanley and 10½ bushels for Chandos, that is to say, a difference of 5 bushels per acre only. Hence, it follows that in times when the mean price of wheat is low, Mallee farmers are probably in a sounder economic position than farmers in the older settled districts.

8. *Financial Aspects of Delayed Fallowing in the Growing of Wheat.*

In March, 1929, an area of 79 acres was sown to a grazing crop of oats: this crop was grazed over throughout the season and not broken up for wheat until December of the same year; the land so treated was subsequently sown to wheat in the 1930-31 season. We have here an example of what might be called unduly delayed fallowing, a practice which is not usually recommended for Mallee Districts, because of its usually depressing influence on wheat yields. In the paragraphs that follow we shall examine some of the financial implications of late fallow in comparison with normal early fallow.

It must be stated here that the 79 acres broken up late in December yielded 827 bushels of wheat, or 10.47 bushels per acre, whereas 339 acres of normal early fallow yielded 5,720 bushels, or 16.87 bushels per acre, an increase above late fallow of about 6½ bushels per acre, or 61.1 per cent.

Summarised comparative costs per acre have been given below:—

The costs per acre can now be expressed comparatively as costs per bushel as follows:—

	Mean Costs per Acre.		Late Fallow Decreases.	
	Late Fallow.	Normal Fallow.	Total.	Percentage.
	£ s. d.	£ s. d.	s. d.	%
Tillage of fallows	0 8 5	0 12 6	4 1	32.7
Seeding operations	0 11 5	0 11 7	0 2	1.4
Harvest operations	0 8 7	0 11 4	2 9	24.3
Balance of expenditure ..	0 10 7	0 14 4	3 9	26.1
Totals	1 19 0	2 9 9	10 9	21.6
Mean yields per acre .	10.47bush.	16.87bush.		

Hence the "costs per acre" of the crop sown on late fallow were 10s. 9d., or 21.6 per cent. less than the corresponding costs of the crop sown on early fallow; this represents an aggregate saving of £42 9s. 3d. on the 79 acres sown.

The saving of 4s. 1d. per acre, or 32.7 per cent., on normal costs of fallowing is attributable to reduction in number of tillage operations given. The costs per acre of seeding operations were, as might have been anticipated, to all intents and purposes identical. There was a reduction of 2s. 9d. per acre on harvest operations, attributable to the reduction in mean yields per acre. The balance of expenditure showed a reduction of 3s. 9d. per acre, or 26.1 per cent., which can be distributed under the following headings:—

	Balance of Expenditure.		Late Fallow Decreases.	
	Late Fallow.	Normal Fallow.		
	s. d.	s. d.	s. d.	s. d.
General Expenses	4 2	5 3	1 1	
Rates and taxes	0 4	0 6	0 2	
Interest	6 1	8 7	2 6	
Totals	10 7	14 4	3 9	

The costs per acre can now be expressed comparatively as costs per bushel as follows:—

	Mean Costs per Bushel.		Late Fallow Increases.	
	Late Fallow.	Normal Fallow.	Total.	Percentage.
	s. d.	s. d.	d.	%
Tillage of fallows	0 9.68	0 8.91	0.77	8.6
Seeding operations	1 1.06	0 8.26	4.80	58.1
Harvest operations	0 9.81	0 8.05	1.76	21.9
Balance of expenditure .. .	1 0.15	0 10.16	1.99	19.6
Totals	3 8.70	2 11.38	9.32	26.3
Mean yields per acre ..	10.47bush.	16.87bush.		

Hence, although a 10.47 bushel crop of wheat sown on late fallow cost 10s. 9d. per acre less to grow than a 16.87 bushel crop sown on early fallow, on a per bushel basis the wheat sown on late fallow cost 9.32d. per bushel more to grow than the wheat sown on early fallow; or, in other words, if wheat had realised on the Farm 2s. 11½d., receipts would have balanced expenditure for wheat sown on early fallow, but would have left wheat sown on late fallow at a debit of 9.32d. per bushel, or in the aggregate of £32 2s. 4d. for the 79 acres. It is suggested, therefore, that notwithstanding the advantage of a few more weeks' grazing, late fallowing for wheat is rarely economically profitable in average Mallee Districts, and particularly so in these days of low prices for wheat.

B.—COSTS OF GROWING OATS IN ROTATION WITH WHEAT.

1. Introductory.

The experience of many years has shown that it is not as a rule safe to sow successive crops of wheat on the relatively light soils of our Mallee Areas without interposing to each crop not only one year of carefully tilled bare fallow, but in addition a crop of oats. The apparent role of the oat crop in the matter seems to be to crowd out plants, such as barley grass, that act as hosts to the Take-all fungus (*Ophiobolus graminis*) and contaminate the soil for the succeeding wheat crop. The value of this practice is particularly noticeable in the early years of reclamation, when the land is still crowded with decaying roots and stumps, in the midst of which wheat plants appear less able to resist "Take-all" than under more normal conditions of farming. Hence, rotations of the following types, involving wheat on the same area of land not more frequently than once in every three or four years, have become more or less standardised in most Mallee Districts.

	ROTATION "A."	ROTATION "B."
1st year	Bare fallow	Bare fallow
2nd year	Wheat	Wheat
3rd year	Oats	Oats
4th year	Bare fallow	Grazing
5th year	Wheat, &c.	Bare fallow, &c.

Rotation "A" (with wheat once in three years) is admissible only on moderate loams that are to all intents and purposes adequately cleared of roots and stumps.

Rotation "B" (with wheat once in four years) is typical of what is usually practised on the lighter types of soil; not infrequently the rotation is extended to a fifth year by a second year of grazing.

On Mallee Farm No. 1 the owner has followed the practice of sowing oats partly on wheat stubbles or grassland and partly on bare fallow.

2. Mean Costs of Growing Oats on Grass Land.

Oats were sown on grass land in two seasons only, namely, in 1929-30 and in 1930-31; full details of mean expenditure incurred have been set out in Table VIII. of the Appendix; this Table consists of three parts, namely:—

Part I.—Detailed analysis of expenditure incurred in growing oats in 1929-30 and 1930-31 on a mean area of 90.5 acres, the mean yield from which was 9.63 bushels per acre.

Part II.—Calculated costs per acre of the above.

Part III.—Calculated costs per bushel of the above.

Table VIII. shows that the mean costs per bushel of growing 90.5 acres of oats, yielding 9.63 bushels per acre, was 4s. 5½d.; such costs are clearly uneconomic, since the mean metropolitan wholesale price of oats for the five-year period closing in 1932 was 2s. 8½d. per bushel only. The main cause of these uneconomically high per bushel "costs" was the low mean yield per acre, which again was attributable to a very unfavorable season in 1929-30. In order to make this point clear the main features of each season have been summarised below:—

Seasons.	Areas Sown. Acres.	Mean Yields.	Mean Costs.	
		Per Acre. Bush.	Per Acre. £ s. d.	Per Bushel. s. d.
1929-30	120	5.52	1 19 4	7 5½
1930-31	61	17.70	2 9 10	2 9½
Means	90.5	9.63	2 2 11'	4 5½

Hence, in a relatively favorable season the oat yield off grass land on Mallee Farm No. 1 was 17.7 bushels per acre, at a cost of 2s. 9½d. per bushel; whereas in an unfavorable season it was 5.52 bushels and 7s. 1½d. respectively. Attention has already been drawn to the fact that experience had shown the expediency in Mallee districts of separating two successive crops of wheat on the same land by an intervening crop of oats, and particularly so in the early stages of settlement; and it follows that mean returns from the rotation as a whole are of greater concern to the farmer than the mean returns of individual crops. Thus, since it must be admitted that unlike the South-East, our Mallee Districts do not usually offer ideal conditions for the growth of oat crops, it might at times be hoped that weaknesses in oat returns might be countered by strength in wheat returns. Unfortunately, although in certain circumstances such a hope can and has been justified, in the present period of low prices for all agricultural products the rotation is bound to fail unless everyone of its members can stand on its own legs; in other words, the Mallee can no longer afford to grow oats at a loss in the hope that a succeeding wheat crop will more than make good the loss.

In this connection, not even the favorable 1930-31 season with its 17.7 bushels of oats to the acre at a cost of 2s. 9½d. can meet the requirements of Mallee Farm No. 1; actually, these costs correspond to 3s. 2d. per bushel, on trucks, Port

Adelaide, and it has already been stated that the mean metropolitan wholesale price for oats for the five years ending in 1932 was 2s. 8½d. only. But it is often urged that oats need not necessarily be sold as such; that they can be fed to advantage to cattle, horses, and sheep; all this might be true provided the oats could be grown at a cost that did not render their use prohibitive. Oats that have cost 7s., 4s., or even 3s. to grow are not likely to prove cheap foodstuffs, even on the farm on which they have been raised. The man who elected to grow oats for his livestock at a cost of 4s. to 5s. a bushel instead of purchasing them from his neighbor at 2s. to 2s. 6d. is in the same position as the suburban gardener who imagines that his back yard cabbages are a sounder proposition than his purchases from the greengrocer.

Nevertheless, in present circumstances it seems almost inevitable that the Mallee wheat farmer should have to grow occasional oat crops; and as costs per acre cannot very well be reduced it remains to be seen what mean yield of oats per acre would be likely to prove directly profitable in the Mallee.

If in this connection we assumed—as we well might—that the mean costs per acre of the 1930-31 Mallee Farm No. 1 oat crop, namely, £2 9s. 10d., remained the same, apart from successive harvest cost increases, we should find that the successive costs per bushel of progressively increasing oat yields would be as follows:—

		s.	d.
Recorded mean costs per bushel of	17.7bush. crop	2	9½
Calculated mean costs per bushel of	20.0bush. crop	2	6½
Calculated mean costs per bushel of	21.0bush. crop	2	5½
Calculated mean costs per bushel of	22.0bush. crop	2	4½
Calculated mean costs per bushel of	23.0bush. crop	2	3½

Thus, it is not until we reach a mean yield per acre of 23 bushels that we can count upon costs per bushel that would be appreciably lower than the parity of the mean metropolitan wholesale price, 2s. 8½d. The calculated costs per bushel of a 23bush. crop are shown to have been 2s. 3½d. per bushel, which is equivalent to 2s. 7½d. on trucks, Port Adelaide, that is to say, 1d. lower than the mean metropolitan wholesale price. Such a mean yield is not impossible even in the Mallee; in many instances more thorough, more careful, handling of the crop is all that would be necessary.

But in the meanwhile, we are bound to recognise that it is miles ahead of the mean yields of oats usually grown on stubbles or grassland of Mallee districts. For the five-year period closing in 1932, the mean yield of oats, whether on fallow or on grass or stubble land, was 5.28 bushels per acre for County Chandos, and 5.15 bushels per acre for the Murray Mallee Division. Yields such as these are clearly uneconomic, and it is questionable whether even the ravages of take-all can justify the costs and wasted effort they have entailed of recent years. I propose discussing this question further after considering the costs of growing oats on bare fallow.

3. Mean Costs of Growing Oats on Bare Fallow.

In 1929-30 oats were sown on 15 acres of bare fallow and in 1931-32 on 33 acres of bare fallow; the mean yields per acre were 18.35 bushels in 1929-30 and 15.15 bushels in 1931-32.

Mean expenditure incurred during these two seasons has been analysed in detail in Table IX., Part I., for a mean area of 24 acres and a mean yield of 16.15 bushels per acre.

In Parts II. and III. of the same Table the mean expenditure has been expressed as mean costs per acre and mean costs per bushel respectively.

The data of Tables VIII. and IX. respectively have been summarised below under Statements "A," "B," and "C":—

Comparative Summarised Statements of Costs of Growing Oats on Grass Land and Bare Fallow respectively.

	Oats on Grass Land (1929-31).			Oats on Bare Fallow (1929-30 and 1931-32).		
	Mean Yield per Acre 9.63 Bush.			Mean Yield per Acre 16.15 Bush.		
	Mean Costs.			Mean Costs.		
	Per Acre.	Per Bush.	Percentages.	Per Acre.	Per Bush.	Percentages.
	s. d.	s. d.	%	s. d.	s. d.	%
STATEMENT "A".						
From the standpoint of Seasonal Field Operations.						
Preparation of Land	7 10	0 10	18.3	12 5	0 9	21.7
Seeding Operations	16 10	1 9	39.2	12 2	0 9	21.3
Harvest Operations	7 7	0 9	17.6	16 6	1 0	28.9
Balance of Expenditure .	10 8	1 1	24.9	16 0	1 0	28.1
Totals	42 11	4 5	100.0	57 1	3 6	100.0

STATEMENT "B".						
From the standpoint of Main Costing Items.						
*Labor (direct and indirect)	7 3	0 9	16.9	13 1	0 10	23.0
Use of Horses	4 5	0 5	10.3	3 3	0 2	5.6
Use of Tractor	6 4	0 8	14.6	10 7	0 8	18.6
Use of Implements	3 5	0 4	8.0	9 7	0 7	16.8
Seed	6 3	0 8	14.6	3 3	0 2	5.7
Purchase of Essential Material	6 5	0 8	15.0	5 3	0 4	9.2
Balance of Expenditure .	8 10	0 11	20.6	12 1	0 9	21.1
Totals	42 11	4 5	100.0	57 1	3 6	100.0

STATEMENT "C".						
From the standpoint of Interest and Depreciation Charges.						
Depreciation of Improvements and Plant	8 4	0 10	19.4	15 3	0 11	26.6
Interest on Land and Improvements	3 4	0 4	7.7	5 6	0 4	9.7
Interest on Floating Capital	2 11	0 3	6.8	3 3	0 2	5.8
Interest on Overdraft ...	0 5	0 1	1.0	0 10	0 1	1.4
Interest and Depreciation Charges	15 0	1 6	34.9	24 10	1 6	43.5
Balance of Expenditure .	27 11	2 11	65.1	32 3	2 0	56.5
Totals	42 11	4 5	100.0	57 1	3 6	100.0
*Labor (direct)	6 1	0 7.5	—	9 11	0 7.5	—
Labor (indirect)	1 2	0 1.5	—	3 2	0 2.5	—
	7 3	0 9	—	13 1	0 10	—

From the above statements we see that although a 16.15 bushel crop of oats grown on bare fallow cost 14s. 2d. per acre more than a 9.63 bushel crop of oats grown on grass land, the costs per bushel were 3s. 6d. for oats on fallow and 4s. 5d. for oats on grass land. Nevertheless, 3s. 6d. per bushel on the farm is considerably above the local parity of the mean metropolitan wholesale price of oats, namely, 2s. 4½d., on the farm; nor for oats sown on bare fallow are costs of 2s. 4½d. per bushel or less attainable, except for mean yields of not less than 30 bushels per acre. Mean yields of oats of 30 bushels and more cannot be expected in the Mallee for the present, at all events.

TABLE VII.
 MALLEE FARM No. 1.
Detailed Analysis of 1929-32 Mean Costs of Growing 422 acres of Wheat on Bare Fallow which averaged 16.92 bushels per acre.
 PART I.—TOTAL COSTS.

	Con- tracts.	Labor.	Horses.	Tractor.	Imple- ments.	Materials.	Miscel- laneous.	Totals.	Percent- ages.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	%
I. TILLAGE OF FALLOWS—									
1. Ploughing	—	35 15 3	39 18 1	41 3 7	11 3 6	—	—	128 0 5	12.47
2. Cultivating	—	26 17 7	25 2 4	46 13 2	11 7 1	—	—	110 0 2	10.71
3. Harrowing	—	4 2 7	9 16 10	0 5 1	2 0 11	—	—	16 5 5	1.59
4. Carting off weeds	—	0 8 8	0 11 2	—	0 1 7	—	—	1 1 5	0.10
Totals	—	67 4 1	75 8 5	88 1 10	24 13 1	—	—	255 7 5	24.87
II. SEEDING OPERATIONS—									
1. Carting out Seed and Super	—	1 1 7	1 13 6	—	0 4 2	—	—	2 19 3	0.29
2. Sowing	—	13 14 7	8 4 7	33 6 7	5 14 10	—	—	61 0 7	5.94
3. Superphosphate	2 4 7	0 3 1	0 6 0	—	0 0 9	87 10 2	—	90 4 7	8.79
4. Seed	5 11 4	1 7 9	—	—	1 6 1	66 2 0	—	74 7 2	7.24
5. Harrowing after sowing	—	2 3 11	3 15 8	2 0 3	0 16 6	—	—	8 16 4	0.86
Totals	7 15 11	18 10 11	13 19 9	35 6 10	8 2 4	153 12 2	—	287 7 11	23.12
III. SPRING TILLAGE (Cutpacker)	—	0 8 9	0 6 4	—	1 3 0	—	—	1 18 1	0.18
IV. HARVEST OPERATIONS—									
1. Reaping	—	26 19 3	—	77 13 9	33 16 5	—	—	138 9 5	13.48
2. Sewing Bags	—	11 0 11	0 10 7	—	0 4 2	—	—	11 15 8	1.15
3. Bags	0 2 4	0 2 2	5 2	—	0 1 9	79 6 6	—	79 12 11	7.76
4. Sewing Twine	—	—	—	—	—	2 5 11	—	2 5 11	0.22
5. Turning wet bags	—	0 5 2	0 0 7	—	—	—	—	0 5 9	0.03
6. Field Sales of Wheat	—	0 1 7	—	—	—	—	—	0 1 7	0.01
7. Carting Seed Wheat to barn	1 2 2	0 15 1	0 12 9	—	0 5 6	—	—	2 15 6	0.27
Totals	1 4 6	39 4 2	1 4 1	77 13 9	34 7 10	81 12 5	—	235 6 9	22.92
V. BALANCE OF EXPENDITURE—									
1. General	—	32 14 4	1 17 1	0 9 4	18 4 8	—	—	91 18 7	8.95
2. Insurance in Field	—	—	—	—	—	—	38 13 2	4 12 1	0.45
3. District Council Rates	—	—	—	—	—	—	4 6 3	4 6 3	0.42
4. Land Tax	—	—	—	—	—	—	4 4 2	4 4 2	0.41
5. Rent (Interest on Land and Improvements)	—	—	—	—	—	—	115 19 3	115 19 3	11.29
6. Interest on Overdraft	—	—	—	—	—	—	12 12 0	12 12 0	1.23
7. Interest on Floating Capital	—	—	—	—	—	—	63 4 9	63 4 9	6.16
Totals	—	32 14 4	1 17 1	0 9 4	18 4 8	—	243 11 8	296 17 1	23.91
Grand Totals	9 0 5	158 2 3	92 15 8	201 11 9	86 10 11	235 4 7	243 11 8	1,026 17 3	—
Percentages	0.88	15.40	9.03	19.63	8.43	22.91	23.72	—	100.00

TABLE VII.
PART II.—COSTS PER ACRE.

	Con- tracts.	Labor.	Horses.	Tractor.	Imple- ments.	Materials.	Miscel- laneous.	Total.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
I. TILLAGE OF FIELDS—								
1. Ploughing	—	1 8-34	1 10-69	1 11-42	0 6-36	—	—	6 0-81
2. Cultivating	—	1 3-29	1 2-29	2 2-53	0 6-48	—	—	5 2-57
3. Harrowing	—	0 2-34	0 5-60	0 0-15	0 1-16	—	—	0 9-25
4. Carting off weeds	—	0 0-25	0 0-32	—	0 0-04	—	—	0 0-61
Totals	—	3 2-22	3 6-90	4 2-10	1 2-02	—	—	12 1-24
II. SEEDING OPERATIONS—								
1. Carding out Seed and Super	—	0 0-61	0 0-95	—	0 0-12	—	—	0 1-68
2. Sowing	—	0 7-81	0 4-68	1 6-95	0 3-27	—	—	2 10-71
3. Superphosphate	0 1-26	0 0-09	0 0-17	—	0 0-02	4 1-77	—	4 3-31
4. Seed	0 3-17	0 0-79	0 0-74	—	0 0-74	3 1-59	—	3 6-29
5. Harrowing after sowing	—	0 1-25	0 2-15	0 1-15	0 0-47	—	—	0 5-02
Totals	0 4-43	0 10-55	0 7-95	1 8-10	0 4-62	7 3-36	—	11 3-01
III. SPRING TILLAGE (Cutlpecker)	—	0 0-25	0 0-18	—	0 0-65	—	—	0 1-08
IV. HARVEST OPERATIONS—								
1. Reaping	—	1 3-34	—	3 8-18	1 7-23	—	—	6 6-75
2. Sewing Bags	—	0 6-23	0 0-30	—	0 0-12	—	—	0 6-70
3. Bags	0 0-07	0 0-06	—	—	0 0-05	3 9-11	—	3 9-29
4. Sewing Twine	—	—	—	—	—	0 1-31	—	0 1-31
5. Turning Wet Bags	—	0 0-14	0 0-02	—	—	—	—	0 0-16
6. Field Sales of Wheat	—	0 0-05	—	—	—	—	—	0 0-05
7. Carting Seed Wheat to barn	0 0-63	0 0-43	0 0-36	—	0 0-16	—	—	0 1-58
Totals	0 0-70	1 10-30	0 0-68	3 8-18	1 7-56	3 10-42	—	11 1-84
V. BALANCE OF EXPENDITURE —								
1. General	—	1 6-60	0 1-06	0 0-27	0 10-37	—	1 9-98	4 4-28
2. Insurance in field	—	—	—	—	—	—	0 2-62	0 2-62
3. District Council Rates	—	—	—	—	—	—	0 2-45	0 2-45
4. Land Tax	—	—	—	—	—	—	0 2-39	0 2-39
5. Rent (Interest on Land and Improvements)	—	—	—	—	—	—	5 5-95	5 5-95
6. Interest on Overdraft	—	—	—	—	—	—	0 7-17	0 7-17
7. Interest on Floating Capital	—	—	—	—	—	—	2 11-97	2 11-97
Totals	—	1 6-60	0 1-06	0 0-27	0 10-37	—	11 6-53	14 0-83
Grand Totals	0 5-13	7 5-92	4 4-77	9 6-65	4 1-22	11 1-78	11 6-53	48 8

TABLE VII.
PART III.—COSTS PER BUSHEL.

	Con- tracts.	Labor.	Horses.	Tractor.	Imple- ments.	Materials.	Miscel- laneous.	Totals.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
I. TILLAGE OF FALLOW—								
1. Ploughing	—	0 1-20	0 1-34	0 1-38	0 0-38	—	—	0 4-30
2. Cultivating	—	0 0-90	0 0-85	0 1-57	0 0-38	—	—	0 3-70
3. Harrowing	—	0 0-14	0 0-33	0 0-01	0 0-07	—	—	0 0-55
4. Carting off Weeds	—	0 0-02	0 0-02	—	—	—	—	0 0-04
Totals	—	0 2-26	0 2-54	0 2-96	0 0-83	—	—	0 8-59
II. SEEDING OPERATIONS—								
1. Carting out Seed and Super.	—	0 0-04	0 0-05	—	0 0-01	—	—	0 0-10
2. Sowing	—	0 0-46	0 0-28	0 1-12	0 0-19	—	—	0 2-05
3. Superphosphate	0 0-07	0 0-01	0 0-01	—	—	0 2-94	—	0 3-03
4. Seed	0 0-19	0 0-05	—	—	0 0-04	0 2-22	—	0 2-50
5. Harrowing after Sowing	—	0 0-07	0 0-13	0 0-07	0 0-03	—	—	0 0-80
Totals	0 0-26	0 0-63	0 0-47	0 1-19	0 0-27	0 5-16	—	0 7-98
III. SPRING TILLAGE (Cutlipecker)	—	0 0-01	0 0-01	—	0 0-04	—	—	0 0-06
IV. HARVEST OPERATIONS—								
1. Reaping	—	0 0-91	—	0 2-61	0 1-14	—	—	0 4-66
2. Sewing Bags	—	0 0-37	0 0-02	—	0 0-01	—	—	0 0-40
3. Bags	0 0-01	—	—	—	—	0 2-66	—	0 2-67
4. Sewing Twine	—	—	—	—	—	0 0-08	—	0 0-08
5. Turning Wet Bags	—	0 0-01	—	—	—	—	—	0 0-01
6. Field Sales of Wheat	—	—	—	—	—	—	—	—
7. Carting Seed Wheat to Barn	0 0-03	0 0-03	0 0-02	—	0 0-01	—	—	0 0-09
Totals	0 0-04	0 1-32	0 0-04	0 2-61	0 1-16	0 2-74	—	0 7-91
V. BALANCE OF EXPENDITURE—								
1. General	—	0 1-10	0 0-06	0 0-02	0 0-61	—	0 1-30	0 3-09
2. Insurance in Field	—	—	—	—	—	—	0 0-16	0 0-16
3. District Council Rates	—	—	—	—	—	—	0 0-14	0 0-14
4. Land Tax	—	—	—	—	—	—	0 0-14	0 0-14
5. Rent (Interest on Land and Improvements)	—	—	—	—	—	—	0 3-90	0 3-90
6. Interest on Overdraft	—	—	—	—	—	—	0 0-42	0 0-42
7. Interest on Floating Capital	—	—	—	—	—	—	0 2-13	0 2-13
Totals	—	0 1-10	0 0-06	0 0-02	0 0-61	—	0 8-19	0 9-98
Grand totals	0 0-30	0 5-32	0 3-12	0 6-78	0 2-91	0 7-90	0 8-19	2 10-52

TABLE VIII.
Detailed Analysis of Expenditure incurred in Growing Oats on Grass Land (1929-30 and 1930-31.)
PART I.—TOTAL EXPENDITURE ON 90.5 ACRES AND MEAN YIELD OF 9.63 BUSHELS PER ACRE.

	Con- tracts.	Labor.	Horses.	Tractor.	Imple- ments.	Materials.	Miscel- laneous.	Totals.	Percent- ages.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	
I. Preparation of Land—									
1. Ploughing	—	7 10 8	14 0 10	—	2 9 5	—	—	24 0 11	12.4
2. Cultivating	—	1 18 5	—	5 19 5	0 15 9	—	—	8 13 7	4.5
3. Harrowing	—	0 7 6	—	1 0 4	1 9 1	—	—	2 16 11	1.4
Totals	—	9 16 7	14 0 10	6 19 9	4 14 3	—	—	35 11 5	18.3
II. SEEDING OPERATIONS—									
1. Carting out Seed and Super	—	0 5 11	0 7 5	—	0 1 2	—	—	0 14 6	0.4
2. Sowing	—	3 11 8	2 14 1	8 9 9	1 15 6	—	—	16 11 0	8.5
3. Superphosphate	0 17 2	—	—	—	—	23 19 8	—	24 16 10	12.8
4. Seed	—	1 3 10	—	—	1 8 2	28 5 6	—	30 17 6	15.9
5. Harrowing after seeding	—	0 15 1	2 2 3	—	0 6 6	—	—	3 3 10	1.6
Totals	0 17 2	5 16 6	5 3 9	8 9 9	3 11 4	52 5 2	—	76 3 8	39.2
III. WEEDING	—	0 10 3	—	—	—	—	—	0 10 3	0.3
IV. HARVEST OPERATIONS—									
1. Reaping	—	4 16 10	—	14 3 5	5 10 9	—	—	24 11 0	12.7
2. Sewing Bags	—	0 16 0	—	—	—	—	—	0 16 0	0.4
3. Bags	—	0 3 4	0 0 4	—	0 0 1	4 15 0	—	4 18 9	2.5
4. Sewing Twine	—	—	—	—	—	0 8 2	—	0 8 2	0.2
5. Carting to Barn	0 15 7	0 11 0	2 0 3	—	0 2 4	—	—	3 9 2	1.8
Totals	0 15 7	6 7 2	2 0 7	14 3 5	5 13 2	5 3 2	—	34 3 1	17.6
V. BALANCE OF EXPENDITURE—									
1. General	—	4 19 3	0 9 4	0 0 5	3 5 6	—	7 13 5	16 6 11	8.4
2. District Council Rates	—	—	—	—	—	—	0 16 0	0 16 0	0.4
3. Land Tax	—	—	—	—	—	—	0 10 11	0 10 11	0.3
4. Interest on Land and Improvements	—	—	—	—	—	—	14 18 11	14 18 11	7.7
5. Interest on Overdraft	—	—	—	—	—	—	2 0 0	2 0 0	1.0
6. Interest on Floating Capital	—	—	—	—	—	—	13 1 6	13 1 6	6.8
Totals	—	4 18 3	0 9 4	0 0 5	3 5 6	—	39 0 9	47 14 3	24.6
Grand Totals	1 12 9	27 8 9	21 14 6	29 13 4	17 4 3	57 8 4	39 0 9	194 2 8	—
Percentages	0.8	14.1	11.2	15.3	8.9	29.6	20.1	—	100.0

TABLE VIII.
PART II.—MEAN COSTS PER ACRE.

	Con- tracts.	Labor.	Horses.	Tractor.	Imple- ments.	Materials.	Miscel- laneous.	Totals.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
I. PREPARATION OF LAND—								
1. Ploughing	—	1 7-99	3 1-23	—	0 6-55	—	—	5 3-77
2. Cultivating	—	0 5-09	—	1 3-83	0 2-10	—	—	1 11-02
3. Harrowing	—	0 0-99	—	0 2-70	0 3-85	—	—	0 7-54
Totals	—	2 2-07	3 1-23	1 6-53	1 0-50	—	—	7 10-33
II. SEEDING OPERATIONS—								
1. Carting out Seed and Super	—	0 0-79	0 0-93	—	0 0-16	—	—	0 1-93
2. Sowing	—	0 9-51	0 7-18	1 10-50	0 4-70	—	—	3 7-89
3. Superphosphate	0 2-28	—	—	—	—	5 3-60	—	5 5-88
4. Seed	—	0 3-16	—	—	0 3-73	6 2-99	—	6 9-88
5. Harrowing after Seeding	—	0 1-99	0 5-60	—	0 0-87	—	—	0 8-46
Totals	0 2-28	1 3-45	1 1-76	1 10-50	0 9-46	11 6-59	—	16 10-04
III. WEEDING	—	0 1-36	—	—	—	—	—	0 1-36
IV. HARVEST OPERATIONS—								
1. Reaping	—	1 0-83	—	3 1-59	1 2-68	—	—	5 5-10
2. Sewing Bags	—	0 2-13	—	—	—	—	—	0 2-13
3. Bags	—	0 0-44	0 0-04	—	0 0-02	1 0-59	—	1 1-09
4. Sewing Twine	—	—	—	—	—	0 1-08	—	0 1-08
5. Carting to Barn	0 2-07	0 1-46	0 5-34	—	0 0-31	—	—	0 9-18
Totals	0 2-07	1 4-86	0 5-38	3 1-59	1 3-01	1 1-67	—	7 6-58
V. PALANCE OF EXPENDITURE—								
1. General	—	1 1-02	1 1-24	0 0-06	0 8-68	—	1 8-34	3 7-34
2. District Council Rates	—	—	—	—	—	—	0 2-13	0 2-13
3. Land Tax	—	—	—	—	—	—	0 1-45	0 1-45
4. Interest on Land and Improvements	—	—	—	—	—	—	3 3-63	3 3-63
5. Interest on Overdraft	—	—	—	—	—	—	0 5-31	0 5-31
6. Interest on Floating Capital	—	—	—	—	—	—	2 10-67	2 10-67
Totals	—	1 1-02	0 1-24	0 0-06	0 8-68	—	8 7-53	10 6-53
Grand Totals	0 4-35	6 0-76	4 9-61	6 6-68	3 9-65	12 8-26	8 7-53	42 10-84

TABLE VIII.
PART III.—MEAN COSTS PER BUSHEL.

	Con- tracts.	Labor.	Horses.	Tractor.	Imple- ments.	Materials.	Miscel- laneous.	Totals.
	d.	d.	d.	d.	d.	d.	d.	s. d.
I. PREPARATION OF LAND—								
1. Ploughing	—	2-08	3-87	—	0-68	—	—	0 6-63
2. Cultivating	—	0-53	—	1-64	0-22	—	—	0 2-39
3. Harrowing	—	0-10	—	0-28	0-40	—	—	0 0-78
Totals	—	2-71	3-87	1-92	1-30	—	—	0 9-80
II. SEEDING OPERATIONS—								
1. Carting out Seed and Super	—	0-08	0-11	—	0-01	—	—	0 0-20
2. Sowing	—	0-99	0-74	2-34	0-49	—	—	0 4-56
3. Superphosphate	0-23	—	—	—	—	6-61	—	0 6-64
4. Seed	—	0-33	—	—	—	7-79	—	0 8-51
5. Harrowing after Seeding	—	0-21	0-58	—	0-09	—	—	0 0-88
Totals	0-23	1-61	1-43	2-34	0-98	14-40	—	1 8-99
III. WEEDING	—	0-14	—	—	—	—	—	0 0-14
IV. HARVEST OPERATIONS—								
1. Reaping	—	1-34	—	3-90	1-53	—	—	0 6-77
2. Sewing Bags	—	0-22	—	—	—	—	—	0 0-22
3. Bags	—	0-04	0-01	—	—	1-31	—	0 1-36
4. Sewing Twine	—	—	—	—	—	0-11	—	0 0-11
5. Carting to Barn	0-22	0-15	0-55	—	0-03	—	—	0 0-95
Totals	0-22	1-75	0-56	3-90	1-56	1-42	—	0 9-41
V. BALANCE OF EXPENDITURE—								
1. General	—	1-35	0-13	0-01	0-90	—	2-11	0 4-50
2. District Council Rates	—	—	—	—	—	—	0-22	0 0-22
3. Land Tax	—	—	—	—	—	—	0-15	0 0-15
4. Interest on Land and Improvements	—	—	—	—	—	—	4-12	0 4-12
5. Interest on Overdraft	—	—	—	—	—	—	0-55	0 0-55
6. Interest on Floating Capital	—	—	—	—	—	—	3-60	0 3-60
Totals	—	1-35	0-13	0-01	0-90	—	10-75	1 1-14
Grand Totals	0-45	7-56	5-99	8-17	4-74	15-82	10-75	4 5-48

Detailed Analysis of Mean Total Expenditure incurred in growing 24 acres of Oats on Fallow (1929-30 and 1931-32) and the mean yield from which was 16.15 bushels per acre.

PART I.—TOTAL EXPENDITURE

	Con- tracta.	Labor.	Horsea.	Tractor.	Imple- ments.	Materials.	Miscel- laneous.	Totals.	Percent- ages.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	%
I. TILLAGE OF FALLOWS—									
1. Ploughing	—	1 17 10	—	3 10 9	0 9 5	—	—	5 18 0	8.62
2. Cultivating	—	1 15 5	1 9 6	4 4 7	0 13 10	—	—	8 3 4	11.93
3. Harrowing	—	0 3 3	0 11 8	—	0 1 7	—	—	0 16 6	1.20
Totals	—	3 16 6	2 1 2	7 15 4	1 4 10	—	—	14 17 10	21.75
II. SEEDING OPERATIONS—									
1. Carting out Seed and Super	—	0 1 4	0 1 7	—	0 0 2	—	—	0 3 1	0.23
2. Sowing	—	0 18 0	—	2 16 10	0 5 7	—	—	4 0 5	5.87
3. Superphosphate	0 1 11	0 0 4	0 0 7	—	0 0 1	4 16 6	—	4 19 5	7.26
4. Seed	—	0 1 6	—	—	0 2 2	3 18 8	—	4 2 4	6.01
5. Harrowing after Sowing	—	0 4 4	0 5 9	0 13 5	0 2 6	—	—	1 6 0	1.90
Totals	0 1 11	1 5 6	0 7 11	3 10 3	0 10 6	8 15 2	—	14 11 3	21.27
III. SPRING TILLAGE—									
1. Cultipacking	—	0 0 7	0 0 5	—	0 1 8	—	—	0 2 8	0.20
2. Handpicking	—	0 19 11	—	—	—	—	—	0 19 11	1.45
Totals	—	1 0 6	0 0 5	—	0 1 8	—	—	1 2 7	1.65
IV. HARVEST OPERATIONS—									
1. Reaping	—	2 3 5	1 6 7	2 2 2	10 16 8	—	—	16 8 10	24.02
2. Sewing Bags	—	0 13 5	—	—	—	—	—	0 13 5	0.98
3. Carting to Barn	0 3 1	0 9 6	0 8 0	—	0 3 5	—	—	1 4 3	1.75
4. Bags	—	0 0 6	0 0 2	—	0 0 1	1 6 6	—	1 7 3	1.99
5. Sewing Twine	—	—	—	—	—	0 2 6	—	0 2 6	0.18
Totals	0 3 1	3 6 10	1 14 9	2 2 2	11 0 2	1 9 0	—	19 16 0	28.92
V. BALANCE OF EXPENDITURE—									
1. General Expenditure	—	2 8 10	0 0 11	0 1 0	1 4 4	—	2 5 6	6 0 7	8.81
2. District Council Rates	—	—	—	—	—	—	0 4 11	0 4 11	0.36
3. Land Tax	—	—	—	—	—	—	0 5 2	0 5 2	0.38
4. Interest on Land and Improvements	—	—	—	—	—	—	6 12 8	6 12 8	9.69
5. Interest on Overdraft	—	—	—	—	—	—	0 19 8	0 19 8	1.43
6. Interest on Floating Capital	—	—	—	—	—	—	3 18 7	3 18 7	5.74
Totals	—	2 8 10	0 0 11	0 1 0	1 4 4	—	14 6 6	18 1 7	26.41
Grand Totals	0 5 0	11 18 2	4 5 2	13 8 9	14 1 6	10 4 2	14 6 6	68 9 3	—
Percentages	0.37	17.40	6.22	19.62	20.56	14.91	20.92	—	100.00

TABLE IX.
PART II.—MEAN COSTS PER ACRE.

	Con- tracts.	Labor.	Horses.	Tractor.	Imple- ments.	Materials.	Miscel- laneous.	Totals
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
I. TILLAGE OF FALLOWS—								
1. Ploughing	—	1 6 91	—	2 11 38	0 4 73	—	—	4 11-02
2. Cultivating	—	1 5-09	1 2-77	3 6-29	0 6-82	—	—	6 9-67
3. Harrowing	—	0 1-63	0 5-83	—	0 0-17	—	—	0 8-23
Totals	—	3 2-23	1 8-60	6 5-67	1 0-42	—	—	12 4-92
II. SEEDING OPERATIONS—								
1. Carting out Seed and Super.	—	0 0-66	0 0-77	—	0 0-11	—	—	0 1-54
2. Sowing	—	0 9-02	—	2 4-40	0 2-77	—	—	3 4-19
3. Superphosphate	0 0-94	0 0-17	0 0-31	—	0 0-04	4 0-25	—	4 1-71
4. Seed	—	0 0-75	—	—	0 1-08	3 3-36	—	3 5-17
5. Harrowing after Seeding	—	0 2-17	0 2-86	0 6-72	0 1-27	—	—	1 1-02
Totals	0 0-94	1 0-77	0 3-94	2 11-12	0 5-25	7 3-61	—	12 1-63
III. SPRING TILLAGE—								
1. Cuttupacking	—	0 0-31	0 0-23	—	0 0-81	—	—	0 1-35
2. Handpicking	—	0 9-96	—	—	—	—	—	0 9-96
Totals	—	0 10-27	0 0-23	—	0 0-81	—	—	0 11-31
IV. HARVEST OPERATIONS—								
1. Reaping	—	1 9-71	1 1-31	1 9-09	9 0-33	—	—	13 8-44
2. Sewing Bags	—	0 6-69	—	—	—	—	—	0 6-69
3. Carting to Barn	0 1-56	0 4-75	0 3-98	—	0 1-73	—	—	1 0-02
4. Bags	—	0 0-27	0 0-06	—	0 0-02	1 1-25	—	1 1-60
5. Sewing Twine	—	—	—	—	—	0 1-25	—	0 1-25
Totals	0 1-56	2 9-42	1 5-35	1 9-09	9 2-03	1 2-50	—	16 6-00
V. BALANCE OF EXPENDITURE—								
1. General	—	2 0-41	0 0-46	0 0-48	1 0-19	—	1 10-75	5 0-29
2. District Council Rates	—	—	—	—	—	—	0 2-46	0 2-46
3. Land Tax	—	—	—	—	—	—	0 2-61	0 2-61
4. Interest on Land and Improvements	—	—	—	—	—	—	5 6-33	5 6-33
5. Interest on Overdraft	—	—	—	—	—	—	0 9-81	0 9-81
6. Interest on Floating Capital	—	—	—	—	—	—	3 3-29	3 3-29
Totals	—	2 0-41	0 0-46	0 0-48	1 0-19	—	11 11-25	15 0-79
Grand totals	0 2-50	9 11-10	3 6-58	11 2-36	11 8-75	8 6-11	11 11-25	57 0-65

TABLE IX.
PART III.—MEAN COSTS PER BUSHEL.

	Con- tracts.		Labor.		Horses.		Tractor.		Imple- ments.		Materials.		Miscel- laneous.		Totals.	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
I. TILLAGE OF FALLOWS—																
1. Ploughing	—	—	0 1-17	—	—	—	0 2-19	0 0-29	—	—	—	—	—	—	0 3-65	—
2. Cultivating	—	—	0 1-10	0 0-32	0 0-36	—	0 2-61	0 0-43	—	—	—	—	—	—	0 5-06	—
3. Harrowing	—	—	0 0-10	0 0-36	—	—	—	0 0-05	—	—	—	—	—	—	0 0-51	—
Totals	—	—	0 2-37	0 1-28	0 1-28	—	0 4-80	0 0-77	—	—	—	—	—	—	0 9-22	—
II. SEEDING OPERATIONS—																
1. Carting out Seed and Super	—	—	0 0-04	0 0-04	0 0-04	—	—	0 0-01	—	—	—	—	—	—	0 0-09	—
2. Sowing	—	—	0 0-56	—	—	—	0 1-76	0 0-17	—	—	—	—	—	—	0 2-49	—
3. Superphosphate	0 0-06	—	0 0-01	0 0-02	—	—	—	—	—	—	0 2-99	—	—	—	0 3-08	—
4. Seed	—	—	0 0-05	—	—	—	—	0 0-07	—	—	0 2-43	—	—	—	0 2-55	—
5. Harrowing after Seeding	—	—	0 0-13	0 0-18	0 0-18	—	0 0-42	0 0-08	—	—	—	—	—	—	0 0-81	—
Totals	0 0-06	—	0 0-79	0 0-24	0 0-24	—	0 2-18	0 0-33	—	—	0 5-42	—	—	—	0 9-02	—
III. SPRING TILLAGE—																
1. Outpacking	—	—	0 0-02	0 0-01	—	—	—	0 0-05	—	—	—	—	—	—	0 0-08	—
2. Handpicking	—	—	0 0-62	—	—	—	—	—	—	—	—	—	—	—	0 0-62	—
Totals	—	—	0 0-64	0 0-01	—	—	—	0 0-05	—	—	—	—	—	—	0 0-70	—
IV. HARVEST OPERATIONS—																
1. Reaping	—	—	0 1-34	0 0-82	0 0-82	—	0 1-31	0 6-71	—	—	—	—	—	—	0 10-18	—
2. Sewing Bags	—	—	0 0-41	—	—	—	—	—	—	—	—	—	—	—	0 0-41	—
3. Carting to Barn	0 0-09	—	0 0-30	0 0-25	—	—	—	0 0-11	—	—	—	—	—	—	0 0-75	—
4. Bags	—	—	0 0-02	—	—	—	—	—	—	—	0 0-82	—	—	—	0 0-84	—
5. Sewing Twine	—	—	—	—	—	—	—	—	—	—	0 0-08	—	—	—	0 0-08	—
Totals	0 0-09	—	0 2-07	0 1-07	0 1-07	—	0 1-31	0 6-82	—	—	0 0-90	—	—	—	1 0-26	—
V. BALANCE OF EXPENDITURE—																
1. General	—	—	0 1-51	0 0-03	0 0-03	—	0 0-03	0 0-75	—	—	—	—	0 1-41	—	0 3-73	—
2. District Council Rates	—	—	—	—	—	—	—	—	—	—	—	—	0 0-15	—	0 0-15	—
3. Land Tax	—	—	—	—	—	—	—	—	—	—	—	—	0 0-18	—	0 0-18	—
Interest on Land and Improvements	—	—	—	—	—	—	—	—	—	—	—	—	0 4-11	—	0 4-11	—
5. Interest on Overdraft	—	—	—	—	—	—	—	—	—	—	—	—	0 0-61	—	0 0-61	—
6. Interest on Floating Capital	—	—	—	—	—	—	—	—	—	—	—	—	0 2-43	—	0 2-43	—
Totals	—	—	0 1-51	0 0-03	0 0-03	—	0 0-03	0 0-75	—	—	—	—	0 8-87	—	0 11-19	—
Grand Totals	0 0-15	—	0 7-38	0 2-63	0 2-63	—	0 8-32	0 8-72	—	—	0 6-32	—	0 8-87	—	3 6-39	—

THE CHAMPIONSHIP WHEAT CROP COMPETITION.

(Won by Mr. Henry Michael, Hilltown.)

In his report on the Championship Wheat Crop Competition for the season 1933-34, Mr. W. J. Spafford (Deputy Director of Agriculture), who judged the entries, stated that for the past 10 years Wheat Crop Competitions, supervised by the Department of Agriculture, have been conducted in South Australia. For the first six seasons the Government subsidised these competitions but, unfortunately, found it necessary to discontinue the subsidy, with the inevitable result that the number of entries received show a decrease on those years when financial aid was given. A generous donation of £100 made by the S.A. Farmers' Co-operative Union Limited, which has been distributed amongst 19 district committees which conducted crop competitions *pro rata* to the number of entries received and paid for, proved of considerable help in maintaining interest in the crop competitions.

The Department of Agriculture supplies the judges, who inspect the crops, make the awards, and prepare reports on all entries in the competitions.

Until the end of September the wheat crop of the State was the most promising yet grown, and it appeared at that time that there was every probability of a record yield much greater than any yet harvested. The lack of rain in October and early November, however, proved serious to most crops and disastrous to many, and reduced the yields to a point considerably below what were anticipated. As is usual in seasons when the spring is dry, the only crops to mature properly were those grown on good fallow, and some very striking instances of this were to be seen in most parts of the State, and were particularly noticeable in the lower rainfall districts.

The want of improvement in the price of wheat, the general depression, and the dry spring militated against the chances of a great number of entries in the crop competitions, nevertheless, 19 districts conducted competitions, and 351 crops were judged. In four of the competitions the judges decided that the winning crop was not sufficiently good to leave in the Championship, so this year only 15 crops were included in the competition.

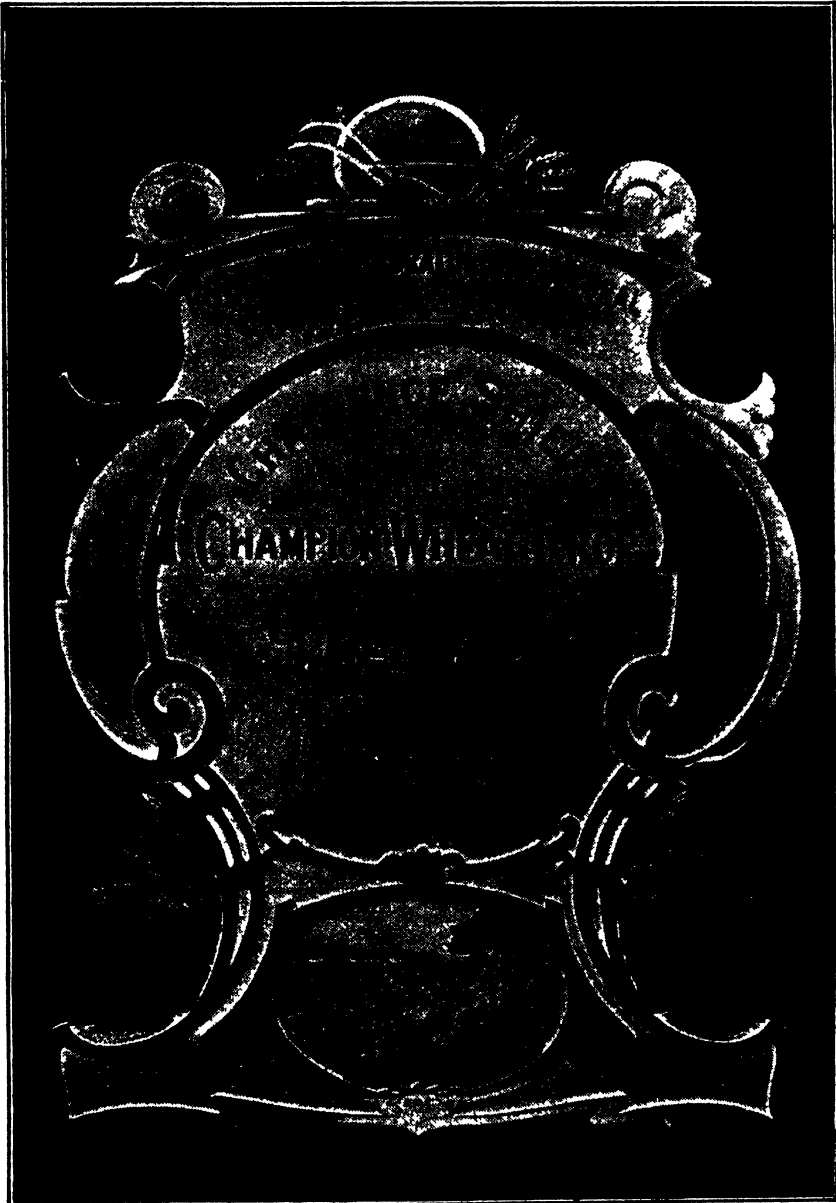
Table Showing Progress of Wheat Crop Competitions.

Year.	Districts Conducting Competitions.	Number of Crops Exhibited.
1924	12	290
1925	13	248
1926	17	444
1927	19	525
1928	22	634
1929	21	520
1930	19	473
1931	16	352
1932	20	385
1933	19	351

In 1927 the Royal Agricultural and Horticultural Society offered as a prize in connection with Wheat Crop Competitions, conducted under the auspices of the Department of Agriculture, a silver challenge shield of the value of 50 guineas, and annually a small replica of the shield valued at five guineas. The Royal Society had in view the offer of special assistance in the encouragement of Wheat Crop Competitions, and in accepting the generous offer the Government agreed to conditions laid down by the society, which were as follows:—

1. The prizes go to the person exhibiting the best crop in the competitions supervised by the Department of Agriculture, the silver challenge shield for a period of 12 months immediately succeeding the award, and the silver replica to become the absolute property of the winner.

2. The challenge shield, with the name of each year's winner engraved thereon, to be exhibited in the town hall or institute nearest the farm on which the winning crop was grown.



3. The crop awarded first prize in each supervised district competition to be taken as an entry for the Championship Competition, except in any case in which it is thought by the judge of the district competition that the winning crop is not of sufficient merit to warrant inspection for the championship trophy.

4. All entries for the championship to be inspected by one judge. Such inspection to be undertaken in each district soon after the district judge has made his awards, but not before the crop has ripened.

5. Each competitor for the championship to be required to stage one bag of grain and one sheaf (about 1ft. in diameter) of grain in the straw at the Royal Spring Show following the competition.

WINNERS OF THE CHAMPIONSHIP WHEAT CROP.

- 1927. F. V. Trenorden, Bordertown. (Federation wheat.)
- 1928. F. Coleman, Saddleworth. (Leak's Rustproof and Fondling wheats.)
- 1929. F. V. Trenorden, Bordertown. (Bena wheat.)
- 1930. H. C. M. Pilgrim, Wolseley. (Gallipoli wheat.)
- 1931. A. M. Dawkins, Gawler River. (Ford wheat.)
- 1932. J. P. Carrigg, Hamley Bridge. (Sword wheat.)
- 1933. H. Michael, Hilltown. (Dan wheat.)

THE ENTRIES.

All of the 15 crops in the Championship Crop Competition were well grown, and their inclusion in this important competition was thoroughly warranted, but some of the most promising of them had matured too rapidly under the peculiar ripening conditions that prevailed, with the result that the yields were reduced because of the shrivelling of the grain. A good deal of difficulty was experienced in placing the best of the crops in the correct order of merit because of their general excellence as competition crops, and all of them reflect credit on the farmers who produced them.

THE AWARDS.

In reporting on the entries it has been decided to follow the practice of other years of indicating the crops which would have been placed second and third to the winner of the championship trophy had this been an ordinary competition, but the other crops are not shown in order of merit, and where any remarks are made on their crops the exhibitors' names are placed in alphabetical order, and not according to points awarded. The awards and a brief description of the crops submitted in the competition are set out below:—

THE CHAMPIONSHIP WHEAT CROP (DAN WHEAT.)

H. Michael, Hilltown.

This excellent crop of Dan wheat won the Championship Wheat Crop Competition for Mr. H. Michael, of Hilltown, after having been placed first in the Midlands District Competition. It was a heavy-yielding crop, very even in growth, and a good competition crop in every way. Very few weeds of any kind were present, there being only isolated plants of spear thistle, saffron thistle, and wild oats, and the crop was practically disease free. Although there was a light sprinkling of a wheat which was taller than Dan and an odd plant or so of a brown-chaffed wheat, the crop was quite good as regards trueness to type. The growth was even and regular, and there were no drill misses.

The fallow on which the crop was grown was preceded by a wheat crop which was also grown on fallow, but the fallow of 1930 followed a crop of oats grown on land that had been rested as pasture in the previous year. In 1932 the block was fallowed in July, cultivated in August, October, and April, and during the first week in June 90lbs. of graded and dry-pickled seed and 105lbs. super-phosphate (48 per cent.) were put in to the acre with a combine.

The manner in which weeds had been got under control and the regularity of the growth of the crop shows that Mr. Michael is highly skilful as an agriculturist, and this beautiful crop is a great credit to him, and he is deserving of the highest praise for its general excellence.

THE OTHER PLACED CROPS.

FISHER BROS., Bordertown (Ranee).

The crop of Ranee which won the Tatiara Wheat Crop Competition for Messrs. Fisher Bros., of Bordertown, was a very attractive crop, and did well in the Championship Competition. There were a few patches as well as scattered plants of wild oats, and just a few plants of silver grass and brome grass, nevertheless the crop was nice and clean. Besides being practically disease free the crop was really true to type for the old-time Ranee, as it only showed odd plants of the bearded throw-back. There were no drill misses, but the crop was a little uneven as far as density was concerned.

The field in which the crop was grown had been farmed as—(a) pasture, (b) fallow (c) wheat, (d) oats, (e) fallow, previously to being seeded to the Ranee. The land was ploughed 3½ in. in depth with a mouldboard plough in August, harrowed in September, cultivated in October, January, April, May, and early June, and during the third week in June 75lbs. of graded and dry-pickled seed was put in with 125lbs. of superphosphate per acre with a combine which was followed by harrows a few days afterwards.

The field was obviously well farmed, and such a good crop could only have resulted from careful and intelligent work.

J. D. CAMPBELL, Barabba (Sword).

The Balaklava Crop Competition was won by Mr. J. D. Campbell with this crop of Sword wheat, which was so clean that it was almost weed free, only containing isolated plants of mustard. The only diseased plants to be seen were a few suffering from loose smut, and it was much truer to type than most crops of Sword in that it only contained a light sprinkling of the dark-chaffed wheat usually found in this variety. The crop had been drilled in carefully, and although there were a few small patches a bit weaker than the bulk of the crop it was nice and even. The grain was not quite as good as might have been, due to the crop maturing a little too rapidly in the long spell of dry weather experienced.

The field on which the crop was grown has been farmed on the system of—(a) fallow, (b) wheat, (c) pasture, for some years now. The land was ploughed towards the end of June, cultivated twice, and harrowed three times before harvest, cultivated in early May, and in the middle of May 63lbs. of graded and dry-pickled seed and 1cwt. superphosphate (45 per cent.) were sown to the acre with a combine.

This was an extremely good competition crop, but would have been much better had it not ripened too quickly which reduced the yield to a noticeable extent.

OTHER ENTRIES (IN ALPHABETICAL ORDER).

W. H. & J. ALDERMAN, Minlaton (Ford).

The first-prize crop in the Southern Yorke Peninsula Competition was this crop of Ford grown by Messrs. Alderman Bros., and although it had a few patches of wild oats and a few plants of mustard and soapwort was really clean. The presence of a few plants affected with bunt lowered the marks given, but otherwise the crop was disease free. There was a fairly heavy sprinkling of a brown-chaffed wheat and a few King's White plants. There were no drill misses, and the crop was even throughout, and was carrying really good quality grain, showing no ill effects of the severe ripening season.

The land carrying the crop had been farmed for some years on the three-course rotation of—(a) fallow, (b) wheat, (c) barley, and this crop was sown on fallow by putting in 90lbs. seed and 120lbs. superphosphate to the acre with a combine during the third week in May.

A. BEELITZ, Parrakie (Waratah).

With this crop of Waratah Mr. Beelitz won the Chandos Crop Competition, and although it contained a few plants of mustard, wild oats, and brome grass, and a couple of barley plants, it was a very clean crop. There was a fair amount of flag smut present, and a few very small patches of take-all. The crop was nice and true to type, only containing a light sprinkling of a white-chaffed wheat. A few small drill misses were noticeable, and the crop was somewhat lighter one end than the other, and on the whole good grain had matured over most of the crop.

Of recent years the field carrying the crop has been farmed as—(a) pasture, (b) fallow, (c) wheat, (d) oats, (e) fallow, and for the crop under review the land was fallowed in July, 1932. In the second week in June 60lbs. of seed and 1cwt. superphosphate per acre were drilled in.

C. G. & G. W. CANT, Kimba (Gluyas).

This crop of Gluyas, which won the Buxton Crop Competition for Messrs. Cant Bros, was so clean that it was only possible to find a few mustard plants scattered here and there. The only disease doing damage was flag smut, and it was quite prevalent. Although there was a sprinkling of King's White and a white-chaffed beardless wheat the crop was very fair as regards trueness to type. The crop was well drilled, and so far as evenness was concerned was very fair.

For some years the field producing the crop had been farmed on the rotation of—(a) fallow, (b) wheat, (c) oats, and in 1932 the land was fallowed in June, cultivated in September and March, and towards the end of May 60lbs. of graded and dry-pickled seed and 70lbs. of superphosphate (48 per cent.) were put in to the acre with a combine.

S. C. CRAWFORD, Strathalbyn (Ford).

The Southern Crop Competition was won by this crop of Ford grown by Mr. Crawford, and except for the presence of a lot of Wimmera rye grass in patches and a couple of plants of barley it was free from weeds. Only one hunted plant was seen, otherwise it was a disease-free crop. Although there was a light sprinkling of a brown-chaffed wheat and isolated woolly plants, the crop was more nearly true to type than most crops of Ford being grown. Other than a few drill misses the crop was very regular and even.

The system of cropping followed of recent years has been—(a) fallow, (b) wheat, (c) oats, (d) pasture, (e) fallow, and the fallow prepared in 1932 was sown with a combine in early June, using 80lbs. of seed pickled with bluestone and 120lbs. superphosphate per acre.

T. W. DAY, Reeve's Plains (Sword).

Although this crop of Sword, which won the first-prize trophy in the Central Crop Competition, matured too rapidly, it was still a really good wheat crop at harvest time. There were some patches of three-cornered jacks, wild oats, and burr clover, and odd plants of mustard; still the crop was very fair as regards cleanliness, and it was almost disease free, although three bunt plants and a little loose smut were found. It was only fair as regards trueness to type, containing a sprinkling of a brown-chaffed wheat and a purple-strawed kind. The crop was well drilled and was even throughout.

Since 1927 the system of cropping the field has been—(a) fallow, (b) wheat, (c) barley, (d) barley, (e) fallow, and to carry this crop the land was ploughed in August, harrowed in September and twice in October, cultivated at the end of October, harrowed in April, and early in May 90lbs. of re-winnowed seed and 90lbs. superphosphate (45 per cent.) were sown to the acre with a combine.

E. H. HAMPEL, Terka (Onas and Currawa).

For his entry which was successful in the Upper North Crop Competition Mr. Hampel exhibited 35 acres of Onas and 15 acres of Currawa. In both crops wild oats were fairly thick, and there were a few plants of mustard, yet if it had not been for the oats the crops would have been clean. The Onas was affected by flag smut very badly, and there were a few small patches with take-all, but with the Currawa it was almost disease free, and only showed a few plants with flag smut. The Onas was true to type except for a few isolated plants of a kind a bit taller, whereas the Currawa was far from good. There were no drill misses, but the crops were rather irregular owing to the varying nature of the soil on which they were grown.

The land has been frequently cropped of recent years on the bare fallow—wheat—bare fallow—wheat rotation. The land was ploughed at the end of the winter, harrowed in September, cultivated twice in October, again in May, and then was seeded with a combine using 60lbs. graded and dry-pickled seed and 90lbs. superphosphate per acre, and the lot was then harrowed.

R. KAIN, Yeelanna (Waratah).

The Flinders Crop Competition was won by Mr. Kain with this crop of Waratah which was very fair as regards cleanliness, although there was some drake, mustard, and poppy, and odd plants of wild oats and spear thistles. At one corner of the block were to be seen a fair number of take-all patches, and a few plants were affected with flag smut. There was hardly any admixture of any kind in the crop, and it was really true to type. Although there were a few misses by the drill the crop was fairly regular and even.

The fallow on which the crop was grown followed the course of cropping of—(a) fallow, (b) wheat, (c) oats for grazing, and was prepared by ploughing in July, was harrowed and cultivated in September, cultivated in October and May, cultivated and harrowed in early June, and about June 20th was sown with 70lbs. graded and dry-pickled seed and 150lbs. superphosphate per acre.

ALEX. MAITLAND, Rochester (Nabawa).

Although this crop of Nabawa which won the Mid-North Crop Competition for Mr. Maitland contained wild oats scattered throughout it, some sheep weed and a few odd plants of mustard, poppy, and turnip, it was fairly clean, and as far as could be seen it was free from injurious diseases. There was a light sprinkling of a brown-chaffed wheat, but the crop was very fair as regards trueness to type. There were no drill misses, and the crop was very even and regular.

The field has been worked on the system of—(a) fallow, (b) wheat, (c) pasture for some time now, and the fallow on which this crop was grown was mouldboard ploughed in June, harrowed in July and twice in August, cultivated in August, October, and April, and harrowed in April. At seeding 80lbs. graded and dry-pickled seed and 90lbs. superphosphate (45 per cent.) were used per acre.

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L. NORTHEY, Thrington (Sword).

The crop grown by Mr. Northey, which won the Northern Yorke Peninsula Crop Competition, consisted of Sword, and was still a good crop despite the fact that it had matured a bit too quickly because it had been sown a little on the early side. It contained a few patches of wild oats and barley grass, and a few plants of mustard and poppy, nevertheless it was a fairly clean crop. No injurious diseases were in evidence. There was a fair amount of admixture of other varieties. It was an even and regular crop, and only showed a couple of drill misses.

The field had been worked as fallow in 1928, carried wheat in 1929, then a crop of oats, then wheat, and in 1932 was ploughed in July, cultivated in September and April, cultipacked before seeding, which was done with a combine in the middle of May by putting in 70lbs. of graded seed and 60lbs. superphosphate (45 per cent.) to the acre.

G. F. PEARCE, Maitland (Ford).

The Mid-Yorke Peninsula Crop Competition was won by Mr. Pearce with this crop of Ford, which was a fairly clean crop, although it contained mustard and wild oats in patches, and a sprinkling of spear thistles. It was apparently disease free, and was very fair as far as trueness to type goes, only showing a light sprinkling of the brown-chaffed wheat usually found in Ford. There were a few drill misses, and the crop was only fairly regular.

In the four years preceding the fallow which carried this crop the land was worked for fallow, wheat, barley, and barley. In the first week of June, 1933, 90lbs. of graded and dry-pickled seed and 150lbs. superphosphate were sown to the acre with a combine.

J. SIMS, Cleve (Felix).

Felix grown by Mr. Sims secured first-prize trophy in the Jervois Crop Competition, and except for the fact that it had a light sprinkling of barley throughout it was a very clean crop, there being present only a few plants of mustard and wild oats and isolated plants of poppy and soapwort. There were a few plants affected with flag smut, an isolated case or two with loose smut, and most of the plants had the appearance of having had an attack of spotted rust. There was a very light sprinkling of King's White wheat in the crop, but it was quite good as regards trueness to type. As well as a few drill misses there were a lot of water runs, and so the crop looked more irregular than was actually the case.

The land should have been in good heart, because the cropping which preceded this one had been light, for in 1928 it was fallowed, then carried wheat, was rested for two years as pasture, and was then fallowed in 1932 by mouldboard ploughing in early June, was harrowed in August, skim-ploughed in September, harrowed in May, and during the first week in June 55lbs. of re-winnowed seed which had been pickled with bluestone and 95lbs. superphosphate (45 per cent.) were seeded to the acre, and the land immediately harrowed.

W. F. WURST, Laura (Nabawa).

This very clean crop of Nabawa wheat which only contained a few plants of wild oats and sheep weed won the Northern Crop Competition for Mr. Wurst, of Laura. Besides being clean the crop was also free from noticeable injurious diseases. There was not much admixture in it, and only a few brown-chaffed heads and isolated plants with white chaff or bearded were to be seen. There were a few drill misses that were not serious, but the crop varied from an extremely heavy-yielding crop on the more friable land to a lighter crop on the red land.

The land has been worked on the fallow—wheat—fallow—wheat rotation for some time now, and the 1932 fallow was harrowed in September, cultivated twice in October and again in May, and was sown in May with a combine, using 56lbs. of graded and dry-pickled seed and 90lbs. superphosphate (45 per cent.) to the acre, and was then harrowed twice.

FACTORS AFFECTING THE SEVERITY OF TAKE-ALL.

[By S. D. GARRETT, B.A., Assistant Plant Pathologist, Waite Agricultural Research Institute, University of Adelaide.]

(Continued from page 674.)

2. SOIL TEMPERATURE.

The first work upon the effect of soil temperature on take-all was that of McKinney and Davis (⁴), who showed by means of experiments in soil temperature tanks that the disease was most severe at low soil temperatures (12°-16° C.)*.

This was confirmed by the work (unpublished) of G. Samuel at the Waite Institute in 1926 and 1927. A South Australian culture of the take-all fungus, *Ophiobolus graminis*, was used, and the wheat seedlings were grown in a mixture of two parts of Glen Osmond red loam to one of sand, steam sterilised before use. The inoculum was 50 grams of a culture of the fungus on oat-barley kernel medium. Infection was recorded by the method of McKinney and Davis after four weeks. The infection ratings obtained in one experiment are given in Table I., and infection curves for the roots only are plotted in Fig. 3 (a). A photograph of plants from the 45 per cent. moisture series at the end of the experiment is given in Fig. 4 (a). The results agree well with those of McKinney and Davis.

TABLE I.—Infection of Federation Wheat Seedlings at Different Soil Temperatures in Glen Osmond Loam.

Temperature.	Moisture in per cent. sat.	Leaf-blight.	Percentage Infection. Tiller-bases.	Roots.
30°C	75	0	0	3
	45	0	0	5
25°C	75	17	28	33
	45	53	57	78
20°C	75	77	95	92
	45	85	100	97
15°C	75	87	100	100
	45	85	100	100
10°C	75	80	100	93
	45	83	100	100

At the time these experiments were done no satisfactory explanation of the behavior of take-all in relation to soil temperature could be advanced. It was known that the growth of the take-all fungus in culture was most vigorous at the higher temperatures (optimum about 25° C.). It was also known from the work of J. G. Dickson and his collaborators (^{1, 2}) that wheat was most vigorous at low temperatures (12°-16° C.), and better able to resist the invasion of the wheat scab fungus (*Gibberella saubinetii*). At higher temperatures (25°-30° C.) the composition of the roots was found to change in such a way as to decrease their resistance to infection by this fungus. Unless the take-all fungus differed markedly in its parasitism from the scab fungus it was difficult to see why wheat plants should not also suffer more from take-all at higher temperatures, at which the wheat plant would be less vigorous and the take-all fungus more vigorous.

* Temperatures in this paper are given in degrees Centigrade, but the following table will enable a rough deduction of the Fahrenheit temperatures to be made from the Centigrade:—

10°C=50°F. 15°C=59°F. 20°C=68°F. 25°C=77°F. 30°C=86°F.

This puzzling situation was largely cleared up by the appearance of a paper by A. W. Henry ⁽³⁾ on "The influence of soil temperature and soil sterilisation on the reaction of wheat seedlings to *Ophiobolus graminis*." Henry found that in unsterilised soil infection fell off with rise of temperature from 18° to 27° C., as found by McKinney and Davis, but that in sterilised soil infection actually increased with rise of temperature (see Fig. 3 (b), a reproduction of Henry's curves for root infection in sterilised and unsterilised soil). The decrease in

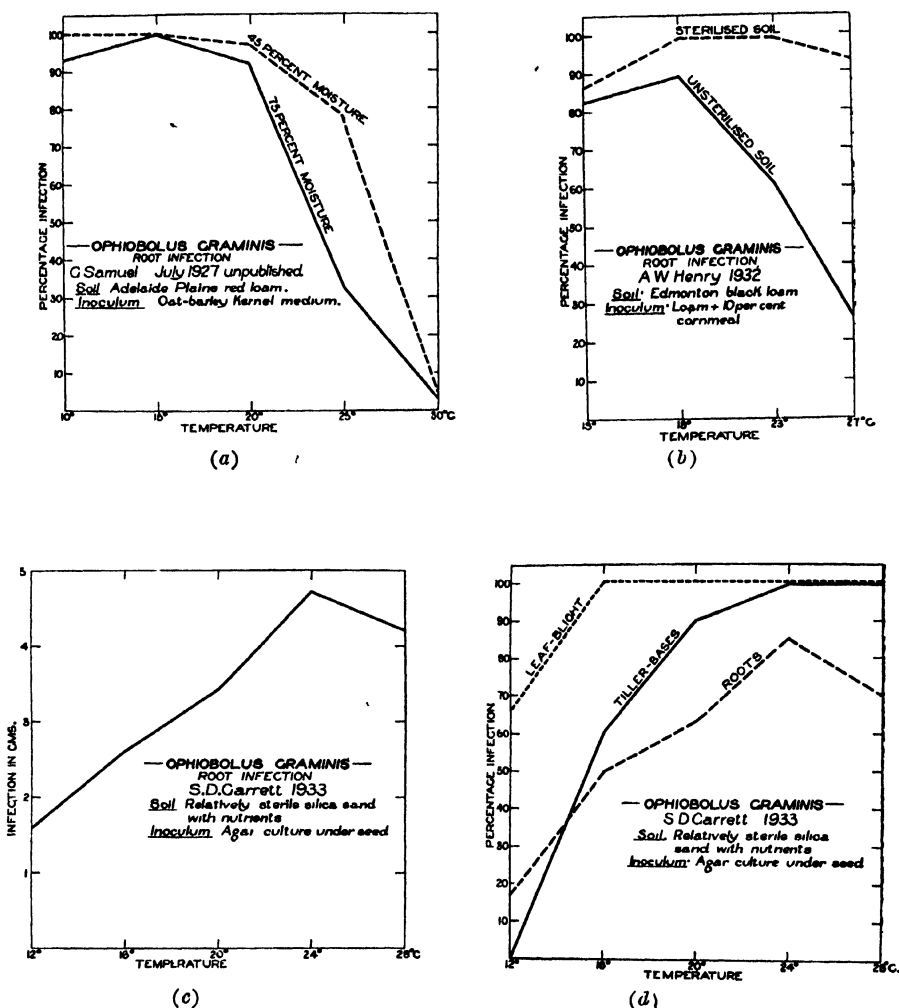


Fig. 3.—Graphs showing the relation of soil temperature to infection of wheat seedlings by *Ophiobolus graminis* under different soil conditions.

infection with rise of temperature in the unsterilised soil was attributed by Henry simply to the antagonism of the other soil organisms to *Ophiobolus*, which he considered to be negligible at 12° C., but very much more active at 25° C. When the other soil micro-organisms were absent, as was the case in the sterilised soil, the true effect of temperature appeared, and infection increased from 12° C. upwards.

McKinney and Davis employed sterilised soil in their experiments, and the soil from the 1926 and 1927 experiments at the Waite Institute was also sterilised. Sterilised soil rapidly reverts to the non-sterile condition, however, and the use of an oat-barley kernel inoculum probably hastens the process considerably. The rapidity with which micro-organisms establish themselves in an experimental soil must also vary with the type of soil and with the degree of sterilisation as well as with the subsequent treatment. Henry did not give details of the soil he used. If it was Edmonton black loam it hardly seems likely that the biological factor would have been completely eliminated throughout the course of his experiments.

Since it was found from the work described in Part I. of this paper that the effect of the biological factor was very slight in Gawler River sand, even when not

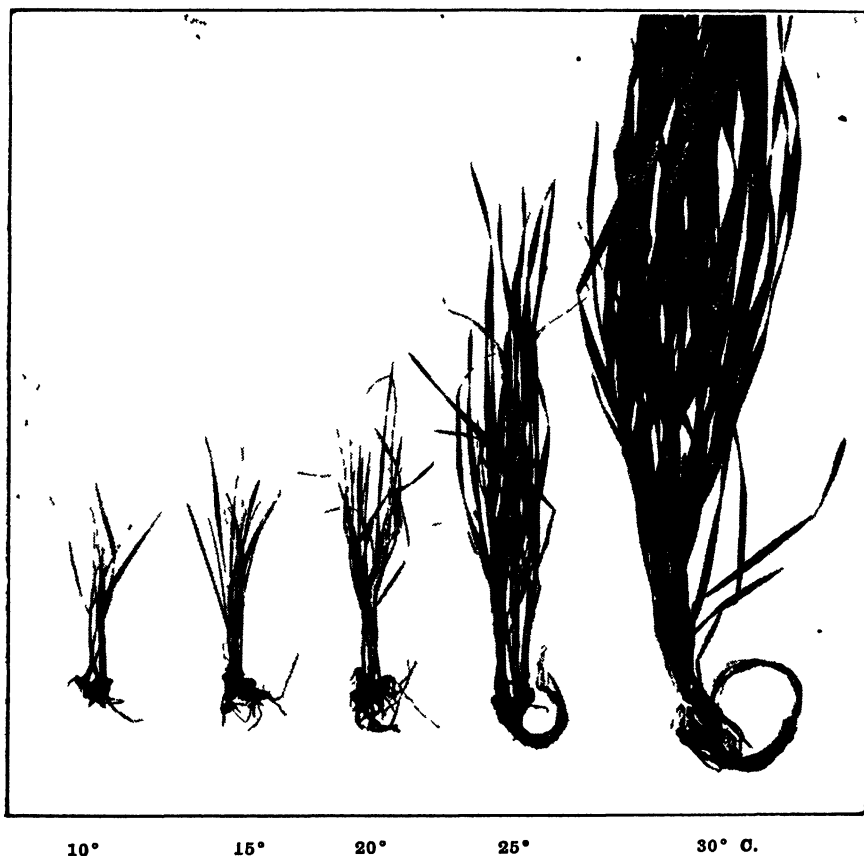


Fig. 4. (a)—Plants from a soil-temperature experiment in clay-loam soil inoculated with a culture of *Ophiobolus graminis* on an oat-barley kernel medium. Biological antagonism has caused infection to fall off with rise of temperature.

sterilised, it was decided to repeat the soil temperature work, using this sand in place of soil. It was hoped in this way to secure a more complete elimination of the complicating effects of soil bacteria, and so to obtain a closer approach to the true form of the temperature-infection curve.

EXPERIMENT ON THE EFFECT OF TEMPERATURE UPON INFECTION OF WHEAT SEEDLINGS UNDER RELATIVELY STERILE CONDITIONS.

Untreated Gawler River sand was employed. It was not sterilised, since previous experiments had shown that sterilisation resulted in only a slight increase of infection. The sand was brought to a moisture content of 50 per cent. saturation

by the addition of a nutrient solution (to secure the best growth of the plants). Four 8 in. containers were filled with the moist sand for each of the five soil temperatures employed, viz.:—12°, 16°, 20°, 24° and 28° C. Fifteen seeds were planted in each container, and three containers were inoculated in each tank by placing a small block of the fungus growing on agar under the seed at planting. After 14 days the plants from one container in each tank were washed out, and infection recorded by measuring the growth of the mycelium down the roots. The results are shown in Table II. and in Fig 3 (c).

TABLE II.—*Infection of Federation Wheat Seedlings at Different Soil Temperatures, in a Silica Sand, with Nutrients, after Two Weeks.*

Temperature.	Mean Infection in cms. from Seed.	Standard Error of Mean.	Difference of Means.
28°C	4.2	0.25	0.5 ± 0.35
24°C	4.7	0.25	1.3 ± 0.3
20°C	3.4	0.17	0.8 ± 0.2
16°C	2.6	0.105	1.0 ± 0.1
12°C	1.6	0.063	

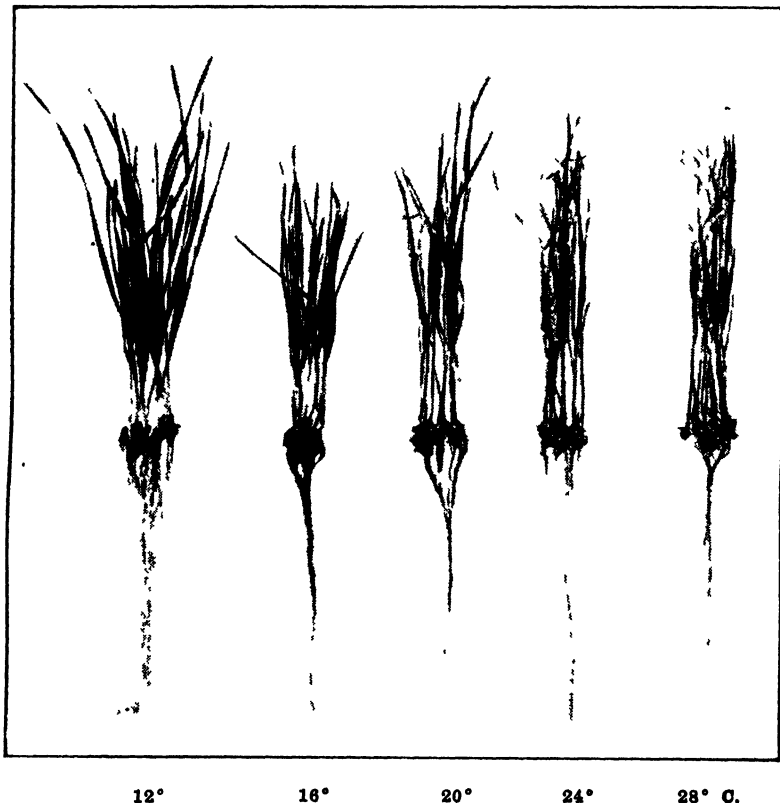


Fig. 4. (b)—Plants from a soil-temperature experiment in practically sterile sand; inoculation by means of a small block of an agar culture of *Ophiobolus graminis* placed beneath the seed. Biological antagonism almost eliminated; infection increased with rise of temperature to 24° C.

After 28 days the degree of infection in the remaining plants was recorded by the method of McKinney and Davis; the results are shown in Table III., and infection curves plotted in Fig. 3 (d). A photograph of the plants at the end of the experiment is shown in Fig. 4 (b).

TABLE III.—*Infection of Federation Wheat Seedlings at Different Soil Temperatures in a Silica Sand after Four Weeks.*

Temperature.	Leaf-blight.	Percentage Infection.	
		Tiller-bases.	Root.
28°C	70	100	100
24°C	85	100	100
20°C	63	90	100
16°C	50	60	100
12°C	17	0	66

It will be seen from Figs 3 (c) and 3 (d) that the two methods of recording infection agree quite well. It is also evident that when soil bacteria are excluded as much as possible by the use of a silica sand in place of soil, the take-all disease increases in severity with increasing temperature up to 24° C. This confirms the work of Henry. The slight fall in infection at 28° C. is probably due to the decrease in growth rate of the fungus at this temperature (optimum temperature for growth of *Ophiobolus graminis* on agar, 25° C.).

EXPERIMENT ON THE EFFECT OF TEMPERATURE ON THE VIABILITY OF *Ophiobolus* INOCULUM IN SOIL.

Since soil bacteria had been found to have such a depressing effect on the infection of wheat seedlings by the take-all fungus at high soil temperatures, a test was made to determine whether a heavy inoculation of take-all mycelium in soil would be greatly reduced in amount at high temperatures in the absence of wheat seedlings. A culture of the fungus upon cornmeal-sand medium (containing 2 per cent. cornmeal by weight) was mixed up with its own weight of Glen Osmond soil partially sterilised by steam. The mixture was brought up to a moisture content of approximately 50 per cent. saturation, and filled into six tumblers. Three tumblers were then maintained at 25° C., and the other three at 12° C. for 14 days. At the end of this time the viability of the inoculum in the two series was compared by planting all tumblers with wheat seeds, and keeping them together at 12° C. After a further 28 days the plants were washed out for an examination of the roots.

Whereas in the 12° series infection was continuous over the entire length of the roots, in the 25° series it was restricted to a number of scattered lesions. This is clearly shown by a drawing of typical root systems from each series (Fig. 5 (b)). A photograph of the plants growing in the tumblers is also shown (Fig. 5 (a)); this gives some idea of the differences in severity of infection in the two series. It is thus evident that *Ophiobolus* inoculum degenerates much more rapidly in the soil at 25° C. than at 12° C. This is probably mainly due to the antagonistic effect of soil micro-organisms at the higher temperatures.

DISCUSSION.

The above experiments give satisfactory confirmation of Henry's work and, indeed, scarcely call for additional comment. When the microbiological factor is excluded (in the present case by the use of silica sand in place of soil), the infection curve for take-all rises steadily with increase of temperature to 24° C., which corresponds to the optimum temperature for the vegetative development of the parasite. When, on the other hand, biological antagonism is allowed full scope by the nature of the soil and the method of inoculation, infection falls off rapidly at the higher temperatures.

It seems likely, therefore, that in soils with a naturally poor microbiological content, such as the Mallee sands, take-all infection may be accelerated by rise of temperature. This may account for the appearance, in some seasons, of patches of take-all in the white-head stage as late as September or October. These may be patches of primary infection in which symptoms of disease did not show up during the winter, when the low soil temperatures (in the region of 10° C.) are favorable to root growth of the wheat plant, and hold the take-all fungus in check

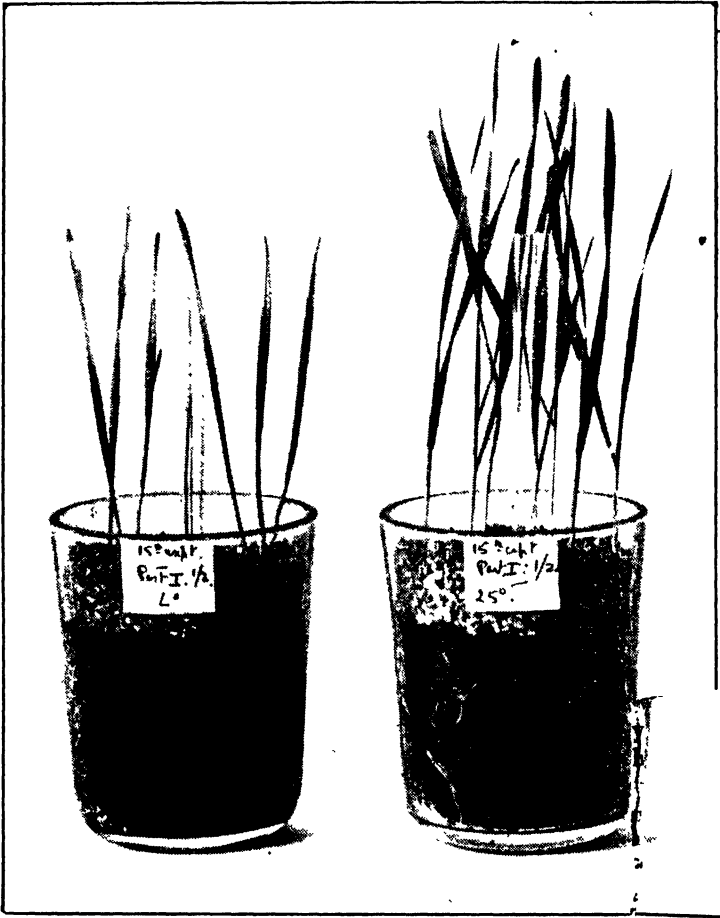


Fig. 5.—Experiment to show that degeneration of cornmeal-sand inoculum of *Ophiobolus graminis* in loam soil is accelerated by rise of temperature from 12° to 25° C.

Fig. 5. (a)—Plants after four weeks' growth in inoculated soil, which was kept for two weeks prior to planting at 12° C. (left), and at 25° C. (right).

to some extent. With the advent of warm weather in spring the higher temperatures depress root production by the plant, and at the same time accelerate the activity of the fungus, with the result that infection makes rapid progress and the plants bleach off as "white-heads."

Finally, the effect of high temperatures (25° C. and above) in accelerating degeneration of *Ophiobolus* inoculum in moist soil has been directly proved by experiment. There is little doubt that the disappearance of take-all in fallows on the heavier soils is largely due to the operation of this factor.

SUMMARY FOR PART II.

Experiments are described confirming the work of A. W. Henry on the effect of soil temperature upon infection of wheat seedlings by the take-all fungus.

When the other soil micro-organisms were practically excluded by the employment of a sterile silica sand, with seed inoculation, infection by the take-all fungus increased steadily with rise of temperature from 12° to 24° C., the optimum temperature for growth of the fungus in pure culture.

It was shown that degeneration of *Ophiobolus* inoculum in soil is much more rapid at 25° than at 12° C.

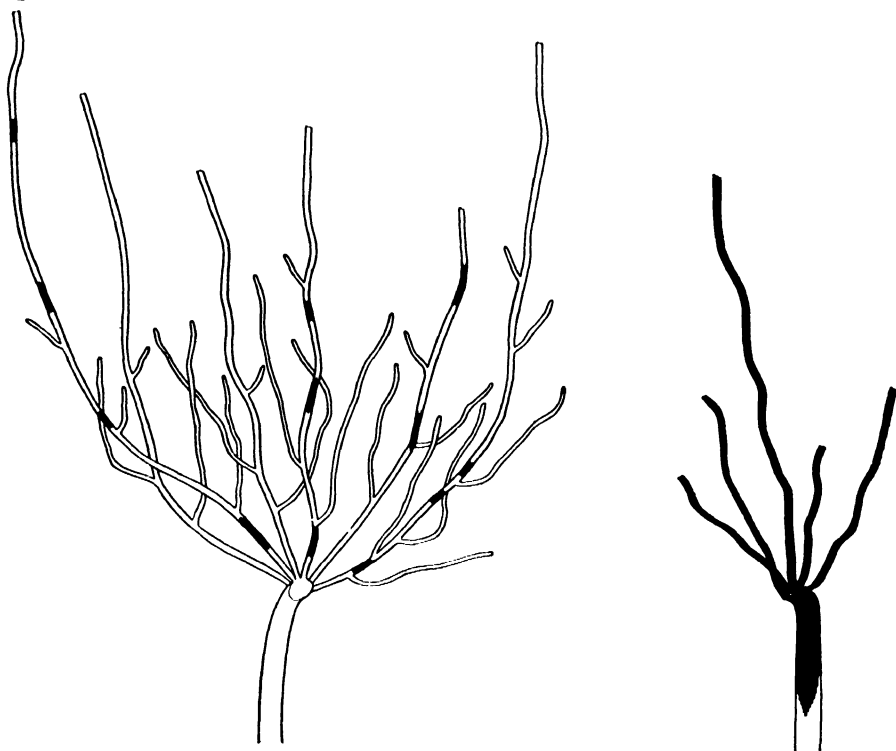


Fig. 5.—Experiment to show that degeneration of cornmeal-sand inoculum of *Ophiobolus graminis* in loam soil is accelerated by rise of temperature from 12° to 25° C.

Fig. 5. (b) Typical root systems from the two series, showing the extent of infection (in black).

It is suggested that in soils with a poor microbiological content, such as the Mallee sands, take-all infection is accelerated by rise of temperature, and that this is a factor contributing to the late appearance of the disease in some seasons, when primary soil infection does not show up until the crop is already in ear.

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(To be continued.)

DAIRY INDUSTRY PRICES.

ROYAL COMMISSION REPORT TO HIS EXCELLENCY THE GOVERNOR.

[A Royal Commission, consisting of Messrs. W. J. Dawkins (Chairman), Professor A. J. Perkins, and J. W. Wainwright, was appointed in January to inquire into and report upon the disparity between the prices paid by the consumer for dairy produce, the London parities of dairy produce, and the prices received by dairymen for milk and cream, the cause of such disparities, and the remedies therefor. The report is dated October 20th, 1933, and portion of it is quoted below.]

(Continued from Page 686, January issue.)

II. BUTTER.

A. THE NATIONAL SIGNIFICANCE OF BUTTER.

From the national viewpoint butter fills a three fold purpose. In the first place it is essential human food-stuff; secondly, it is rapidly becoming an export item of importance to South Australia; and thirdly it offers occupation for available family farm labor, particularly in times of low prices for staple farm crops. Its importance relatively to other true dairy products may be stressed as follows in terms of quantities of milk estimated to have been used in South Australia in the 1932-33 season:-

	Milk Used	
	Quantities	Percentages
	Galls.	%
Manufacture of butter	45,000,000	79.0
Human consumption, &c.	8,000,000	14.0
Manufacture of cheese	4,000,000	7.0
Approximate estimate of total milk produced	57,000,000	100.0

Recent progress achieved by the butter industry in South Australia may be gauged by the data that follow:-

Butter Manufactured.				
	In Factories.	On Farms.	Total.	Dairy Cows.
	Cwts.	Cwts.	Cwts.	Nos.
1926-27	88,000	32,000	120,000	127,000
1927-28	78,000	30,000	108,000	118,000
1928-29	73,000	28,000	101,000	109,000
1929-30	68,000	27,000	95,000	104,000
1930-31	87,000	29,000	116,000	110,000
1931-32	123,000	35,000	158,000	128,000
1932-33	150,000	45,000	195,000	149,000
Means—				
1926-30	76,750	29,250	106,000	114,500
1930-32	105,000	32,000	137,000	119,000
1932-33	150,000	45,000	195,000	149,000

It will be observed that much progress has been achieved during the course of the last two seasons. Relatively to 1929-30 butter production has been more than doubled and dairy cattle have increased by 45,000 head, or over 43 per cent. As will be seen later on, the question of farm-made butter is a vexed one with traders; in the meanwhile attention is drawn to the fact that although the quantity of butter made on farms has undoubtedly increased of recent years—from

27,000cwt. in 1929-30 to 45,000cwt. (estimate) in 1932-33 its proportional relation to total butter produced has actually declined, namely, from 29 per cent. of total butter made in 1929-30 to 23 per cent. in 1932-33 (estimate).

In view of all the circumstances it is very regrettable that general discontent should latterly have been rife among those dairymen whose business it is to separate milk and sell the cream thereof to butter manufacturers. All those who have attended public meetings at which dairy questions were discussed are aware of the intensity of this discontent, which indeed has been voiced by several witnesses who appeared before the Commission. The fundamental basis of this discontent is obviously the low values realised latterly for cans of cream, coupled with the almost ineradicable suspicion of suppliers of cream that in such transactions they did not usually get a fair deal.

B. DETERMINATION OF LOCAL BUTTER AND BUTTERFAT PRICES.

It is hardly necessary to stress the fact that the main factor behind the low local butterfat prices of recent years has been the progressive fall in London butter prices, which itself was brought about by an overstocked market under pressure of unprecedented world conditions. The position has, however, been complicated by other factors, and as there has been a good deal of misunderstanding among cream suppliers and others as to the relationship between butterfat prices, on the one hand, and wholesale and retail butter price, export bounties and London butter quotations, on the other, it is proposed to summarise the position in the following paragraphs:

1. *Normal Relative Value at Butter Wholesale Price.*—(a) When free play is allowed to economic factors, the home wholesale price of any commodity that is being produced in excess of home requirement, is more or less the price obtainable at the time on the best available importing market, less costs of delivery to that market, and plus or minus exchange differences operating between these two markets. Such, obviously, but for export bounties, would be the present position of butter in South Australia, with the additional limiting fact that Great Britain is her only possible importing market of any consequence; but even if South Australia had no exportable butter surplus, as happens fairly regularly at specified times of each year, the same factors would, nevertheless, continue to function, and exportable surpluses of other States of the Commonwealth would effectively check appreciable increase in South Australian butter prices above export parity, apart from such as would naturally arise from costs of transfer from one market to another.

(b) When, however, export and import markets respectively are separated by thousands of miles, as is Adelaide from London, then a new factor, which no prudent trader can afford to overlook, will come into action, namely, the relative stability of prices on the importing market at the time that manufacturing liabilities were being incurred in the exporting country. If at the time manufacturers should have reason to anticipate progressively rising overseas import prices wholesale prices of the exporting country would generally tend to rise slightly above corresponding strict export parity of the day; but if the reverse were the case, these wholesale prices would tend to lag behind strict export parity; and since in the latter case the financial success of the transaction would be in the balance, the lag of a falling import market would usually be proportionally greater than any corresponding price enhancement of a rising market.

(c) And, in the main, it is because ever since January, 1929, exporters have had to face progressively falling London butter prices that cream suppliers have from time to time been able to point to apparent discrepancies between local

(iii.) *Insurance*.—Insurance is assessed on a percentage of values and averaged 6d. per cwt. for the five-year period ending on June 30th, 1930; 5d. per cwt. for the three-year period ending June 30th, 1933.

(g) Hence, in rough summary, consignment sales to London would involve, under present conditions, costs varying from 22s. 10d. to 23s. 10d. per cwt., or 2.45d. to 2.55d. per lb.

For. c.i.f. sales corresponding costs would be 17s. 11d. per cwt., or 1.92d. per lb.

For f.o.b. sales, 6s. 10d. per cwt., or 0.73d. per lb.

2. *The Paterson Scheme*.—(a) *Constitution and Objective*.—In the above paragraph an attempt has been made to show in what fashion the Adelaide wholesale price of butter is linked up with London market prices. Ever since 1926, however, this normal relationship has been disturbed by the functioning of the Paterson scheme; and as this scheme is not well understood by those chiefly concerned, it is necessary to give it close consideration.

The Paterson scheme is a voluntary agreement between the butter manufacturers of Australia, excluding those of Western Australia, for the purpose of maintaining the Australian wholesale price of butter at a higher rate than its corresponding export parity. It is managed by a central controlling body known as the Australian Stabilisation Committee, upon which all States interested are represented. In addition, matters of purely local concern are left in the hands of State advisory committees. Complaints made before this Commission that South Australian producers were not represented on the Advisory Committee are met by the terms of the agreement which specifically provide that the power to create such a committee shall be vested in those directly responsible for the payment of the levies, namely, the local butter manufacturers. It follows that the absence of direct representatives of the cream suppliers of South Australia is due to the absence of co-operative factories in this State. It can be added, however, that, as in New South Wales, Victoria, and Queensland, 90 per cent. of the butter made is manufactured in co-operative factories, producers' interests are more than amply protected on the central controlling body, the majority of whose members are direct representatives of producers.

The prime objective of the agreement has been stated to be the raising of the Australian wholesale butter price above its corresponding export parity value; nor could such an objective have been achieved without a definitely binding understanding among the contracting States to the effect that the home market of each State should be left to the manufacturers of that State, and that no butter should be exported to another State unless there were a definite request for the same from manufacturers of that State. The results achieved have been remarkable, and are a tribute to the thoroughness with which a purely voluntary agreement has been observed by individuals with frequently divergent interests.

(b) *Method of Action*.—We have already seen that, under normal conditions, the Australian home wholesale price of butter is practically the same as the net price realisable by a manufacturer on the London market, or in other terms, its export parity. It follows that apart from statutory enactment, there is no way of increasing the home price of an exportable commodity, except by increasing the net returns of the exporter by means of an export bounty, the value per pound of which should be equal to the amount by which it was intended to raise the local wholesale price above export parity. For example, if the export parity of butter to-day were 8d., and if it were desired to raise the local wholesale price of butter by 3d. above parity, it would be necessary to provide a bounty of 3d. per lb., or 28s. per cwt. for all butter exported. If, in this matter, we assume the active co-operation of all butter manufacturers of the Commonwealth apart from those of Western Australia, the mere knowledge that such an export bounty were available to all manufacturers would, of itself, lead to the immediate

increase in the wholesale home consumption price of butter by an equal amount, that is to say, in the present example, from 8d. to 11d. per lb. In other words, since in the circumstances the mean net returns would be the same in either case, it would be quite immaterial to the manufacturer as to whether his butter were exported or whether it were sold on the home market, and tendencies towards competitive reductions in price would be reduced to a minimum, apart from questions of relative quantity and grade. Such, then, has been the policy that has been very successfully put into action by the Australian Stabilisation Committee.

But whilst it might be comparatively easy to secure theoretical agreement as to the advantages to producers of an export bounty on butter, it is quite another matter to give practical effect to the agreement on a purely voluntary basis, and without assistance from the public purse; and the original promoters of the Paterson scheme are to be congratulated on the ingenuity with which this difficulty has been met since 1926.

Towards this end a fixed yearly levy has been collected on all butter manufactured or processed in factories, and the aggregate value of these levies has generally sufficed to pay the requisite bounty on all butter exported from the Commonwealth, with the exception of Western Australia. It is sometimes loosely assumed that these levies have been made upon the producers, or cream suppliers. As this is very far from being the case, it is necessary to stress the fact that the fund from which the export bounties have been paid has been built up by contributions of the butter manufacturers of the Commonwealth, and subsequently recovered in butter sales made to consumers. It is, of course, true that in New South Wales, Victoria, and Queensland the great majority of the butter factories is under co-operative control, and that to that extent producers may be said to have assisted in building up the fund; but as part-owners of the factories only and not as producers. In South Australia, however, the trade is mainly in the hands of proprietary companies.

(c) *Benefit to Producers.*—The actual benefit derived by the dairyman from the Paterson scheme may be summarised as follows:—He will benefit to the extent that the wholesale price of butter in Australia has been raised above its corresponding export parity, less costs incurred by manufacturers to secure such a result, or, in other words, to the extent of the value of the export bounty per lb. of butter exported, less the value of the levy per lb. raised on all butter manufactured in order to pay this bounty. A concrete example will serve to make this position clear.

Let us assume that apart from bounties the London export parity of butter on the Adelaide market were 8d. per lb.; in the absence of bounties it would be on this figure that the price payable to dairymen for butterfat would be calculated, namely, 8d., less 2½d. for manufacturing costs, &c., multiplied by 1.18, or 6½d. per lb. of butterfat only.

If, again, we assume that as is the case at the present moment a Paterson bounty of 28s. per cwt., or 3d. per lb., were paid on all butter exported then the wholesale price of butter, which normally equals its export parity, namely, 8d. per lb. in this case, would be raised from 8d. to 11d. per lb.; but, in order to secure this result manufacturers would have contributed 1½d. per lb. on all butter manufactured in order to create the fund from which the export bounty could be paid. It follows that since the manufacturers must be compensated for their outlay in this direction the figure upon which the butterfat price would be calculated would be in this instance London export parity—8d.—plus the export bounty per pound—3d.—less manufacturers' advance of 1½d. on *all* butter manufactured. These calculations would give 9½d. instead of 8d., as the figure upon which the butterfat price would be calculated, namely 9½d., less 2½d., multiplied by 1.18, or 8d. per lb. of butterfat.

At this stage it is necessary to stress the fact that manufacturers and exporters have not benefited directly by a penny piece from the Paterson scheme; their aggregate net returns from overseas and home sales have been no greater than they would have been had there been no such scheme in existence. In fact, since manufacturers are obliged to provide levies on butter manufactured in advance of sales they can legitimately claim to have been out of pocket to the extent of interest due until such time as the value of the levies had been completely recouped by sales.

(d) *Varying Effectiveness of Paterson Levies.*—It has been shown above that the present benefit accruing to dairymen from the Paterson scheme was equivalent to 1½d. per lb. of butter manufactured only; in this connection it is necessary to recall that the scheme, although voluntary, is, apart from Western Australia, Commonwealth wide in its incidence, and that dairymen's Paterson benefit per lb. of butter manufactured has progressively declined under the influence of rapidly rising Commonwealth exports of butter; in other words, the "effectiveness" of the levy on butter manufactured has, from the dairymen's viewpoint, declined proportionally to the rise in the Commonwealth percentage of butter produced that has been exported abroad in any one year. These facts may be illustrated as follows:—If, as was the case between 1926 and 1929, one-third only of the butter produced in the Commonwealth were exported a levy of 2d. per lb. on manufactured butter would provide for a bounty of 6d. per lb. on all butter exported, and would raise the home wholesale price of butter by 6d. above export parity and the price paid to producers for butterfat by 4½d. per lb., or by 4d. on the basis of commercial butterfat. If, on the other hand, one-half of the butter produced in the Commonwealth were exported, as has happened since 1931-32, the same levy of 2d. per lb. on manufactured butter would provide for a bounty of 4d. per lb. only on *all* butter exported would raise the home wholesale price of butter by 4d., and the price paid to producers for butterfat by 2½d. per lb. only, or 2d. on the basis of commercial butterfat.

Data below show what has been the relationship of the Commonwealth export percentage to the Paterson scheme in each year since its inception and the corresponding benefit of the scheme to dairymen of Australia:—

Seasons.	Commonwealth Butter		Paterson Benefit to Dairymen		
	Exports as Percentages of Total Production.	Mean Levies per Lb. on Butter Manufactured.	Mean Export Bounties. Per Lb.	per Lb. of Butter Manufactured.	on Total Production.
	%	d.		d.	£
1926-27	30.40	1½	3½	2	2,104,425
1927-28	35.41	1½	3½	2	2,333,645
1928-29	35.34	1½	3½	2	2,415,693
1929-30	35.99	1½	4½	2½	3,426,965
1930-31	46.57	1½	3	1½	1,825,027
1931-32	51.58	1½	2½	1	1,638,896

Aggregate Paterson benefit to dairy industry (1926-1932) .. £13,744,651

NOTE A.—One half-penny has been added to mean export bounties in 1926-27 and 1927-28 seasons because in those two seasons corresponding amounts were refunded to cream suppliers.

NOTE B.—Aggregate benefit under the Paterson scheme has been calculated by multiplying the benefit per lb. by total butter production. This includes "farm" or "dairy" butter to which reference will be made later, on the grounds that farm butter, although it pays no levies, benefits with factory butter from the resulting rise in wholesale butter prices; but it is probable that farm butter does not usually secure the full benefit of the Paterson scheme, and hence figures given above have been to some extent over-stated.

From the above it will be seen that the aggregate benefit of the Paterson scheme to dairymen of the Commonwealth has been estimated at £13,750,000 between 1926-27 and 1931-32 inclusively, at the same time the value of this yearly aggregate has been gradually declining under the influence of increasing Commonwealth exports of butter.

Attention is drawn to the fact that whereas throughout the three seasons ending on June 30th, 1932, the mean levy on manufactured butter was uniformly 1½d. per lb., the dairyman's Paterson benefit during this period was on a descending scale in each successive season, namely, 2½d., 1½d., and 1d. per lb. of commercial butter respectively. We see here one of the factors that have of recent years led to apparent anomalies in butterfat prices, but which hitherto seems to have been overlooked. If, for purposes of illustration, it were assumed that London mean butter parity prices were the same in each one of these three seasons, say, 10d. per lb., then, other things being equal, including the levies on manufactured butter, the mean price of butterfat would have been 12½d. per lb. in 1929-30, 10½d. in 1930-31, and 10d. in 1931-32. Hence, notwithstanding the fact that the levies on manufactured butter were equal and the London parity prices were assumed to be equal in each year there would have been a difference of 2½d. between the price that could have been paid for butterfat in 1929-30 and that which could have been paid in 1931-32. Obviously, in this instance the controlling factor would have been the fact that in 1929-30 season one-third of the butter manufactured in the Commonwealth was exported and in 1931-32 more than half.

(d) *Paterson Scheme in Danger*.—At this stage it is necessary to stress the fact that the Paterson scheme, which over the past seven years has subsidised Commonwealth dairymen at the mean approximate rate of two and a quarter million per annum, is becoming increasingly difficult to carry on as a voluntary scheme. The position appears to have been caused by two main factors, namely—(1) progressive increase in the proportion of Commonwealth exports of manufactured butter and (2) progressive increase in Commonwealth output of "farm" or "dairy" butter; and it will be no exaggeration to add that in these times of deplorably low prices the disappearance of the Paterson scheme, unless countered by a suitable substitute, would very considerably reduce Australian exports of butter.

But, as has already been pointed out elsewhere, the Paterson scheme, although a purely voluntary organisation, functions, and has functioned well, throughout the Commonwealth with the exception of Western Australia; and even in the latter State a purely local Paterson scheme is at work. Hence, it would be idle to suggest individual State action with a view to saving it from extinction. The best that can be said in the matter is that the Commonwealth Government would confer an invaluable boon upon one of the foremost of Commonwealth rural industries if it could be induced to recognise the Paterson scheme by legal enactment *during the present economic crisis*. It is true that on the petition of representatives of the dairying industry of Australia the Commonwealth Government has already refused to take any such action, on the grounds, it is believed, that it could not give legal sanction to a private organisation, the main objective of which was to assist the industry by raising the price of butter to Australian consumers above London export parity. In the circumstances it seems somewhat anomalous that the Commonwealth Government should have offered as a substitute the complicated dried fruit legislation, which, in effect, would give rise to the very results that are apparently objected to in the Paterson scheme. Surely a successful scheme in being that has received the voluntary adherence of the dairying States of the Commonwealth should receive preference over an untried scheme that is not necessarily acceptable to all States alike, and particularly so when it can be said of the former that it has made no call upon the

public purse, and that it not only saved the dairying industry during seven successive years of gradually declining prices, but, in addition, rendered possible unparalleled expansion in production and in Commonwealth exports during the last three years. It can, indeed, be said that the Paterson scheme is in difficulties, not because it has failed, but because it has been too successful. If the scheme were definitely protected by Federal legislation *during the present economic crisis*, and subject to appropriate safeguards in the interests of consumers, the main difficulties could readily be dealt with; "farm" or "dairy" butter offered for sale would immediately become liable for the same levies as factory butter probably by means of a duty stamp; and the levy on all butter manufactured could be raised sufficiently to ensure to it the "effectiveness" of earlier years, which corresponded to a benefit to dairymen of about 2½d. per lb. of butterfat.

(c) *Paterson Statistical Data in South Australia*.—Data concerning levies collected on butter manufactured on the one hand and bounties paid on butter exported on the other, under the Paterson scheme in South Australia, are shown below for the seven and a half years ending on the 30th June, 1933:—

Paterson Scheme Data in South Australia.

Year.	Total Levies Collected.	Bounties Paid to South Australian Exporters.	Refunds to Suppliers.	Amounts Transferred to other States.
	£	£	£	£
1926	59,592	22,672	17,381	19,343
1927	50,283	10,678	14,613	23,000
1928	50,641	12,211	—	40,000
1929	51,286	14,144	—	33,000
1930	59,002	32,767	—	13,500
1931 (six months) . . .	27,358	13,428	—	22,000
1931-32	99,563	83,255	—	7,300
1932-33	125,636	123,711	—	2,000
Totals	523,361	312,866	31,994	160,143
Add refunds		31,994		
		344,860		
Add transfers		160,143		
Total outgoings		£505,003		

From the above it will be noted that during these seven and a half years the sum of £160,143, or over 30 per cent. of the total levies collected in South Australia, was transferred to other States. In this connection it must be pointed out that the Federal character of the Paterson scheme renders unavoidable such transfers of a proportion of the levies collected in States, such as South Australia, in which the home consumption percentage of butter produced in those States was relatively high, to States, such as Queensland, in which corresponding consumption percentages were low. In other words, although at the outset manufacturers advance the value of the Paterson scheme levies they recover the latter from the proceeds of subsequent sales, and, strictly speaking, the aggregate Commonwealth levies may be said to be paid by Commonwealth consumers for the benefit of Commonwealth dairymen; and since for the sake of convenience levies collected in any one State are, in the first instance, placed to the credit of that State it follows that some States will collect more than would be required for the payment of local export bounties—at the present moment New South Wales, South Australia, Tasmania, and (Western Australia)—whereas other States—at the present moment Queensland and Victoria—would collect less than would be required for the payment of export bounties in those States; hence, under the agreement States with surpluses transfer the latter to States with deficits.

It should be observed, however, that South Australia's exportable surplus is rapidly increasing, and with the continuance of favorable seasons there is reason to believe that this surplus will soon reach the Commonwealth mean surplus, which would imply a cessation of transfers of South Australian money to the wealthier States.

(f) *Commonwealth Paterson Statistical Data.*—Comprehensive data concerning the Commonwealth position of the Paterson scheme are shown below:—

Commonwealth Paterson Scheme.

	Total Levies Collected in Australia.	Pates of Levy.	Total Amounts of Bounties Paid to Australian Exporters.	Rates of Bounties.	Refunded to Australian Cream Suppliers.
	£	d.	£	d.	£
1926	1,451,804	1½	990,248	3	422,829
1927	1,441,054	1½	1,046,941	3	417,088
1928	1,709,276	1½	1,689,546	3, 4	—
1929	2,115,582	1½	2,119,193	4½	—
1930	3,501,673	1½	3,621,738	3½, 3, 2½	—
1931 (6 months) }					
1931-32	2,625,076	1½	2,219,067	2½, 3	—
Totals	12,844,465		11,686,733		839,917
Add refunds			839,917		
Total outgoings			12,526,650		

3. *Supplementary or Equalisation Scheme.*—The Commonwealth Paterson Scheme has not, however, been the only "scheme" that has of recent years influenced butter prices to the advantage of producers on the South Australian market; in addition, a purely South Australian scheme, known as the "Supplementary" or "Equalisation" scheme, has been functioning since September 23rd, 1929, and it is necessary to give it brief consideration.

It has already been stressed that ever since Australia entered the ranks of butter exporters the home wholesale price of butter has necessarily been determined upon a basis of London parity, and that since the value of the Paterson Export Bounty has led to a corresponding increase in the home wholesale price above London parity, to all intents and purposes the Paterson scheme cannot be said to have disturbed the dependence of local prices upon London prices. On the other hand, London prices vary from time to time, and for the convenience of trade and the avoidance of wasteful competition, it has been customary for manufacturers to determine on each Monday what shall be for the current week the home wholesale price of butter on the basis of the London parity of the day. This arbitrary fixation of a price for a definite number of days on the export parity of a single day, however useful from a local trading point of view, must obviously lead to disparity between Australian and London prices, according as the latter rose or fell during the course of the week. The effects of these disparities were, however, of little consequence in South Australia, so long as our exports of butter remained more or less negligible. But as soon as South Australian exports began to assume appreciable proportions difficulties developed. Manufacturers tended to separate out into two sections, namely, those who in the main catered for the home market on the one hand, and those who in the main were exporters, on the other; and the latter, who by the payment of levies had, in common with others, assisted to maintain local prices above London parity, claimed rightly enough that factory-door net returns from exported butter should be no less than corresponding returns from butter sold on the local market. Unfortunately, too, during these years of expanding exports, traders have been faced with progressively falling London prices, and it follows that weekly disparities between London and Adelaide have usually told against

exporters. Another difficulty of the position, of which both sections were well aware, was that the dwindling effectiveness of Paterson levies had fallen so low that it was highly doubtful that current prices paid for butterfat would suffice to maintain the rate of production upon which both sections of the trade depended. It is to difficulties such as these that the supplementary scheme may be said to have owed its genesis.

The mechanism of the scheme is substantially that of the Paterson Scheme, that is to say, levies are made on all butter manufactured, and bounties are paid on exports from the fund created and maintained by these levies. The main differences between the two schemes are:—(1) That whereas under the Paterson Scheme the rates of levies and bounties are fairly constant throughout a twelvemonth, under the supplementary scheme they vary from time to time, according to the requirements of the position; and (2) that owing to the fact that the supplementary scheme is a purely South Australian scheme, the effectiveness of its levies, and consequently its benefit to producers, is far greater than that of the Commonwealth Paterson Scheme. The rates of levies and bounties under this scheme since its initiation have been as follows:—

	Levies. d. per lb.	Bounties. d. per lb.	Benefit to Producers. d. per lb.
1929-30	$\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{1}{2}$
1930-31	$\frac{1}{4}$ to $\frac{1}{2}$	$\frac{1}{4}$ to 2	$\frac{1}{4}$ to $1\frac{1}{2}$
1931-32	$\frac{1}{4}$ to $\frac{3}{8}$	$\frac{1}{4}$ to $2\frac{3}{8}$	Nil to $1\frac{1}{2}$
1932-33	$1/16$ to 1	$\frac{1}{4}$ to $2\frac{1}{2}$	$1/16$ to $1\frac{1}{2}$

It should be added that from time to time the trade has by agreement suspended both levies and bounties under the supplementary scheme.

The mode of action of the supplementary scheme on a falling market may be illustrated by the following example:—

Let us suppose that on a given Monday the local wholesale price of butter had been fixed upon the basis of 70s. per cwt., f.o.b., i.e., 9 $\frac{1}{2}$ d. per lb., exclusive of supplementary bounty but inclusive of 28s. per cwt. Paterson Bounty. On this basis the price payable for butterfat would be 8 $\frac{1}{2}$ d. per lb.

If, now, we suppose further that on the Monday following, f.o.b. prices appeared to be in the neighborhood of 65s., exporters would claim that the local butter price should be lowered, otherwise their sales would be made at a disadvantage relatively to local sales. On the other hand, the trade generally would be averse to a reduction in the price of butterfat, which already was abnormally low. In this connection the difficulty would be overcome by providing a bounty under the supplementary scheme, which, after deduction of the levy, would leave to the exporter an additional $\frac{1}{2}$ d. per lb., and place him on a level footing with local sellers. And this accordingly has been done from time to time.

Similarly, should the market advance instead of receding, matters could be adjusted between exporters and local sellers by reducing the supplementary bounty to a corresponding degree.

But although the original objective of the supplementary scheme was to equalise matters between exporters and local sellers, it has not been without other advantages. In the first place, it should be noted that as soon as an additional export bounty is provided for, the local wholesale price responds by an equivalent increase, and the producer benefits to the extent of the difference between the new bounty on the one hand and the new levy on the other. But, apart from this aspect of the question, in the words of Mr. Harding Browne, as soon as the trade became familiar with the supplementary scheme they realised that it had many other possibilities in it. Hence, to some extent, and particularly in times of local scarcity, the supplementary scheme has been used to maintain local butter prices above those of other States. Such an action would not, of course, have been possible except for the binding agreement between all manufacturers, traders, and agents of the Commonwealth to the effect that in each State local manufacturers

should have a free field within their own territory, and that no butter should be exported to another State except at the demand and under the supervision of the local State Advisory Committee.

Further, in addition to levies on butter manufactured in the State, it has been customary to impose special levies on all butter imported into South Australia because of temporary local scarcity. Such action was found necessary because at such times local prices were usually maintained at a higher level than the prices of other States, and it became necessary to equalise matters between the two. These special levies have hitherto varied between $\frac{1}{4}$ d. and $1\frac{1}{4}$ d. per lb.

One example of the effectiveness of the supplementary scheme in this direction will be given from the evidence of Mr. A. G. Taylor. This concerns two f.o.b. sales, one of which took place on November 1st, 1932, at 100s. per cwt., and the other on March 14th, 1933, at 72s. per cwt. Transactions involved were as follows :—

	November 1st, 1932.		March 14th, 1933.	
	s. d.	s. d.	s. d.	s. d.
F.O.B. price per cwt.		100 0		72 0
Less Adelaide charges		7 0		7 0
		93 0		65 0
Plus Paterson bounty	28 0		28 0	
Supplementary bounty	2 8	30 8	30 8	58 8
		123 8		123 8
Corresponding wholesale butter price ...		1 1 $\frac{1}{4}$		1 1 $\frac{1}{4}$
Less Manufacturing charges	0 2 $\frac{1}{2}$		0 2 $\frac{1}{2}$	
Paterson levy	0 1 $\frac{3}{4}$		0 1 $\frac{3}{4}$	
Supplementary levy	0 0 $\frac{3}{4}$	0 4 $\frac{7}{16}$	0 0 $\frac{1}{16}$	0 5 $\frac{3}{16}$
		0 8 $\frac{13}{16}$		0 8 $\frac{1}{16}$
		$\times 1.18$		$\times 1.18$
		— 10 $\frac{1}{2}$ d.		— 9 $\frac{1}{2}$ d.
Butterfat price				

It will be observed that although on March 14th, 1933, the f.o.b. price was as low as 72s., it was possible, by means of a supplementary export bounty of 30s. 8d. per cwt., to maintain the local wholesale price of butter at the same level as on November 1st, 1932, namely, 1s. $1\frac{1}{4}$ d. per lb., at a time when the f.o.b. value was as high as 100s. per cwt. The price paid for butterfat, however, had to fall from $10\frac{1}{2}$ d. to $9\frac{1}{2}$ d., owing to the relatively high level of 15/16d. per lb. Had it not been for the supplementary bounty the price payable for butterfat on the 1st March, 1933, would have been $6\frac{3}{4}$ d. per lb. instead of $9\frac{1}{2}$ d.

Those responsible for inaugurating and successfully working the supplementary scheme are to be congratulated upon their efforts, and in view of the apparently precarious position of the Commonwealth Paterson Scheme, your Commissioners desire to stress the fact that should the latter eventually close down, South Australia has, in the supplementary scheme, adequate machinery for a purely State organisation, which, under present guidance and management, could effectively replace the Paterson Scheme, provided that South Australia could continue to be protected against an inflow of outside butter. In such circumstances your Commissioners would respectfully commend the supplementary scheme for Government assistance and protection until such time as the price of butter should reach more normal levels.

4. "Farm" or "Dairy" Butter.—In the present report occasional reference has already been made to the supposed injurious influence of "farm" or "dairy" butter upon the Paterson Scheme. It is necessary, therefore, to examine this question in close detail.

In the tabulated statement that follows the relationship of dairy butter to total production in each of the States concerned has been shown for a period of six years ending on June 30th, 1932.

Seasons.	New South Wales.			Victoria.			Queensland.			South Australia.			Tasmania.			Total of the Five States.		
	Quantities Made.	Percentage of Total Production.	Quantities Made.	Quantities Made.	Percentage of Total Production.	Quantities Made.	Quantities Made.	Percentage of Total Production.	Quantities Made.	Quantities Made.	Percentage of Total Production.	Quantities Made.	Quantities Made.	Percentage of Total Production.	Quantities Made.	Quantities Made.	Percentage of Total Production.	
	Cwts.	%	Cwts.	Cwts.	%	Cwts.	Cwts.	%	Cwts.	Cwts.	%	Cwts.	Cwts.	%	Cwts.	Cwts.	%	
926-27	42,891	5.01	34,708	20,962	4.57	31,778	26.53	29.24	15,747	146,086	6.58							
927-28	43,647	4.85	32,074	22,989	3.57	30,307	27.97	31.61	18,387	147,404	5.99							
928-29	40,274	4.73	30,933	23,734	3.45	28,204	27.92	27.19	17,952	141,097	5.55							
929-30	37,572	4.04	30,980	24,044	3.42	27,974	29.04	24.14	18,294	138,864	5.31							
930-31	43,837	4.34	33,581	25,210	2.95	29,156	25.19	22.97	20,108	154,892	4.98							
931-32	48,209	4.36	37,054	26,449	3.02	34,235	21.71	25.86	21,848	167,795	4.93							

From the above data the following points should be noted:—

(i.) In the matter of "farm" butter the five Paterson Scheme States separate into two sections, namely:—

(a) The larger butter-producing States—New South Wales, Victoria, and Queensland—in which during the six seasons under consideration the percentage of "farm" butter made has varied from 3 per cent. to 5 per cent. of total butter produced in any one season; and

(b) The smaller butter-producing States—South Australia and Tasmania—in which over the same period the percentage of "farm" butter made has varied from 21 per cent. to 31 per cent. of total production.

(ii.) But owing to the vast total quantities of butter produced in the three larger States, namely, on the average, 2,528,294cwts. per annum, relatively to corresponding production in the two smaller States, namely, on the average, 187,470cwts. per annum only, the high percentage of "farm" butter made in the latter has not affected the mean percentage of the five States very appreciably. The latter percentage varied from 5 per cent. to 6½ per cent. only.

(iii.) It is true that the quantities of "farm" butter made in all States have shown a tendency to increase during the six seasons under consideration, but particularly so in 1930-31 and 1931-32, and it is stated in the trade that when the figures become available the increases will be found to be more striking in 1932-33. But, on the other hand, these increases in "farm" butter have not kept pace with total production increases, and the percentages have accordingly declined.

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From the above we may conclude that the high proportion of "farm" butter made in South Australia and Tasmania has not injured the Paterson Scheme to the extent that it has usually been assumed to have done. It must be remembered that there always has been, and always will be, a limited but perfectly legitimate demand for well-made "farm" butter; and that levies on sales of this type of butter could not be expected until such time as the Paterson Scheme received Commonwealth legal sanction. Similarly, in South Australia, and probably in all the States, many farmers in outlying districts are unable to market their cream to advantage except as farm butter, which, again, will escape Paterson levies. During the six seasons under consideration the mean percentage of farm butter in the five States was 5.48 per cent., but for the three large producing States 3.95 per cent. only; we may assume, therefore, that 4 per cent. of total butter as farm butter would make ample provision for legitimate escapees from Paterson levies; and 1.48 per cent. of total production would, therefore, represent the extent of the damage done to the Paterson Scheme by some dairymen in South Australia and Tasmania. The monetary value of this damage can be assessed as follows:—1.48 per cent. of total butter production of the five States in the six seasons had a mean value of 40,290 cwt. of butter per annum, on which a sum of £32,904 per annum in levies would have been lost to the Paterson Scheme. On the other hand, had these levies been collected and distributed in the form of export bounties their influence on mean exports of 1,357,882 cwt. per annum would not have exceeded 5d. per cwt., that is to say, an amount which could not have had even fractional influence on the local price of butterfat per lb., and the latter, after all, was the main objective of the Paterson Scheme.

But, although the relative insignificance of their dairy production obviously absolved South Australia and Tasmania from the accusation of having done appreciable damage to the Paterson Scheme, it was surely not to the credit of the dairymen of these two States that at a time when brother dairymen in other States were straining every nerve to raise the local price of butter above its calamitous London parity equivalent, 20 per cent. to 30 per cent. of the former should not have hesitated to take full advantage of the results secured, whilst they did not contribute a penny piece towards the latter. The matter might, perhaps, have been overlooked had the butter made been commercially possible; the great bulk of it, however, is usually saturated with butter milk, badly worked, of doubtful soundness, and manufactured and handled under unhygienic conditions. Most country storekeepers think themselves obliged to accept farm butter, in common with eggs, in payment for their own goods; they sell what they can locally, and finally dispose of the remnant for whatever it will fetch to the factories, in which it will be deodorised and reprocessed, and subsequently disposed of as a low-grade butter.

In the above connection your Commissioners wish to stress the fact that in the interests of public health stringent regulations are enforced relative to the handling and manufacture of butter in factories, and relative to the ultimate composition of that butter; and, in view of the fact that 20 per cent. to 30 per cent. of the butter produced in the State is now usually badly-made farm butter, they recommend that, for the protection of public health, the premises of all farms upon which butter is made for sale or exchange shall be subject to similar measures of inspection and similar regulations, including those prescribing the recognised standards for saleable butter.

Attention is also drawn to the fact that on the 3rd day of July last a special resolution was adopted by South Australian butter factories to the effect that from that date they undertook that they would no longer reprocess farm butter; and this may be accounted as the first shot in the campaign against unwanted farm butter. It may be of interest to note in this connection that during the 12 months ending on the 30th June, 1933, about 3,678 cwt. of farm butter was reprocessed in South Australian butter factories.

5. *Critique of Cream Payments.*—(i.) *Usual Complaints of Suppliers.*—The grave suspicions to which these transactions have given rise in the minds of suppliers have already been hinted at earlier in this report; and, as in such matters, it is usually the unknown or the nebulously perceived which is generally responsible for these regrettable misunderstandings, it seems worth while to explore the position from every possible angle, and, from an entirely impartial outlook, state the facts in the frankest manner possible. If this be well done, it is hoped that, if not all grounds for suspicion, at all events the grosser amongst them may be dispelled for all time.

A very common complaint is to the effect that the cream supplier's wife was able to make from a can of cream more commercial butter than should have been possible on the basis of the number of pounds of butterfat paid for by a factory manager from a corresponding can of cream; and to cap the position, the cream supplier's wife had been able to realise more money than the factory manager was willing to pay. This, of course, is the genesis of farm butter.

Unfortunately, we have here one of those problems that involve the difficulties of proving a negative. Moreover, the facts as stated by the cream supplier might be substantially correct without, however, involving any moral delinquency on the part of the factory manager or of his employees. Nevertheless, it must be stressed that in most cases of this character the cream supplier and his wife are not necessarily the best possible judges of what constituted two absolutely even cans of cream; and particularly not if the attempt were made to divide into two equal parts a specially thick can of cream. But in a general way it may be admitted that the farmer's wife will make more butter from a given quantity of butterfat than she is legally entitled to do. Her butter will generally be insufficiently worked; it will contain too much butter milk, and therefore more moisture than the law allows, and her hand might be on the heavy side when salting the butter.

On the other hand, it is readily understandable that the farmer's wife should be able to command a higher price for butter—the finished product—than the factory manager could afford to pay for butterfat—the raw material. But to clamor for similarity of payment would be as reasonable as the claim of a wheat farmer to be paid for wheat on the same basis as bread.

Another common complaint is to the effect that when dissatisfied cream suppliers take their cream to another factory they can usually depend upon improved money returns for a few weeks; but that thereafter returns fall back to the old level. In this connection the sinister inference is usually drawn that the old clients of the factory are made to pay for the welcome given to the new clients; in other words, the robbing of Peter to pay Paul.

The preliminary overpayment of new clients is too common and well-established a fact to be denied; indeed, as will be shown in the sequel, it is one of the natural consequences of deliberate suppression of price competition; but, as between factory and cream supplier, it is no more immoral or commercially undesirable than the well-known practice of some shopkeepers of throwing in with every purchase some unconsidered trifle, with a view to increase in business. The main objection, if any, is that it tends to deceive the supplier as to the true value of his cream, and eventually to confirm his opinion that in the matter of honesty there is not much to choose between factory managers.

But whilst in certain circumstances slight preliminary overpayment might be commercially defensible, those who imagine that it cannot be done except at the expense of other unsuspecting clients can have but the haziest notion of commercial transactions; nor can they realise the perilous position of the factory proprietor who deliberately instructed his employees to tamper with payments to old clients in order to provide a bonus for new ones.

Similar in character are the complaints that (a) cream is graded below value; (b) butterfat tests are systematically inaccurate; (c) net cream weights are in correct; (d) butterfat prices do not correspond to overseas parity, or even to local retail prices, &c. In effect, cream suppliers appear to believe that every possible advantage is taken of them in order to withhold portion of the money that is their due. And, ludicrous though most of these complaints are, it cannot be denied that by ill-considered actions in the past manufacturers themselves have been largely responsible for the atmosphere of suspicion from which these complaints have materialised. Very briefly, they may be dealt with as follows:—

(a) It is against the probabilities of the case that cream should have been graded below its value, except possibly in error. A far more general occurrence is the grading of cream above its value, due to the manufacturer's fear of losing clients. This is one of the factors behind the relatively low quality of South Australian butter. How manufacturers appear able to pay the same price for choicest and second grade cream will be discussed later on; obviously it is one of those factors that help to confirm the suspicion of suspicious minds.

(b) All factories employ certificated testers, whose certificates would be cancelled should they be detected in entering wrong tests. It is absurd to suppose that testers would risk their means of livelihood by deliberately reducing tests, or that their employers would risk their trade reputations by asking them to do so. At the special request of manufacturers, the Department of Agriculture is now preparing special regulations, which stipulate that numbered samples of all cream tested in any one day shall be kept back for 24 hours after the day of testing. Hence, any inspector coming into a factory will be in a position to check all tests of the immediately preceding day. Provision is also being made that payment to cream suppliers shall be strictly based upon the sheets of the cream tests.

(c) In the matter of irregular net cream weights, suppliers are usually in a position to do their own checking.

(d) The relationship of butter fat prices to London butter prices has already been dealt with in detail earlier in this report. As to local retail prices it can be said that a charge of 3d. per lb. is usually made by manufacturers for costs of delivery and putting the butter into prints, and that the retailer usually claims for expenses and profits 2d. per lb. above factory print prices. Cut prices, which are common in the retail trade, frequently tend to confuse the issues.

(ii.) *The Position of the Factories.*—The position of the factories in the matter is admittedly difficult, their opening offence is that in this State they are for the most part proprietary concerns, and as such suspect to cream suppliers whom it is their natural aim in life to conciliate: the majority of these factories has spared no expense to render itself technically efficient, in the matter of premises, equipment, and personnel, all are acutely aware that their very existence, let alone profits, is apart from efficiency, dependent upon continuously adequate turnover, and that this turnover is at the mercy of an independent army of cream suppliers, who delivers it up in weekly or bi-weekly dribblets of varying degrees of quality. The main function of the factory is therefore to attract to it as much cream as it can possibly handle and adequately market. Was it conceivable therefore that these factories whose existence was dependent upon continuity of supply should of set purpose tamper with the meagre weekly payments to those whom it was their ambition to retain indefinitely on their pay rolls? And yet such appears to be the general impression among cream suppliers, and the only consolation in the matter that the factories may take to themselves is that this impression embraces them, one and all, to an equal degree, and that after all factories are quite as essential to the wellbeing of cream suppliers, as the latter are essential to the wellbeing of factories.

Examples are not wanting to show that the factories have fully realised that ability to balance their ledgers was more or less related to ability in their clients to continue in active occupation of their holdings, but unfortunately, any overt act on their part in this direction has always been open to misconception. The factories, for instance, appreciated to the full the disastrous influence of declining world prices on the future prospects of their clients, and entered zealously into the Paterson scheme, and provided the not inconsiderable sums from which the export bounties were paid, but when in the course of time they made it known that before passing on the advantage of the export bounty to the producer, they were compelled to deduct therefrom the value of the levies, which they themselves had provided, they were immediately accused of keeping back from the producer something to which they had no legal right.

The pertinacity of factories in paying choicest price for inferior cream is but another example of the value which they place on the goodwill of the least desirable of their customers.

The fleets of motor trucks which scour country roads and by-ways, and which for a song, and at times for nothing, pick up partially filled cans of cream from the farm gate post, are supposed to be rendering a service to suppliers of cream, and yet they are viewed with the gravest suspicion by the latter. These costly conveyances, say these ungrateful clients, are run from unearned profits wrung out of the unfortunate cream suppliers. As a matter of fact, each motor truck is a marauding unit, with entirely benevolent intentions towards cream suppliers, but intent upon snatching disgruntled suppliers from rival factories. But since all factories follow the same line of policy, costs involved are pure waste of money, and as such cream suppliers, for once, have legitimate grounds of complaints.

This leads us to the point that many of the actions of the factories would appear to lend color to the popular view that more money was made from butter-making than was always apparent from a study of balance-sheets, hence the necessity of giving close consideration to this point.

(iii.) *Factory Revenues and Costs.*—There is a popular misconception among dairymen to the effect that factory manufacturing charges should have been reduced proportionally to the fall in prices of butter and butterfat, it has even been suggested that economies on lines of the Premiers' Plan should have been applied to the industry. It is overlooked, however, that the economic position of a large industrial undertaking is very different from that of a rural undertaking owned and managed by a farmer-proprietor. Such an undertaking, whether owned co-operatively or a proprietary concern, is in effect a national undertaking outweighing in national importance and service many hundreds of cream suppliers. It has been built up at great cost for the special purpose, in this instance, of providing adequate marketing facilities for the dairying industry of the State. The bulk of the capital invested in an undertaking of this kind is usually represented by borrowed money, or share capital in one form or another, and interest on this money must be found whether the price of butter be high or low. Similarly, the payment of a competent technical staff, provision for general working expenses, the accumulation of reserves towards replacement of wasting assets, and such improvements as changing conditions render necessary, must all be met each year, and cannot be accommodated to the rise or fall of the prices of raw material. Moreover, market risks are all the greater in periods of depression and falling markets, and in such times the only sane attitude for those in control of large industrial undertakings should, both in their own interests and those of the community, be towards maintaining them intact for better use in better times, nor can this be done by under-charging for services rendered. Hence, what we have to consider in the above connection is not so much as to

whether recent factory manufacturing charges can be considered reasonable in relation to current butter and butterfat prices, but rather whether profits disclosed in balance-sheets have been unreasonably large or not.

Balance-sheets of the transactions of several of these proprietary companies have been examined, and, as far as could be ascertained, the profits of recent years have not been excessive. But, unfortunately, these companies are not as a rule exclusively butter manufacturers—they may be produce merchants, general merchants, &c., as well—and whereas the individual position of these companies will no doubt be accurately reflected in their respective yearly balance-sheets, it is rarely possible to segregate costs and transactions that concern butter to the exclusion of other activities of the companies. This aspect of the matter acquires added importance when “costing” inquiries become necessary. Thus a factory proprietor assured the Commission that if the costly practice of picking up farmers’ cream by means of motor vehicles were abandoned by mutual agreement, or prohibited by law, it would then be possible to raise the price of butterfat by at least $\frac{1}{2}$ d. per lb.; in other words, that in his opinion, the present so-called “manufacturing costs” of 2 $\frac{1}{2}$ d. per lb. were at least $\frac{1}{2}$ d. too high, due to unwarranted competitive service to the farmer, who was well able to do the work himself. Unfortunately, in a matter such as this, the Commission is not in a position to decide whether even 2d. per lb. was a fair estimate of costs of manufacture, because neither records nor accounts have been kept in such a manner as to render accurate “costing” possible. Hence, since some measure of supervision in this direction seems unavoidable, if only with a view to allaying unwarranted suspicion, your Commissioners recommend that the accounts of each butter factory be kept in such a manner that the following information is separately recorded:—

- (1) The expenditure involved in the delivery of cream and/or butter and/or milk at the factory door.
- (2) The charges made to cream suppliers and others to recoup the expenditure thus incurred.
- (3) The expenditure involved in manufacture, buying, and selling of cream, milk, and butter.
- (4) Expenditure incurred in the delivery of butter to buyers, stores, &c., for local sale.
- (5) Expenditure incurred in consignment and delivery of butter for sale abroad.

(iv.) *Prices Paid for Butterfat.*—The manner in which local wholesale prices of butter are connected up with London butter prices has already been shown in detail; similarly, the relationship of butterfat prices to the above prices has also been stated, but not critically examined.

It should be stated here that these prices—wholesale butter price and butterfat price—are determined weekly at a special meeting of manufacturers, and until comparatively recently these prices have been based upon f.o.b. or c.i.f. & c. quotations known at the time to those attending the meeting. Early in the present year, however, a tendency appeared in some quarters to sell Australian butter in London on forward f.o.b. quotations; eventually the Australian Export Control Board came to the conclusion that transactions of this kind had a dangerously demoralising influence on a persistently falling market, and prohibited future overseas sales of Australian butter at prices below f.o.b. or c.i.f. & c. limits to be supplied weekly to all States by the Board. In this connection South Australia has been allowed the doubtful privilege of selling butter 2s. below the limit of the Export Control Board, presumably in recognition of the lower average quality of our butter.

In the discussion that follows it will be simpler to consider butterfat prices in relation to f.o.b. quotations. Two examples of this relationship are given below, namely, one for the week commencing August 14th, 1933, and the other for the week commencing September 17th, 1933:—

	Week Commencing August, 14th, 1933.		Week Commencing September 17th, 1933.	
	Per Cwt. s. d.	Per Lb. d.	Per Cwt. s. d.	Per Lb. d.
F.O.B. price	96 6	10.34	105 0	11.25
Less local export costs . .	7 0	0.75	7 0	0.75
	89 6	9.59	98 0	10.50
Plus Paterson bounty . . .	28 0	3.00	28 0	3.00
Plus supplementary bounty	15 6	1.66	11 8	1.25
Adelaide wholesale price .	133 0	14.25	137 8	14.75
Less manufacturer's charges	23 4	2.50	23 4	2.50
	109 8	11.75	114 4	12.25
Less Paterson levy	16 4	1.75	16 4	1.75
	93 4	10.00	98 0	10.50
Less supplementary levy . .	7 7	0.81	8 9	0.94
Multiply by 1.18	85 9	9.19	89 3	9.56
Butterfat price	101 2½	10.84	105 3¼	11.28

Before opening a general discussion on the above statement the atmosphere of suspicion that surrounds all dairy questions renders it advisable to repeat here that in this statement the levies deducted from the wholesale price of butter represented moneys especially advanced by manufacturers for the purpose of lifting the local price of butter above export parity; hence, it follows that dairymen cannot be credited with the full value of the increase above parity, which corresponded to the value of the export bounties, but only with the difference between bounties and levies respectively. It is worth noting, too, that had there been no Paterson and supplementary schemes in operation the butterfat price in the week beginning August 14th, 1933, would have been 8½d. per lb. only instead of 10¾d., and in the week beginning September 17th, 1933, 9½d. per lb. instead of 11½d.

If levies and export bounties be omitted from consideration, the determination of the weekly price of butterfat becomes comparatively easy. To this end costs incurred between the factory and the ship, say, ¾d. per lb., are first deducted from the f.o.b. price of butter; a corresponding deduction is then made for the so-called costs of manufacture, say, 2½d. per lb.; finally the remnant of these two deductions should be multiplied by 1.18, and the result would be the butterfat prices for the week.

Before examining in detail the chief items that enter into these calculations, it is necessary to stress the fact that the main purpose behind these calculations runs counter to a very important economic factor, namely, trade competition, which in effect it attempts to suppress by fixing the maximum price that shall be paid for butterfat in any one week. It is true that these prices may, and frequently do, vary from week to week, but in each week they are determined on the same rigid lines, which admit of no price competition between manufacturers. Hence we appear to have here an example of price fixation by individuals interested in one side only of the bargain, and since there must obviously be varying degrees of business and technical efficiency among manufacturers forming party to this price fixation agreement, it follows that a price that leaves a normal profit

to the least efficient must in certain circumstances leave an abnormal one to the most efficient. And in the meanwhile the less efficient are protected by the fixed price, and the cream supplier and the community as a whole lose the advantages of keen competition among efficient trade rivals.

But if price fixation has succeeded in stifling the healthiest and most effective form of trade competition, namely, price competition, it cannot be said to have displaced competition altogether; it has merely driven the latter underground. It can indeed be said that it is to the artificial fixing of the price of butterfat that we owe, indirectly if not directly, such measures as the ingratiating motor service between factory and farm, deceptive initial over-payments of disgruntled suppliers of rival factories, deliberate overgrading of inferior cream, refusal to distinguish in the matter of payments between good and bad cream, the tendency to pay for cream on a flat rate, whether delivered at the seaboard or at inland centres; in fact, all those measures by means of which it was hoped to gain favor with suppliers and trade advantages over rivals. But, unfortunately, all such actions have been perversely misconstrued by suppliers, who "feared the Greeks even when they came with gifts in their hands"; and hence, both directly and indirectly, the regrettable atmosphere of suspicion and distrust in which the industry has been immersed of late years can be traced back to injudicious price fixation of butterfat and the suppression of price competition.

It is the opinion of your Commissioners that price fixation is one of those measures which should be availed of only when none other appears to be available—they have recommended it in corresponding circumstances elsewhere in this report—but even then it is apt to work against the best interests of the community if left in the hands of interested parties. In the instance under consideration your Commissioners believe that price fixation is justifiable in the matter of the wholesale price of butter, because no other adequate means of adjusting the conflicting interests of exporters and home suppliers is apparent. Moreover, the fact that the price eventually determined upon is inevitably the result of a compromise between divergent interests is sufficient guarantee that the community as a whole is not likely to suffer thereby. There does not, however, appear to be a sufficient reason why the price of butterfat should be fixed. If the market were free, as it undoubtedly should be in the interests of producers, the same calculations to arrive at its price would no doubt be made, but not necessarily with the same results. The more efficient among the manufacturers would come to realise that the underground work of the past was no longer good business; and that the relative magnitude of their turnover would depend exclusively upon their ability to outbid their rivals in prices offered for butterfat. And eventually the 2½d. per lb. which under present conditions is claimed and secured by all and sundry for so-called manufacturing costs would gradually recede until it reached its true mean commercial value under efficient methods of management. On the other hand, the outlook of the less efficient would not necessarily be hopeless. They would probably find in keen price competition the necessary stimulus to improved technique, which eventually should enable them to compete on level terms with their more advanced rivals. The producers' gain in the matter should be appreciable increase in the price of butterfat under corresponding conditions, provided that the market could be kept open and free.

In the meanwhile, however, and in the absence of a free market for butterfat, it becomes necessary to examine closely the fairness of the formula upon which the price of butterfat has hitherto been fixed. At this stage it is convenient to reply to the introductory portion of Appendix VI., in which Mr. Harding Browne sets out very clearly manufacturers' objections to "making public their commercial calculations." In summary they claim that these calculations are intricate and liable to vary from day to day, and therefore open to misinterpretation by the uninitiated. They seem to claim, too, that no more than any other body of merchants should

they be compelled to reveal in detail the calculations upon which they base the price of their raw material. In the opinion of your Commissioners arguments such as these are perfectly sound and legitimate, provided that the market of the raw material were free and subject to price competition; but when this is notoriously not the case, not only cream suppliers, but the community as a whole, has a right to know exactly what takes place when such prices are fixed, and it must be acknowledged that manufacturers have not hesitated to lay all their cards on the table in so far as this question is concerned.

(a) *Local Costs Between Factory and Ship.*—These local costs represent the first item to be deducted from the f.o.b. price, and one usually estimated at 7s. per cwt., or 3d. per lb. The details vary slightly from firm to firm, and from time to time, but the following may be accepted as representative of present-day conditions (September, 1933):—

	Per Cwt.
	s. d.
Two export cases at 1s. 6½d.	3 1½
Export levy, 1/30d. per lb.	0 3½
Grading, carting, and wharfage	2 6
Brokerage	0 11½
	6 11

In some statements on this subject supplied to the Commission, freight from country stations had been included. Such a charge does not appear to be a legitimate debit against export charges; it should, in fact, have been recovered in reduced price for butterfat by inland factories.

(b) *"Manufacturing Costs."*—The above term is stated in Appendix VI. to be a misnomer; and well it might be, and yet it must have been coined by the manufacturers themselves. Actually this charge, which has been standardised at 2½d. per lb., includes cost of manufacture, market risks, and the manufacturer's profit. In addition, manufacturers make a charge of ¾d. per lb., or 7s. per cwt., for putting the butter into 1lb. prints, and delivering it to the retailers, that is to say, exactly as much as it costs to put butter aboard at the Outer Harbor. If the manufacturers agreed amongst themselves to call for a contractor to deliver their butter, and sold it only on order, instead of hawking it around from place to place, considerable economies could be made in distribution, which could be passed back to the producer. It is not possible at present to criticise these manufacturing charges to any practical effect, nor will it be possible to do so until records and accounts are kept in such a fashion as to render this feasible.

(c) *Conversion of Price of Commercial Butter into Price of Butterfat.*—This conversion is effected by multiplying the price of commercial butter by 1.18 on the assumption that 100lbs. of butterfat should make 118lbs. of commercial butter. The figure almost universally recognised in Victoria is, however, 120lbs. of commercial butter, and whatever may have been conditions in the past, a recent investigation undertaken at the request of your Commissioners, showed that under improved manufacturing conditions 120lbs. held good for South Australia as well. The facts are as follows:—

1. The returns from 23 factories in the 12 months ending on December 31st, 1932, were carefully examined with the following results:—

2. The total quantity of butterfat paid for by these factories was 13,591,089lbs. (121,349cwt.), and the total amount of butter made, 16,348,518lbs. (145,969cwt.). These figures give a mean over-run of 20.28, that is to say, 100lbs. of butterfat has given 120½lbs. of butter.

3. Since in the above connection the price of butterfat was based on the assumption that 100lbs. of butterfat would make 118lbs. of commercial butter only, whereas in actual practice it made 120½lbs., it can reasonably be stated that cream suppliers were short-paid to that extent, excluding extra services, over-rating, &c.

4. During this 12-month period—1932—the mean price paid for butterfat was 10.9d. per lb. Had the price been calculated upon the basis of 100lbs. of butterfat for 120lbs. of commercial butter instead of 118lbs. only, the mean price paid would have been 11.08d. per lb., that is to say, a difference of 0.18d. per lb.

5. On the 13,591,089lbs. of butterfat purchased by these 23 factories in 1932, short payment of 0.18d. per lb. would have been equivalent to an aggregate sum of £10,465, or a mean of £455 per factory per annum. On the other hand, on the basis of a mean individual supply of 10galls. of 45 per cent. cream per week, this sum distributed among 5,800 cream suppliers would represent less than £2 per supplier per annum.

Notwithstanding the relative unimportance of the sums involved, your Commissioners are of the opinion that so long as there is an understanding among buyers that no more shall be paid for butterfat than a fixed price based upon a rigid formula, it is essential that such formula should, as much as possible, correspond to reality, or in other words, that it should give the supplier full advantage of all the commercial butter that could be made from his butterfat by an efficient factory. It is generally recognised in Victoria that 120lbs. of butter from 100lbs. of butterfat was the normal anticipation of any efficient factory, and this anticipation has now been shown to have applied to South Australian factories in 1932, hence, your Commissioners recommend that until such time as there is a definitely free market for butterfat in South Australia, calculations used for fixing commercially the price of butterfat shall be legally based upon the principle that the cream supplier shall be entitled to a price which takes into account all the commercial butter that can be manufactured from his butterfat by a competently equipped and managed butter factory; and that provisionally the legal ratio shall be not less than 120lbs. of commercial butter from 100lbs. of butterfat sold.

It is obvious that to some extent the amount of butter made will depend upon the effectiveness of the factory methods in use, to some extent, too, the relationship of total butter made to total butterfat purchased will be a check on the general accuracy of the cream tests. But because some factories may be more or less inefficient is no sound reason why cream suppliers should be penalised for the inefficiency of manufacturers, in other words, if we are to have a fixed flat price for butterfat this price must be based upon the capacity of the efficient and not of the inefficient.

The relative positions of the 23 factories examined in 1932 are shown below:—

Number of Factories.	Lbs. of Commercial Butter made from 100lbs. of Butterfat.	
	Range. lbs.	Mean. lbs.
2	122.2 to 122.3	122.25
7	121.1 to 121.9	121.54
5	120.0 to 120.8	120.56
3	119.1 to 119.9	119.42
4	118.5 to 118.8	118.67
1	117.8	117.80
1	116.2	116.20
23	116.2 to 122.3	120.25

It will be observed that of these 23 factories nine did not come up to the standard of 120lbs. of butter to 100lbs. of butterfat; on the other hand, 13 of them showed more than 120lbs., all that can be said in the matter is that the less efficient must improve their methods.

6. *Payment of Cream on the Basis of Butterfat or that of Commercial Butter.*—

It is frequently argued that if cream were purchased by manufacturers on the basis of commercial butter, as is the case in New South Wales and Queensland, instead of on the basis of butterfat, as is the case over the rest of the world, the South

Australian cream supplier would stand to gain thereby. It is nevertheless exceedingly difficult to believe that such would necessarily be the case since given adequate supervision in either case, theoretically the results should be identical, and on a free market for butterfat they would be so in actual practice. It is somewhat significant that the Chief Dairy Instructor, Mr. H. B. Barlow—whose report on the subject is attached herewith as Appendix VII.—himself an advocate of commercial butter, should summarise the position as follows:—"When all is said the chief advantage of the Commercial Butter system is the ease with which it can be checked."

Payment on a butterfat basis is certainly the more logical of the two, the manufacturer buys butterfat, and not commercial butter. If he were compelled by law to pay for butterfat on the basis of commercial butter, then to all intents and purposes he would be acting as the manufacturing and selling agent of the cream suppliers, and corresponding charges would be deducted from all payments made. In the absence of the check of a free market, would it be easier to check the fairness of charges made under the Commercial Butter Plan than to correlate butterfat purchased with butter sold under the Butterfat Plan? Of the two, the latter task would probably be the easier. Moreover, intricate questions as to the legal ownership of the butter might arise until sales had been definitely effected.

In the circumstances, your Commissioners do not recommend any alteration to the current South Australian practice, namely, payment of cream on a butterfat basis.

7. *Relative Inferiority of South Australian Butter.*—It is generally admitted that the average South Australian butter is usually of lower quality than that made in New South Wales or Victoria, and that this relative inferiority is commonly reflected in reduced overseas prices. This statement must not, however, be taken for a sweeping condemnation of all butter manufactured in South Australia, some of which is indeed of excellent quality, particularly over the cooler portions of the year. But the statement is intended to give expression to the average commercial quality, which necessarily reacts upon the average overseas parity of South Australian butterfat, when divested of current export bounties.

Although, no doubt, it can be said that there are several minor factors that contribute to this relative lack of quality in our butter, the chief factor of all is unquestionably the absence in South Australia of large compact areas of typical dairying country, and all the natural consequences that derive therefrom. Incidentally, it can be stated here that the complete reclamation of the South-East and the gradual building up of its pastures must eventually make good this present national disability. At the present moment at all events, our cream comes for the most part from isolated mixed farms rather than from dairy farms, and frequently from wheat farms, upon which milk and cream are but unimportant sidelines. Hence deficiency in quality in butter is primarily traceable to the unsatisfactory conditions under which the raw material or cream is produced and handled.

Apart from probable incompetency among many producers, the main difficulty is insufficiency of daily herd production of cream coupled with the damaging influence of the relatively high temperatures to which the cream is usually exposed, and the long distances which the latter must usually cover before reaching the factory door. If on the average it should take a week to fill a can of cream, the latter would not as a rule leave the farm more than once a week, and unfortunately in the interim it would be exposed in summer to excessive air temperatures, and later on in conveyances, or at railway stations to still more damaging sun temperatures. Hence, it follows that in the summer months of the year there is very little cream that reaches South Australian factories that is not more or less inferior in quality, and unfortunately for the most part manufacturers in the interests of their turnover, have not hesitated in the past to grade cream of this character as

choicest, and even when forced by Departmental regulations to grade the cream at its true grade, to make no distinction between the price paid for choicest and that paid for inferior grades of cream. Obviously, tactics of this kind do not make for improvement in the quality of South Australian cream, and consequently in the quality of South Australian butter, and consequently again in the price paid for South Australian butterfat.

Quite recently a deputation of manufacturers waited upon the Director of Agriculture and asked that regulations under the Dairy Industry Act should be so framed as to compel cream payments in strict accord with the testers' sheets, and presumably of the graders' sheets, too. If this were done it would imply enforcement of differential payments for creams of varying grades, and if such enforcement were found to be incompatible with the provisions of the present Act, your Commissioners recommend its amendment towards such end.

It is their firm belief that accurate grading of cream, and differential payments for the same, are of material interest to the dairying industry as a whole, but particularly so to cream suppliers. The first result would be improvement in the average quality of cream in response to the stimulus of differential payments, this would lead to improvement in the average quality of our butter, to be followed eventually by overseas recognition and improvement in overseas parity, which would then render possible improvement in average butterfat prices. All such processes, however, are necessarily slow, and will involve initial disappointment unless taken in hand by firm but sympathetic educational guidance. The Department of Agriculture has at the present time a limited staff of dairy instructors, five in all, scattered over an immense area of country, it would not be practicable, nor is it suggested, that every cream supplier should be under the direct supervision of a dairy officer. But it is believed to be practicable, and indeed essential to real progress in the dairying industry of the State, that the country dairy officers should be in intimate contact with all factories and cream depots in their districts, and if the number of these officers is insufficient for the purpose then it should be increased accordingly. These officers should take every opportunity to inspect the cream as it is received at the factory door, and check the grading, it should be rendered obligatory upon all managers of factories and cream depots to supply district dairy instructors with a weekly list of the names and addresses of all cream suppliers whose cream had been graded during the course of the week below first grade, with such comments as the managers might think fit. A copy of each such statement should be forwarded to the Chief Dairy Instructor for noting and filing. It should then be the normal duty of the dairy officers to pay early visits of inspection to all those who had been supplying inferior cream, to inquire into the causes of the trouble, and suggest suitable means for the overcoming of them. In all such matters the Chief Dairy Instructor should be kept advised of the general position and of any results that might follow.

But should the cream supplier prove recalcitrant and refuse to act upon the dairy officer's advice, the latter is in the unenviable position of having no alternative but to recommend cancellation of the farmer's licence, a request which the Minister might refuse. This position has arisen very largely because of the refusal of Parliament to sanction regulations dealing with the handling of dairy products on the farm. It is the firm belief of your Commissioners that it is in the best interests of neither the dairy industry nor the community that the premises on which milk and milk products are handled should escape periodic inspection, and compliance with modern requirements of hygiene and sanitation. In the circumstances they respectfully recommend that adequate regulations under the Dairy Industry Act be re-submitted to Parliament, in the belief that a very strong case can be made for their acceptance.

C. SUMMARISED CONCLUSIONS AND RECOMMENDATIONS AS TO BUTTER.

After a careful consideration of the whole position, your Commissioners are satisfied that the main cause of the low butterfat prices of recent years is the progressive decline in London butter prices since January, 1929. They recognise, too, that these prices have been maintained appreciably above export parity by the functioning of the Paterson Scheme, a private Commonwealth concern which appears to have been admirably managed. It is based upon the principle of export bounties, paid from aggregate levies upon all butter manufactured in the Commonwealth, apart from Western Australia. With the increase in Commonwealth exports the aggregate levies have gradually been declining in value relative to the bounties they are meant to finance, and the scheme is now said to be in danger of extinction. Hence your Commissioners recommend—

Recommendation 21.—That in the event of the sudden closure of the Paterson Scheme, without adequate substitute, that the South Australian Government should offer no opposition to the expansion of the "Supplementary" South Australian Scheme.

The amount of farm butter made in South Australia varies from 20 per cent. to 30 per cent. of total production, all of which has escaped levies under the Paterson and Supplementary Schemes; and whilst the amount produced has been too small to affect the Commonwealth Scheme, it would certainly work to the disadvantage of a purely local scheme. And as the bulk of this butter is of very low grade and handled under defective conditions, it is recommended—

Recommendation 22.—That all farms manufacturing butter for sale or for barter shall be licensed and subject to regulations providing that the butter shall conform to the standards of the Food and Drugs Act, and that methods of manufacture and premises shall be reasonably hygienic and sanitary.

For some years back the Commonwealth export regulations have prohibited the use of any preservatives excepting common salt in the manufacture of butter, and, although at first there was some difficulty in getting butter so treated to keep well, improved modern methods of manufacture have proved that butter made without preservatives can be landed in Great Britain, and be distributed to British consumers in practically as good condition as it left Australia. It is, therefore, an anomaly that the dangerous practice of using preservatives in butter should still be allowed for butter intended for use on the local market. Hence it is recommended—

Recommendation 23.—That section 32 (3) of regulations of the Food and Drugs Act, 1908, issued on May 5th, 1932, relative to the use of preservatives in butter be repealed and a new section be drafted prohibiting the use of any preservative in the manufacture of butter with the exception of common salt.

After careful consideration of the whole position your Commissioners are satisfied that the suspicions of the cream suppliers that they are being defrauded by manufacturers are supported neither by facts nor by the probabilities of the case. Nevertheless, these suspicions are comprehensible enough. Suppliers, who lead comparatively isolated lives, find themselves compelled to accept prices which do not meet costs of production; they know that there is no price-competition among manufacturers, and that the fixed price is determined on a complicated formula by interested parties; and from the possibility of unfair action in this direction that they perceive they jump to the certainty, and thereafter see confirmation of their suspicions in every action of the manufacturers such as high cream grading to new customers, over testing, discrimination in the cost of collection of cream, &c.

Actually the position can be viewed as follows:—The commercial success of manufacturers, apart from efficiency, is mainly dependent upon adequacy of turnover, and their main aim may be said to be to attract cream suppliers, and to

retain them on their pay rolls; and whilst errors in testing or accounting will arise from time to time, as in the best regulated concerns, it is, nevertheless, inconceivable that large trading concerns, dependent for their success upon suppliers, should be foolish enough to risk the goodwill of the latter by the petty defalcations of which they are suspected.

The suppression of price competition, however, is the weak link in the manufacturers' case, for it is obvious that the price must be fixed upon a basis acceptable to all, efficient and inefficient alike, and it follows that the cream supplier does not under a fixed price get the true commercial value of his butterfat. As matters stand he can be said to receive the value that the less efficient manufacturers can afford to pay, and no more, whereas under freer conditions he would receive the value that the most efficient ones could afford to pay. The whole question hinges around what value should be placed upon what has come to be known as manufacturing costs, &c. The value at present claimed under the fixed price understanding is 2½d. per lb. of butter manufactured. Evidence submitted indicated that this figure would be subject to appreciable reduction, possibly ¾d. or thereabouts, under the healthy stimulus of free price competition.

Hence your Commissioners feel that if it were possible to establish in South Australia a free market for butterfat, and to render illegal any understanding among buyers as to a fixed price, butterfat would soon find its true commercial value, which would continue no doubt to vary with world parity prices, but would not be less than what the best equipped and managed factories could afford to pay. Evidently, too, in such circumstances the inefficient ones would have to mend their ways, or else disappear. It is, however, recognised that even if prohibition of price fixation were legally feasible, it would be difficult, if not impossible, to prevent a secret understanding on the subject among buyers on the basis of an accepted formula. Hence it is recommended—

Recommendation 24.—That the Crown Law Officers inquire into the legal feasibility of prohibiting price fixation of butterfat in South Australia, and express an opinion as to the possibility of enforcing such a prohibition against the combined opposition of buyers.

But as for the time being the establishment of a free market for butterfat in South Australia is highly problematic, it is advisable in the meanwhile that certain precautions be taken in order to allay the suspicions of suppliers, and if necessary, to protect them against possible exploitation. Towards this end your Commissioners recommend—

Recommendation 25.—That the manner in which records and accounts shall be kept by manufacturers, and balance-sheets presented by them, shall be prescribed in order to render possible accurate segregation of all major operations.

Recommendation 26.—That in the absence of a free market for butterfat, the terms of the formula by means of which the price of butterfat is to be determined shall be definitely fixed from time to time by Government representatives in consultation with representatives of the manufacturers. Such terms shall include costs of placing exported butter aboard ship, and all *intra-mural* factory costs, with due allowance for market risks and profits, but shall not include costs of conveying cream to the factory door or to railway siding, which costs should be borne by the cream suppliers.

As soon as data become available under Recommendation 25, the above costs shall be based upon the data of obviously well equipped and managed factories only.

Recommendation 27.—That in all calculations for the determination of the commercial value of butterfat it shall be legally recognised that the cream supplier is entitled to a price which takes into due account the total amount of commercial

butter which could be made from his butterfat by an efficient butter factory; and that provisionally the legal ratio shall be not less than 120lbs. of commercial butter from 100lbs. of butterfat sold.

Recommendation 28.—That for the double purpose of raising the average standard of South Australian cream, on the one hand, and of satisfying cream suppliers that their interests are under effective official supervision, on the other, the dairy branch of the Department of Agriculture should be strengthened in order to render possible more frequent and thorough factory inspections. Towards this end it is recommended that—

- (a) The holding back for 24 hours of carefully numbered samples of all cream tested in any one day, as requested by manufacturers, be strictly enforced, and that inspecting officers be instructed always to test random samples of the preceding day and to report deficiencies and errors to the Chief Dairy Instructor.
- (b) The true grading of cream be insisted upon and provision be made for differential payments of cream if necessary, by means of amendment of the Dairy Industry Act.
- (c) Payments by factories for cream to be strictly based upon the original sheets of graders' and testers' results, and penalties be provided for any contravention.
- (d) It be obligatory upon all factory managers to supply weekly returns to the Chief Dairy Instructor setting out names and addresses of cream suppliers whose cream had been graded below first grade during that week. On receipt of the same this officer shall take early steps to investigate the trouble and provide for necessary remedial measures.
- (e) Special regulations for the control of farm premises, and of milk and milk products handled thereon, should be resubmitted to Parliament, accompanied by a clear statement as to the urgent need of these regulations.

The objective of lower costs of manufacturing can best be achieved by the elimination of unnecessary transport costs and the reduction of the aggregate capital and labor costs of the factories to the lowest amount which is necessary.

There are now more factories in South Australia than are necessary to manufacture the cream available, and an increase in the capital investment in factories tends to increase rather than reduce manufacturing costs.

There is a tendency to encourage new factories in South Australia, due to the voluntary basis of the Paterson Scheme, since a new factory can commence operations under the shelter of the scheme and make no contributions to it.

While the Paterson Scheme is in operation it should be a condition of each butter factory licence that it should conform to the requirements of the Paterson Scheme Levy.

In the interests of economical production the Hon. the Minister should have power to refuse a licence to open a factory on the grounds that public convenience and necessity does not require it. Hence your Commissioners recommend—

Recommendation 29.—That power be sought under the Dairy Industry Act enabling the Minister of Agriculture to decline to issue a licence for a new butter factory on the grounds that neither public convenience nor necessity require it.

Finally, your Commissioners deem it their bounden duty and their pleasure to acknowledge the valuable assistance they received during the course of their inquiries from private individuals and officials, and from corporate bodies and

associations, both in South Australia and in the other States; they recognise that without such assistance this report, whatever its value, could not have been completed.

They wish also to express appreciation of the conscientious manner in which Mr. R. G. Hitchcox has attended to his secretarial duties.

We have the honor to be,

Sir,

Your Excellency's obedient servants,

W. J. DAWKINS, Chairman.

A. J. PERKINS, Member.

J. W. WAINWRIGHT, Member.

(Subject to dissent.)

R. G. HITCHCOX, Secretary.

Adelaide, October 20th, 1933.

DISSENT.

I regret very much that I am unable to agree with the recommendations herein dealing with the metropolitan milk supply concerning:—

- (1) Price control of milk for human consumption.
- (2) Restriction of each milk supplier by licence to a specified weekly quantity in country districts, and restriction of cows in the metropolitan area to a stated number.

1. Power to fix a price of milk for human consumption should be given (which should be used only if the necessity arises) in order to induce producers to go to the extra expense and trouble which is required to obtain a pure milk supply for human consumption under conditions laid down by the controlling authorities. All cities pay more for their milk supply than the commercial price of milk for butter, cheese, &c., because producers will not incur the necessary expense and trouble unless the extra price is offered; hence some form of price fixation or agreement has become usual; but the extra price offered should not be *more* than is necessary to recompense the producer for the extra expense and labor required in producing milk for human consumption.

If a higher price be fixed than is an adequate return for the service, many more people will demand the privilege of supplying, and a much greater quantity than is required will be striving to exploit the favored market.

2. *Restriction of Supply.*—The experience of price fixing in all countries has shown that if the price of any commodity in a market (State, National, or International) is fixed at a level that is out of balance with other related commodities in the market, it stimulates a greater supply of the higher priced article, and if some form of restricting the supply is not successfully established the market becomes glutted with the over-valued commodity. The objections to such restrictions are:—

- (1) The higher price which renders restriction necessary is a form of taxation of consumers for the benefit of producers. This may at times be justified, but Parliament is the properly constituted body to impose taxation.
- (2) The number of producers who are permitted to obtain the higher price is to be limited, and others who may desire to come in are to be excluded upon an arbitrary basis.
- (3) Producers outside the favored field who desired to come in would never be contented, and would regard their arbitrary exclusion as unjust.
- (4) The limitation of supply to a weekly quantity, and restrictions of herds, are artificial restrictions, which are arbitrary, and unjustifiably hamper healthy freedom of trade and individual liberty.

Annual Contracts.—The milk supply of a city is approximately constant throughout the year, and as increased capital must be invested by producers in providing a pure milk supply (as compared with cream supply), each milk producer should be able to sell a regular quantity throughout the year, and as it can be more economically produced under such conditions, milk wholesale firms in most cities make annual contracts with milk suppliers.

This practice of annual contracts has been adopted by wholesalers in all Australian cities, and also in Europe and America. In Adelaide this method of purchasing is hampered by the irregularity of the supply from within the metropolitan area. Metropolitan production increases during the July to December period, and falls off heavily during the January to June, or January to May period, when the city must rely upon country producers for most of its milk. This metropolitan surplus (when green fodder is plentiful) tends to rob the country producers of their trade during that period.

I suggest that metropolitan and country milk suppliers should be placed upon an equitable basis in marketing surplus milk, and that in order to secure this, metropolitan suppliers should be required, from time to time, to nominate a supply of milk which they are prepared to *regularly maintain* (within reasonable margins), and that all surplus to this (usually during July to December) must be used for cream and butter. A system of annual contracts between country milk suppliers and city wholesalers will then naturally develop under free conditions.

J. W. WAINWRIGHT.

October 13th, 1933.

APPENDIX VI.

Statement Supplied by the Secretary of the Stabilization Committee concerning the Relationship of Butterfat Prices to London Butter Prices.

Your letter of July 4th, setting out the text of various resolutions adopted at a conference of Branches of the Agricultural Bureau held at Mount Barker in May, has been considered by my Committee, and I have been desired to reply thereto as follows:—

Whilst recognising the close inter-dependence of the manufacturer and the producer in the butter industry my Committee cannot admit the right of the supplier to any form of control in the industrial and commercial matters of manufacture, marketing, and price fixing. The manufacturer of butter, like the manufacturer in any other industry, buys his raw material, and from the moment the property in the material passes to him he has to bear all risks. He immediately becomes liable to the supplier for payment for the butterfat, and, thenceforth, he has to carry multitudinous risks, such as deterioration, movement of the market, bad debts, &c. It is admitted that a peculiarity exists in this industry in that the seller places himself in the hands of the manufacturer for the correct measurement of the quantity and quality of the raw material delivered. The very circumstances of the trade make this inevitable, and realising this the Government has set up adequate machinery for seeing that this trust imposed by the supplier in the manufacturer is not abused. This machinery includes the filing of monthly returns by all manufacturers, full powers to audit records, to ascertain that such returns are true, and the widest possible powers of general inspection, in addition to which all suppliers have the right to call upon the Chief Dairy Instructor to make particular and detailed checks. With this unusual feature adequately covered so as to protect the supplier, the position of the butter manufacturer is, we repeat, in no way different from that of any other manufacturer. From this emerges the fact that the term "manufacturing charges" is a misnomer. A charge cannot exist without there being some second party to the charge, and as the raw

material, immediately it has been measured, becomes the property of the manufacturer, the element commonly called "manufacturing charges" is his calculation of the expenses of manufacture and marketing and provision for his profit. These expenses cannot possibly be constant, because the butter is sold not only in Australia, but to numerous buyers in Great Britain and the East, and it rarely happens that all butters command exactly the same price. The manufacturer aims to allow a margin that on the average will be adequate. No instance is known to members of my Committee of parties who carry no financial responsibility for the operations involved being given even partial control of an industry. It is true that Parliament regulates the charges of such monopolies as the gas and electric light industries in this State, but this power is exercised because of the privilege of monopoly which Parliament grants the companies rendering these services. When the producer asks for control of the commercial functions in the dairy industry he is not in a position to confer upon the manufacturer any compensating protection. The manufacturer is left open to the full blast of free competition and the risks of the general economic situation. It is he who in the long run has to meet his wages bill and his obligations to his creditors, and, consequently, he holds that demands for control of his ordinary commercial operations can find no support in either equity or precedent. Furthermore, the existence of a Government butter factory and the active presence of its representative upon the Price-fixing Committee are sufficient guarantee that manufacturers are not extracting unjustifiable profits from the industry. If this were so it would be reflected in the trading results of the Government-owned factory, but reference to the report of the Parliamentary Standing Committee on Public Works on the Port Adelaide Freezing Works and Butter Factory, and to subsequent reports of the Auditor-General, will show that its profits from the manufacture of butter, even when they occur, are negligible. This is an important fact, because the Government butter factory was intentionally established as a "check" factory. Also on the Price-fixing Committee are the representatives of two large co-operative organisations established and controlled by primary producers. In fact, we can think of no other industry in the State where the sellers of a raw material have such facilities for exercising influence upon the buyers of the product as they have in the butter trade. The foregoing remarks cover the questions raised by the resolutions 1 and 3.

All that need be said in respect of resolution 2 is that for several months factories have been so notifying suppliers, and have even gone to the extent of enlisting the assistance of the Government Dairy Inspector to see that the policy is carried out in a thorough manner.

Finally, we refer to your request for a statement showing how the price of butterfat in Adelaide is reconciled with the London price of butter, and here we are confronted with the principle dealt with above. We have not heard of wheat growers claiming a right to demand an explanation from merchants as to how the local price of wheat is reconciled with the price in Liverpool or Chicago, or similar demands from the breeders of cattle and the growers of apples. All merchants are compelled to take into consideration a multitude of factors, all of which may, and frequently do, vary from day to day, so that it requires a close knowledge of the particular brand of commerce concerned even to be able to follow the calculations involved. An explanation that holds good to-day may not apply correctly at another date, and in setting out the position at any given time there is a danger that when departures from it are observed they will be regarded suspiciously by outsiders not familiar with the factors operating. Consequently you will see that your last request confronts the members of my Committee with two difficulties:—(1) They do not grant that they, more than any other merchant or manufacturer, are required to make public their commercial calculations; and (2) they are alive to the danger of any such information, if

given, being gravely misinterpreted by those unfamiliar with the countless factors bearing upon their affairs. But although firmly maintaining this position, they desire to work amicably with all other sections of the industry, and in the hope that a concession to your request on this occasion will help towards this end they have authorised me to give merely as an instance the method followed in establishing the price on Monday afternoon, the 18th July, this information being set out in the attached statements.

I. PRICES—GENERAL STATEMENT.

My Committee incline to the view that many of the confused ideas regarding the price of butter arise from the fact that the prices shown in the cabled market reports from London are accepted by readers as if these were the actual prices realisable instantaneously by manufacturers for stocks in Adelaide. It should always be remembered that the cables give only the price of butter actually "on spot" in London, whereas butters leaving the South Australian factories at that date cannot arrive in London until six weeks later. Owing to this delay it is fallacious to attempt to find absolute agreement at any given date between London and Adelaide prices. If a long period is taken for comparison, a complete year for instance, a close agreement will be found to exist.

South Australian butter manufacturers, as well as those in other States, have found that because of this constant fluctuation in the London price, the figure offered by London merchants for butter f.o.b. Adelaide, or c.i.f. and e. constitutes in the long run the most reliable basis from which to work prices.

The attached statement A is a calculation of the price realised by the manufacturer on the basis of sales at 103s. (sterling) per cwt. in London for butter sent to that market on consignment.

Statement B is a similar calculation on the basis of c.i.f. and e. London sales at 101s. (sterling).

These prices have been adopted for illustration because, as indicated in the final paragraph of our letter, they form the basis adopted by the Committee in establishing the local price on the 18th instant. Normally the price is fixed every Monday afternoon on the quotation then ruling. The fluctuating nature of the London market already referred to makes variations during the week inevitable, but, as will be readily realised, the average is found to be fair. It is an impossible ideal to make the local market move in detailed sympathy with the London market. To illustrate this aspect of the question, although 101s. c.i.f. and e. was taken as a basis for the week commencing the 18th instant, in the latter part of the week 99s. was the maximum price obtainable. In this manufacturers suffered, but, of course, compensation comes when the movement is in the other direction. It is, to repeat, the average position that must always be used as a basis for comparison.

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II. STATEMENT A.

Net return of manufacturers of butter shipped on consignment and sold in London for 103s. per cwt., which was the spot price in London last week:—

	Shillings per Cwt.
Choicest butter sold in London	103.00
Less London charges, including port dues, lighterage, land, housing, delivering, rent, cabling, trade discount, commission and <i>del-credere</i> risk, which average 4½ per cent.	4.89
	<hr/> 98.11
Plus 25 per cent. exchange	24.52
	<hr/> 122.63
Deduct freight to London, 8s. per cwt., plus 18 per cent.	9.44
Insurance at 6s. 10d. per cent., plus 25 per cent.41
	<hr/> 9.85
	<hr/> 112.78
Add Paterson bounty	28.00
	<hr/> 140.78
Less Australian charges (cost of cases, freezing, wharfage, cartage to Outer Harbor and putting aboard, Commonwealth grading fee, and Dairy Council levy)	6.83
	<hr/> 133.95
Less levy to Paterson plan	16.33
	<hr/> 117.62

Net price to manufacturer in Adelaide on butter sent on consignment and sold in London at 103s. per cwt. would be 117s. 7d. per cwt. in Australian currency.

III. STATEMENT B.

Net value to manufacturer, in Australian currency, of butter sold at 101s. per cwt. c.i.f. and c., London:—

	Shillings per Cwt.
Value of choicest butter	101.00
Deduct London selling agent's commission of 1 per cent.	1.01
	<hr/> 99.99
Add exchange at 24.75 per cent., this being the rate obtained on demand draft	24.75
	<hr/> 124.74
Deduct freight to London at 8s. per cwt., plus 18 per cent.	9.44
Insurance at 6s. 10d. per cent., plus 25 per cent.41
	<hr/> 9.85
	<hr/> 114.89
Deduct Australian charges (cost of cases, freezing, wharfage, cartage to Outer Harbor and putting aboard, Commonwealth inspection fee, and Dairy Council levy)	6.83
	<hr/> 108.06
Add Paterson Scheme bounty	28.00
	<hr/> 136.06
Less levy to Paterson plan, 1½d. per lb.	16.33
	<hr/> 119.73

Which is equivalent to 1.83s., or 12.83d. per lb. net to the manufacturer. As the price being paid by most manufacturers for butterfat is 1s. per lb., it will be seen that from the over-run, the manufacturer received 2.66d. per lb. to cover the cost of manufacture, interest, depreciation and profit.

The foregoing shows the result, as already stated, where the manufacturer actually secured 101s. for his butter; not all manufacturers succeeded in doing this.

APPENDIX VII.—*Statement by Chief Dairy Instructor Concerning Relative Advantages and Disadvantages of Cream Payments on Basis of Commercial Butter or on Basis of Butterfat Respectively.*

With reference to my opinion as to which is the better method of payment, the commercial butter system of butterfat basis—briefly, the difference in the two systems is:—

Commercial Butter System.—The cream is tested for butterfat content, and an estimation made, by the use of an approved chart, of the corresponding amount of commercial butter which can be made from the ascertained amount of butterfat.

In testing (Babcock method) a modification is made to the usual practice, inasmuch as the amount of cream taken (to represent 9 grammes) is measured with a pipette, and with rich cream an allowance is made in the chart to compensate for variations in specific gravity.

On account sales, the net pounds of cream, test, and estimated pounds of butter are shown, and the gross price per pound of butter is stated. The necessary charges to be taken from this price are then deducted.

Butterfat Basis.—The cream is tested in the orthodox manner of weighing out 9 grammes of cream, and the amount of butterfat in the cream is arrived at.

No charges are shown on the account sales, but a net price for butterfat is arrived at by taking all charges into consideration.

In favor of the butterfat system of payment it may be stated that it is universal throughout the world, except in New South Wales and Queensland—and, at the same time, with the exception of Denmark—these two States are practically the only large dairying centres in the world which are practically wholly controlled by purely co-operative interests run by the producers themselves.

In my opinion, the chief reasons why the Commercial Butter System is better for the producer are:—

1. The price quoted on the account sales is comparative with the published wholesale price of butter.
2. As the contents of the cream bought, the butter manufactured, and the butter sold by the factory are all in the terms of commercial butter, a comparison is easily arrived at.
3. Granted efficient Government control, which stipulates that all over-run, over and above the chart estimation, must be returned to the suppliers *pro rata*, the supervision of factory payments is a simple matter, and suppliers can be assured that the factory does not sell any butter which they, the suppliers, are not credited with.

Thus, provided the factories pay the full market price, their only means of making profits will come from the manufacturing charges.

The chief objections I see to the Butterfat System of payment are:—

1. It is very difficult for the average farmer to appreciate the difference between butterfat and butter. This often leads to a considerable amount of misunderstanding.

2. Theoretically, it is possible to make 122lbs. of butter from 100lbs. of butter-fat, but in practice only about 120lbs. are made commercially; nevertheless, because it is possible to make 122lbs. of butter, when checking the books, 122lbs. must be allowable. In my opinion, this gives the factories at least 2 per cent. to "play with."
3. In addition, it is by no means a simple matter to check butterfat paid for with butter manufactured and sold.
4. The fact that no charges appear on the account sales under the Butterfat System also tends to make the supplier suspicious.

When all is said, the chief advantage of the Commercial Butter System of payment is the ease with which it can be checked.

H. B. BARLOW, Chief Dairy Instructor.

September 21st, 1933.

PRACTICAL POULTRY MANAGEMENT.

The Library of the Department of Agriculture acknowledges the receipt of "Practical Poultry Management" under the joint authorship of J. E. Rice, B.Sc. (Agric.), and H. E. Botsford, B.Sc. (Agric.) The volume is profusely illustrated and deals with every phase of the breeding, rearing, and marketing of poultry and is one which should prove equally informative to students and commercial poultry keepers. Published by Messrs. Chapman & Hall, 11, Henrietta Street, Covent Garden, London, W.C. 2. Price, 16s. 6d. net.

COMPOST HEAPS FOR THE GARDEN.

The following information relative to the preparation of a compost heap has been supplied by Mr. W. J. Spafford, Deputy Director of Agriculture, in response to an inquiry received from a subscriber to the *Journal of Agriculture*.

1. *Is it essential to add Farmyard Manure?*—As a rule the addition of farmyard manure does not improve the compost, because most of the material put in the heap consists of plants which contain all of their original nutriment, whereas farmyard manure consists of a mixture of the remains of plants after animals have extracted some of the nutriment and poor quality organic matter used as litter, such as straw, &c. The presence of some farmyard manure may tend to hasten decomposition, but this is generally rapid enough, provided that the heap is kept moist.

2. *Will the addition of Artificial Manure help?*—Most compost heaps do not contain sufficient phosphorus and some nitrogen is lost in decomposition and so the addition of a phosphatic manure and some sulphate of ammonia will add considerably to the manurial value of the compost and lead to a fuller and more rapid decomposition. Poor organic matter, like straw, sticky dry weeds, over-mature plants, &c., can be converted into good manure by the addition of the artificials already referred to and some lime added as well. When straw is used about $\frac{1}{2}$ wt. of sulphate of ammonia, 1wt. finely ground limestone, and a little finely ground raw rock phosphate is added per ton of straw stacked, and the heap is kept damp and well aerated.

3. *Should Lime be added?*—Slaked lime or finely ground limestone can be added to a compost heap with advantage to the finished product. It encourages a complete decomposition, and its presence improves soil texture when the heap is used as a manure. About 1wt. per ton of compost is a liberal application, and it can be put into the heap by sprinkling it on layer after layer as the building of the heap proceeds. Freshly burnt lime should not be used as it delays fermentation and leads to the loss of nitrogen as ammonia.

SHEEP FEEDING EXPERIMENT CONDUCTED AT ROSEWORTHY AGRICULTURAL COLLEGE.

MAINTENANCE RATION UNDER SOUTH AUSTRALIAN CONDITIONS.

[By S. E. WHICKER, D.D.A., Stockman.]

INTRODUCTION.

The hand-feeding of sheep within the agricultural areas of South Australia is of great importance to the farmer and the State; a shortage of feed during two or three months of the year considerably reduces the number of stock that can be carried, unless the sheep are hand-fed over this short period. In drought years the economic hand-feeding of sheep is of even greater importance.

Increasing attention is being shown to fat-lamb raising as a means of stocking farms. Under these conditions, pregnant ewes comprise the greater portion of the stock to be fed. During a drought year wethers are disposed of to save the feed and the pregnant ewes retained because these are necessary to replenish the flock, and will repay the cost of feeding. It is a natural assumption, therefore, that any information on the hand-feeding of pregnant ewes will be of value and interest to sheepmen. It may be argued that suitable feed for dry sheep would be suitable feed for pregnant ewes, but experience has shown that where pregnant ewes are being hand-fed complications very often arise. In the last stages of gestation a heavy strain is placed on the body of the ewe to supply the requirements of the developing foetus, or foetuses. At this period numerous deaths very often occur amongst pregnant ewes which are being hand-fed. These deaths under South Australian conditions are largely due to what is known as "Twin Lamb Disease" (T.L.D.), sometimes referred to as "Toxaemia of Pregnancy Disease" (T.P.D.). At present very little is known of the history or cause of this trouble, and any feed which will maintain pregnant ewes without an outbreak would be invaluable, primarily as a means of safe feeding during periods of feed shortage and, at the same time, have a secondary significance of great importance in that the knowledge so gained would narrow down the dietetical problem connected with T.L.D., and perhaps lead to the partial elucidation of the cause. With the idea of gathering data along these lines the investigations reported herein were initiated at Roseworthy College. Although so far the tests have only been carried out over one season, it is considered that the results are of sufficient interest to justify publication.

REVIEW OF LITERATURE.

In reviewing literature on the subject of hand-feeding sheep under Australian conditions it appears that while most of the work has been carried out with dry sheep (references 1, 2, 3, and 5), in those cases where the experiments have been conducted with pregnant ewes (references 4 and 6) no trouble has been experienced with Twin Lamb Disease. One of the chief difficulties under College conditions, and this is true of many other parts of South Australia when hand-feeding pregnant ewes during the periods of temporary feed shortage, is the almost regular occurrence of Twin Lamb Disease. This is particularly so where crossbred or Merino ewes in lambs to rams of British breeds are concerned.

Most of the work carried out in other States emphasises oats as a valuable and reliable supplementary concentrate. Further, cereal ensilage supplemented with oats as a ration has been likewise used with successful results.

SCOPE OF EXPERIMENT.

Fodders Used.—On most farms there are three sources of sheep-feed reserves which can be conveniently and cheaply stored—these are ensilage, hay, and oats—they are accessible to all farmers within the agricultural areas. These feeds were therefore taken as the bases of the main rations. Because it was considered that ensilage alone might not be very suitable, a fourth ration was made by using bran with ensilage. Linseed nuts were included as a fifth ration, firstly because they are readily procurable as a concentrated supplement to roughage of low feeding value, and secondly in order that a comparison between these and feeds produced on the farm could be obtained. Finally, because Twin Lamb Disease was likely to be a limiting factor in the suitability of feeds green lucerne was included with the hope that it would provide a control lot. Serious outbreaks of T.P.D. do not usually occur when early greenfeed is available in the paddocks during the three weeks preceding lambing.

Sheep.—To provide sufficient sheep for six lots of 20 sheep each, 60 Merino and 60 Dorset Horn-Merino half-bred ewes, all full mouthed, were mated to Southdown rams on November 22nd. The rams were removed on January 11th.

SCHEME OF EXPERIMENT.

In order that this test could be considered in the light of supplementary feeding under paddock conditions, each lot was confined to a fenced plot of approximately two acres carrying long wheat stubble. Each plot had been grazed after harvest till it was considered that hand-feeding in addition to the stubble grazing would be necessary. In an attempt to equalise possible variations in the value of the feed on each plot, each lot was moved to the next succeeding plot each week after weighing. The 60 Merino ewes were divided off into even lots of 10, as also were the 60 Dorset Horn-Merino half-bred ewes. Each lot was then made to contain 10 Merino and 10 Dorset Horn-Merino ewes. Each ewe was ear tagged to allow the recording of individual weights, and the sheep in each group were branded with a numeral on the fleece to avoid any possibility of confusion. A platform scale with a frame and doors was used for weekly individual weighings.

In order to form a basis on which to compare the various supplements, the rations to be fed were calculated on a protein basis, seeing that protein would be the most essential constituent to add to the stubble grazing, mostly of a carbohydrate nature.

The maintenance requirement of 0.50lbs. of protein equivalent per head per week (reference, Wood 7) was used as a basis for each ration. The rations were calculated accordingly.

A lick consisting of coarse salt, 100 parts; superphosphate (45 per cent.), 60 parts; and Epsom salts, 10 parts, was supplied to each lot.

A week was allowed for the sheep to become accustomed to the experimental feeds and the conditions before the initial weights were recorded.

•
RATIONS.

At first the rations used were calculated from assumed analyses of the feeds. While the test was in progress representative samples of the feeds in use were analysed in the College chemistry laboratory, and slight adjustments in the rations were necessary to correct the protein equivalent supplied to each lot. The alterations in the rations were made after the fourth week, on March 22nd.

In Table I. are shown the rations supplied:—

TABLE I.

Lot.	Number of Sheep.	Daily Ration per Sheep.	
		22nd Feb. to 21st March.	22nd March to 19th April.
1	20	1lb. 6ozs. Chaff	1lb. 6ozs. Chaff
2	20	15ozs. Oats	1lb. 3ozs. Oats
3	20	4lbs. 2ozs. Ensilage	5lbs. 5ozs. Ensilage
4	20	3lbs. 6ozs. Ensilage	3lbs. 13ozs. Ensilage
		4ozs. Bran	4ozs. Bran
5	20	4-6ozs. Linseed Nuts	4-8ozs. Linseed Nuts
6	20	3lbs. Green lucerne	2lbs. 10ozs. Green Lucerne

The chaff, silage, oats, and lucerne were all produced on the College farm. The chaff was oaten, and on analysis was found to contain must less fibre than in a normal sample. The oats were a fair sample of feed oats from the 1932 harvest. The ensilage was chaffed ensilage from a concrete tub silo, and was made from stubble pasture containing wild oats, 24 per cent.; barley grass, 23 per cent.; burr trefoil, 23 per cent.; wheat, 19 per cent.; cultivated oats, 10 per cent., and odd weeds. It was a good sample of olive-green sour ensilage. The bran and linseed nuts were purchased.

ANALYSES OF FOODS.

In Table II. are shown the analyses of the foods:—

TABLE II.

Food.	Composition.					
	Dry Matter.	Protein.	Oil.	Carbo-hydrate.	Fibre.	Ash.
Chaff	83.2	7.5	1.4	52.0	17.8*	5.0
Oats	90.2	7.6	4.1	66.4	8.8	3.3
Ensilage	34.2	2.6	0.8	14.7	11.6	4.5
Bran	87.3	11.9	3.2	59.9	7.8	4.5
Linseed nuts	89.9	28.7	1.2	45.8	8.2	6.0
Green lucerne	25.8	4.9	0.7	11.5	6.2	2.5

*Each food with the exception of chaff shows a normal analysis. In this particular chaff, the fibre is very low.

In Table III. are given the digestible nutrients:—

TABLE III.

Food.	Digestible Nutrients.				
	Crude Protein.	True Protein.	Oil.	Carbo-hydrate.	Fibre.
Chaff.....	5.6	4.8	1.0	32.8	10.7
Oats	6.6	5.3	3.4	51.1	2.2
Ensilage	1.7	1.0	0.4	8.2	6.4
Bran	8.9	7.3	2.2	42.5	1.6
Linseed nuts	24.7	23.3	1.1	36.6	4.1
Green lucerne	3.5	1.9	0.4	7.6	2.7

The protein requirement per week on which the calculation of the rations is based is expressed in terms of protein equivalent, which equals digestible pure protein plus half the remaining digestible nitrogenous substances. Assuming the live weight of a sheep is 130lbs., the requirements per week for maintenance are, according to Wood (7):—Dry matter, 28.5; net starch equivalent, 10.5; protein equivalent, 0.50lbs.

The gross starch equivalent is calculated from digestible nutrients by the method given by Wood (7) thus:—Pure protein multiplied by 1.25, plus other nitrogenous substances multiplied by 0.6, plus oil multiplied by 2.3, plus carbohydrate multiplied by 1, plus fibre multiplied by 1, which equals the fuel value of 100lbs. as starch.

The net starch equivalent or production value is calculated proportionally from this, the proportion being that obtained from Wood's (7) figures. The net starch equivalents give the best available figures for the production value of the foodstuffs, while the gross starch equivalents give the heating or fuel value. The net equivalent is equal to the gross equivalent less energy expended in digestion.

The nutritive ratio is calculated from digestible nutrients, and is obtained by dividing the crude protein into the sum of oil, multiplied by 2.3, plus carbohydrate, plus fibre.

In Table IV. are shown the starch equivalents and nutritive ratios of the foods:—

TABLE IV.

Food.	Daily Ration in ozs.	Starch Equivalent of 100lbs. of Foodstuffs.		Nutritive Ratio.
		Gross.	Net.	
Chaff	22	52.3	39.8	8.2
Oats	19	68.5	63.0	9.3
Ensilage	85	17.2	11.6	9.1
Ensilage	61	17.2	11.6	9.1
Bran	4	59.3	35.0	5.5
Linseed nuts	4.8	73.1	64.5	1.7
Green lucerne	42	14.6	10.1	3.2

RESULTS.

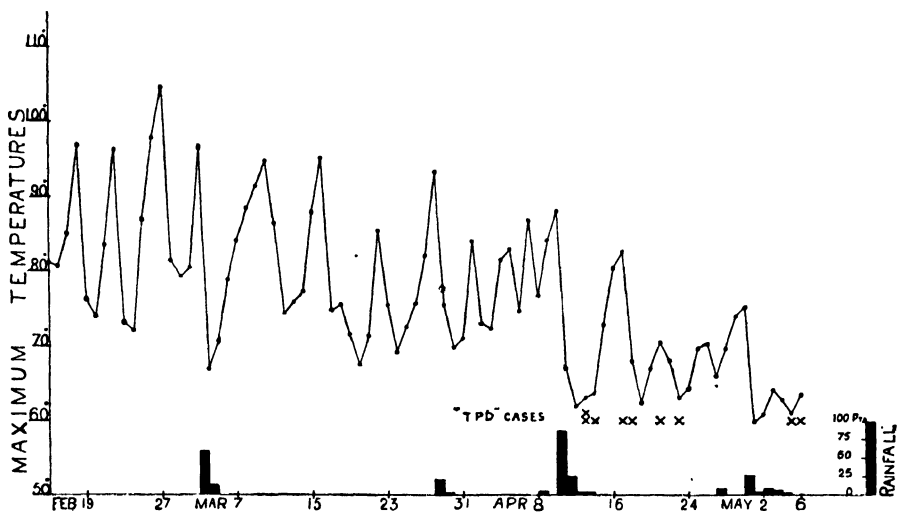
In this experiment the results are to be gauged as much from the health of the sheep with respect to the appearance of T.L.D. as from the gain or loss of weight.

Health.—Cases of T.L.D. occurred in all lots with the exception of the lot fed on ensilage alone. On the occurrence of the second definite case in each lot that particular lot was removed from the test, because treatment of these cases once they are definitely established has, so far, met with little success, and nothing could be gained by a needless slaughter of ewes and lambs once the fact that the disease had been produced in a particular lot had been established.

On April 19th, 1933, the last general weighing was conducted. Three groups were carried on from this date with the object of allowing cases of T.L.D. to

make their appearance; these were weighed as usual, but the weights have been deleted from the results because the numbers in each group had been reduced on account of some ewes having lambed. Further, as some lots had been removed the data are not strictly comparable. Also at this time sufficient new grass had made its appearance in the plots to influence the weights.

As the first cases were not obtained until rain and cold winds were experienced, the record of rainfall and maximum temperatures at this period in relation to the incidence of disease have been examined. This is shown in the accompanying graph. In addition to this the loss in weight of the affected animals, together with the mean loss of 10 sheep of the same breeding in the lot, is recorded.

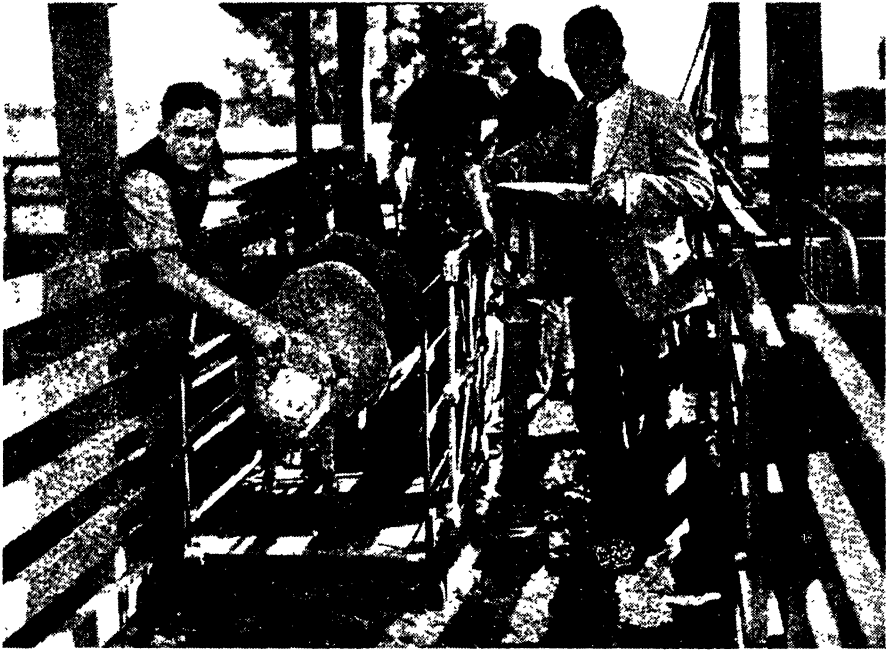


In Table V. are shown the total mean loss in weight of animals affected by T.L.D., as compared with the total mean loss in weight of the 10 sheep of the same breed and feeding:—

TABLE V.

Lot No.	Feed	Ear tag of Ewe.	Date.	Breed.	Total Mean Loss of Weight of Case.	Mean Loss in Weight of 10 Similar Ewes.
1	Chaff	76	17/4/33	Merino	12.8	7.7
		93	18/4/33	Merino..	13.3	7.7
2	Oats.....	8	13/4/33	Merino..	2.6	3.4
		781	23/4/33	Merino..	8.0	3.4
3	Ensilage	No cases				
4	Ensilage and bran .		13/4/33	Merino..	6.6	9.1
			14/4/33	Merino..	7.7	9.1
5	Linseed nuts	175	21/4/33	Dorset-	16.3	7.2
6	Green lucerne	2	5/5/33	Merino	5.1	7.4
		133	6/5/33	Dorset-	2.1	5.3
				Merino		

Table V. shows that four cases lost more while five cases lost less weight than the average loss in weight of the group of 10 sheep. Up to April 19th, 1933, only the chaff, oats, and ensilage plus bran fed lots had shown definite cases. On April 21st, 1933, the lot fed on linseed nuts showed a case, and as many of the ewes appeared cold, miserable, and weak this group was also removed. At May 2nd, 1933, neither the ensilage nor the green lucerne lot had produced a case, and as the paddock under use was required for tillage these two groups were removed to the sheep yards, there being 15 ewes left in the ensilage group and 10 in the lucerne group yet to lamb. On May 5th, 1933, just three days after removal to the yards, a case occurred in the lucerne lot. On the 6th another case occurred, and the remaining ewes were released. No cases occurred in the ensilage fed lot, and the ewes were released on June 8th, there being no pregnant ewes left. It should be noted that when these lots were removed to the yards



Weighing the Sheep.

they were limited to the ration supplied, and no roughage was available. The ensilage group was not consuming all the ration supplied. It is not possible to say whether the lowering of roughage had any effect upon the sudden appearance of cases in the lucerne lot.

As the lot fed on green lucerne showed cases of T.L.D., it is worth noting here that of the remaining 323 pregnant ewes on the College property only one case of T.L.D. occurred. This sheep was a Border Leicester-Merino half-bred ewe, and on *post mortem* was found to be carrying triplet lambs.

By careful grazing and interchange of the stubble paddocks, which in some cases contained a good growth of wire weed or hog weed (*Polygonum aviculare*), it was not necessary to resort to hand-feeding outside the experimental feeding flock.

TABLE VI.

Lot 1.			Lot 2.			Lot 3.			Lot 4.			Lot 5.			Lot 6.		
Initial weights.	Final weights.	Variations.	Initial weights.	Final weights.	Variations.	Initial weights.	Final weights.	Variations.	Initial weights.	Final weights.	Variations.	Initial weights.	Final weights.	Variations.	Initial weights.	Final weights.	Variations.
100	94	6	117	114	3	125	120	5	116	102	14	108	95	13	118	112	6
116	109	7	104	103	1	109	95	14	95	86	9	121	111	10	103	95	8
100	91	9	104	101	3	118	119	1	133	122	11	112	104	8	104	100	4
116	111	5	109	101	8	124	116	8	107	95	12	100	85	15	105	95	10
105	96	9	113	105	8	124	100	24	106	99	7	94	87	7	121	108	13
173	63	16	139	92	47	132	131	1	116	107	9	113	101	12	106	104	2
108	100	8	118	110	8	127	116	11	92	88	4	101	88	12	106	95	11
113	98	15	124	125	1	112	105	7	100	89	11	111	102	9	119	109	10
121	112	9	104	107	3	125	123	2	101	86	15	119	108	11	120	113	7
124	116	8	113	104	9	111	101	10	125	86	39	95	80	15	136	124	12
156	154	2	136	154	2	120	112	8	167	161	6	136	134	2	164	158	6
148	143	5	148	152	4	133	147	14	161	152	9	140	131	9	146	140	6
147	136	11	173	176	3	137	130	7	165	163	2	128	116	12	171	160	11
175	167	8	157	162	5	146	137	9	167	160	7	128	119	9	154	152	2
150	145	5	154	162	8	150	147	3	147	150	3	160	151	9	154	150	4
135	129	6	159	154	5	152	145	7	145	148	3	160	147	13	142	139	3
157	155	2	149	151	2	146	135	11	135	127	8	145	134	11	172	160	12
140	130	10	145	146	1	167	167	—	180	176	4	150	143	7	142	127	15
143	137	6	149	150	1	157	149	8	124	124	—	138	130	8	144	131	13
146	146	—	143	148	5	159	153	6	168	173	5	141	118	23	163	152	11
2,576	2,437	139	2,683	2,625	58	2,665	2,533	132	2,638	2,508	130	2,500	2,285	215	2,690	2,524	166
128.8	121.85	6.95	131.9	131.3	0.6	133.25	126.9	6.35	131.9	125.4	6.5	125.0	114.25	10.7	134.5	126.2	8.3
Mean loss as percentage of initial weight		5.40			0.45			4.77			4.93			8.60			6.17

Variations in Bodyweight.—In Table VI. the initial and final weighings of each individual sheep in the experiment are given together with the variations. In Table VII. are shown the mean initial weight and the mean variations from initial mean weight in pounds:—

TABLE VII.

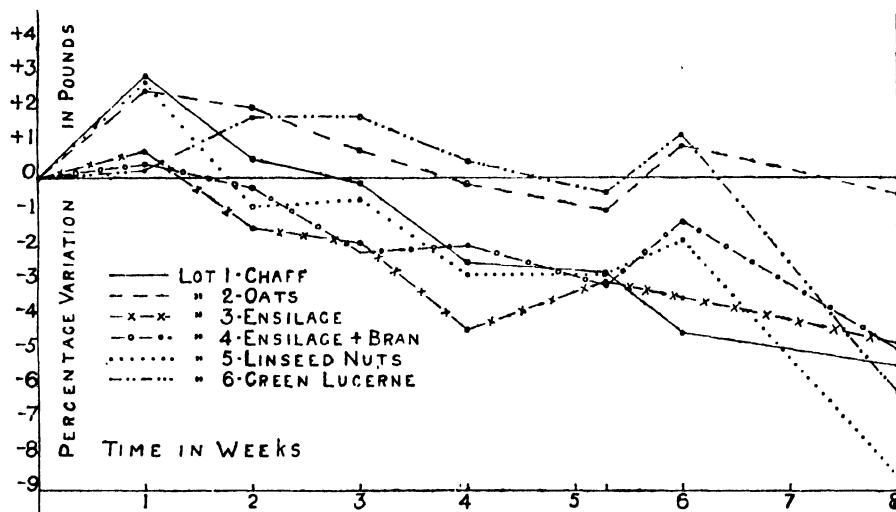
Lot No.	Feed.	Mean Initial Weight.	Mean Variations from Initial Weight at each Weighing.						
			1/3/33.	8/3/33.	15/3/33.	22/3/33.	31/3/33.	5/4/33.	19/4/33.
1	Chaff	128.80	+ 3.85	+ 0.65	— 0.20	— 3.15	— 3.50	— 5.75	— 6.95
2	Oats.....	131.90	+ 3.30	+ 2.65	+ 1.00	— 0.25	— 1.25	+ 1.20	— 0.60
3	Ensilage ..	133.25	+ 0.10	— 1.90	— 2.50	— 5.85	— 4.00	— 4.65	— 6.35
4	Ensilage + bran	131.90	+ 0.50	— 0.40	— 2.85	— 2.60	— 4.10	— 1.65	— 6.50
5	Linseed nuts	125.00	+ 3.45	— 1.05	— 0.80	— 3.50	— 3.50	— 2.25	— 10.75
6	Green lucerne	134.50	+ 0.25	+ 2.35	+ 2.35	+ 0.65	— 0.55	+ 1.70	— 8.30

In Table VIII. are given the mean percentage variation from initial weights:—

TABLE VIII.

Lot No.	Feed.	Mean Percentage Variations from Initial Weight at each Weighing.						
		1/3/33.	8/3/33.	15/3/33.	22/2/22.	31/3/33.	5/4/33.	19/4/33
1	Chaff	+ 2.99	+ 0.51	— 0.16	— 2.45	— 2.72	— 4.46	— 5.40
2	Oats.....	+ 2.50	+ 2.01	+ 0.76	— 0.19	— 0.95	+ 0.91	— 0.46
3	Ensilage	+ 0.75	— 1.43	— 1.88	— 4.39	— 3.00	— 3.49	— 4.77
4	Ensilage + bran...	+ 0.38	— 0.30	— 2.16	— 1.97	— 3.11	— 1.25	— 4.93
5	Linseed nuts	+ 2.76	— 0.84	— 0.64	— 2.80	— 2.80	— 1.80	— 8.60
6	Green lucerne	+ 0.19	+ 1.75	+ 1.75	+ 0.48	— 0.41	+ 1.26	— 6.17

The figures shown in Table VIII. have been used to plot the accompanying graph.



In Table IX. are shown the losses from initial to final weights, both absolute and as a mean percentage of initial weight, also the probable error, range of variation, and standard deviation:—

TABLE IX.

Lot No.	No. of Sheep.	Absolute Losses of each lot from Initial to Final Weight.	Mean Loss in Weight and Probable Error as Percentage.	Range of Variation.	Standard Deviation.
1	20	139lbs.	5.40 % \pm .387	\pm 0 to - 15	3.37
2	20	12lbs.	0.45 % \pm .533	+ 8 to - 9	4.69
3	20	127lbs.	4.77 % \pm .427	+ 1 to - 14	3.80
4	20	130lbs.	4.93 % \pm .653	+ 5 to - 15	5.76
5	20	215lbs.	8.60 % \pm .480	- 2 to - 23	4.02
6	20	166lbs.	6.17 % \pm .427	- 2 to - 15	3.91

The standard deviation is a measure of variability upon which the calculation of the significance of results is based.

In Table X. is shown the significance of the difference between the mean loss in each group as compared with every other group:—

TABLE X.

Lot.	Feed.	Mean Loss as Percentage.	Lot.	Feed.	Mean Loss as Percentage.	Diff. in % Loss.	S.E. of Difference.	Significance.
1	Chaff	5.40	2	Oats.....	0.45	4.95	0.99	Highly
1	Chaff	5.40	3	Ensilage	4.77	0.63	0.86	Not
1	Chaff	5.40	4	Ensilage + bran	4.93	0.47	1.14	Not
1	Chaff	5.40	5	Linseed nuts	8.60	3.20	0.92	Highly
1	Chaff	5.40	6	Green lucerne	6.17	0.77	0.86	Not
2	Oats.....	0.45	3	Ensilage	4.77	4.32	1.02	Highly
2	Oats.....	0.45	4	Ensilage + bran	4.93	4.48	1.26	Highly
2	Oats.....	0.45	5	Linseed nuts	8.60	8.15	1.07	Highly
2	Oats.....	0.45	6	Green lucerne	6.17	5.72	1.02	Highly
3	Ensilage	4.77	4	Ensilage + bran	4.93	0.16	1.17	Not
3	Ensilage	4.77	5	Linseed nuts	8.60	3.83	0.96	Highly
3	Ensilage	4.77	6	Green lucerne	6.16	1.40	0.92	Not
4	Ensilage + bran	4.93	5	Linseed nuts	8.60	3.67	1.22	Highly
4	Ensilage + bran	4.93	6	Green lucerne	6.17	1.24	1.14	Not
5	Linseed nuts	8.60	6	Green lucerne	6.17	2.43	0.96	Significant.

A study of the above table reveals that from the point of view of loss of body weight the oat ration has given a significantly better result than all other rations; that there is no significant difference between chaff, ensilage, ensilage-

plus bran and green lucerne when each ration is compared with the other three; that the linseed nuts ration shows a greater loss from initial to final weight than any other food. The loss in weight on linseed nuts and green lucerne was very heavy when cold weather was experienced; this may be attributed to the fact that both are very deficient in carbohydrate, and as carbohydrate would be very necessary during cold weather to maintain body heat these foods might be expected to fall short in maintenance requirements. During cold weather it would probably be beyond the powers of the ewes to obtain sufficient carbohydrate over and above that required for digestion from straw. By feeding 4.8ozs. of linseed nuts, with a nutritive ration of 1 : 1.7, very little carbohydrate would be provided.

Response of Merino and Half-bred Dorset Horn-Merino to Hand-feeding.—In Table XI. is shown the difference between the mean loss of the Merino ewes in all groups, as compared with the mean loss of the Dorset Horn-Merino ewes in all groups:—

TABLE XI.

No. of Ewes of Each Breed.	Merino.		Dorset Horn-Merino.	
	Mean Loss.		Mean Loss.	
	Lbs.	Percentage of Initial Weight.	Lbs.	Percentage of Initial Weight.
60	7.96	7.22	6.05	4.04

It would appear from these figures that the half-bred Dorset Horn-Merino ewes responded better under the feeding conditions than did the Merino ewes.

Food Consumption.—In Table XII. are given the total amounts of food supplied, together with the amounts remaining and consumed:—

TABLE XII.

Lot No.	Feed.	Supplied.	Remaining.	Consumed.
		Lbs.	Lbs.	Lbs.
1	Chaff	1,540	248	1,292
2	Oats	1,190	—	1,190
3	Ensilage	5,285	101	5,184
4	{ Ensilage	4,025	—	4,025
	{ Bran	280	—	280
5	Linseed nuts	329	—	329
6	Green lucerne	3,150	—	3,150

It will be seen from the above that the chaff lot and the ensilage lot did not consume all the feed supplied. In the chaff lot amounts varying from 10lbs. to 73lbs. weekly remained. Amounts varying from 3½lbs. to 46½lbs. weekly remained from the lot fed on ensilage. In the chaff lot the 73lbs. were left the first week, while in the ensilage lot the 46½lbs. were left during the last week.

Salt Lick Consumption.—Although of only minor importance the salt lick consumption is given here for the whole period of the test.

In Table XIII. is shown in pounds the total consumption for each group:—

TABLE XIII.

Lot.	Feed.	Total Salt Lick Consumed in Lbs.
1	Chaff	28·7
2	Oats	20·5
3	Ensilage	28·3
4	Ensilage + bran	26·1
5	Linseed nuts	37·6
6	Green lucerne	32·6

It will be seen that Lot 2, which shows the least loss in body weight shows the smallest salt lick consumption, while Lot 5, which shows the greatest loss in body weight, shows the greatest consumption of salt lick. The consumption varies from ¼oz. to ½oz. per head per day.

Costs.—In Table XIV. are given the costs of feeding 100 sheep per day at each ration, together with the costs for the experiment, considering lots of 20 sheep for periods of four weeks and a total of eight weeks:—

TABLE XIV.

Lot.	Price of Feed.	Cost 100 Sheep Day.		Cost for 20 Sheep for four Weeks.		Total Cost for 20 for eight Weeks.
		1st Ration.	2nd Ration.	1st Ration.	2nd Ration.	
		s. d.	s. d.	s. d.	s. d.	£ s. d.
1	Chaff, £1 12s. 6d. per ton	2 0	2 0	11 2	11 2	1 2 4
2	Oats, 1s. 6d. bush.	3 6	4 5½	19 8	24 11	2 4 7
3	Ensilage, 10s. per ton	1 10	2 4½	10 4	13 3	1 3 7
4	Ensilage, 10s.; bran £5 17s. 6d. per ton	2 8½	2 10½	15 3	16 3	1 11 6
5	Linseed nuts, £14 per ton	4 0	4 2	22 6	23 6	2 6 0
6	Lucerno, 17s. per ton	2 3	2 0	12 9	11 2	1 3 11

In compiling the above costs the amounts of chaff and of ensilage not consumed have not been considered. These amount to chaff, 248lbs., = 3s. 7d., and ensilage, 101lbs., = 5d.

CONSIDERATION OF RESULTS WITH SPECIAL REFERENCE TO MAINTENANCE RATION UNDER SOUTH AUSTRALIAN CONDITIONS.

According to Wood (7) the maintenance ration per week for a sheep of 130lbs. live weight under English conditions is:—Dry matter, 28.5lbs.; starch equivalent, 10.5lbs.; protein equivalent, 0.50lbs. Allowing that the sheep in this experiment satisfied their appetites on the wheat straw available, the rations supplied would fall short of supplying the maintenance requirement of carbohydrate, and the sheep should lose weight to the extent of that shown in Table XV.

In this table is shown the mean loss of fat per week calculated from Wood's (7) figures, together with the actual mean loss in weight as obtained by weighing of the experimental lots.

TABLE XV. •

Lot.	Calculated Mean Weekly Loss in Weight in Lbs.	Actual Mean Weekly Loss in Weight in Lbs.
1	1.6	0.87
2	1.0	0.075
3	1.7	0.79
4	1.8	0.81
5	2.3	1.34
6	2.3	1.04

It appears that the maintenance standard as given by Wood (7) under English conditions is too high under general South Australian sheep feeding conditions by the equivalent of approximately 1lb. of fat per week.

Hand-feeding of sheep in South Australia is generally necessary at the end of summer and during autumn when temperatures are generally high.

The average maximum temperature for February and March is between 80 and 90 degrees. Under these climatic conditions very little food would be required for maintaining body heat as compared with English conditions.

This would explain the lower carbohydrate maintenance requirement obtained from this experiment.

SUMMARY AND CONCLUSIONS.

1. An experiment in the supplementary feeding of sheep was carried out with six lots, each of 20 pregnant ewes. Of these 10 were Merino and 10 Dorset Horn-Merino half-bred ewes. The experiment commenced on February 22nd, after allowing one week for the animals to become accustomed to the experimental conditions, and covered a period of 15 weeks ending on June 8th. From the point of view of actual gain or loss of body weight the experiment finished on April 19th, a period of eight weeks.

2. The feeds tested were chaff, oats, ensilage, ensilage plus bran, linseed nuts, and green lucerne. The rations fed were each calculated to contain a maintenance requirement of 0.50lbs. of protein equivalent per sheep per week. Each lot was enclosed in a 2-acre plot of long wheat straw stubble which had been previously grazed.

3. "Toxaemia of Pregnancy Disease" (T.P.D.) or "Twin Lamb Disease" (T.L.D.) occurred in all lots except those fed on ensilage alone.

After access to stubble feed was cut off a ration of 2lbs. 10ozs. of green lucerne per head per day failed to prevent the occurrence of T.P.D. The lot fed on ensilage alone, although similarly cut off from stubble feed at the same time, did not show any cases of T.P.D. Because the number of ewes carrying twin lambs—most susceptible—was few the non-appearance of T.P.D. cannot be stated as directly due to the ensilage ration. A further experiment using a larger number of sheep is necessary to test the effectiveness of feeding large quantities of ensilage to prevent an outbreak of T.P.D.. Although nine cases of T.L.D. occurred in the 120 experimental ewes being hand-fed, only one case—triplet lambs—occurred amongst the remaining 323 pregnant ewes on the property which did not require to be hand-fed.

4. Oats alone showed the least loss of weight. Cases of T.P.D. occurred first in lots fed on oats and ensilage plus bran respectively.

5. The outbreak of T.P.D. followed a period of low maximum temperatures, and generally cold conditions following after rain. The necessity for well-sheltered lambing paddocks is indicated by this.

6. Of the nine cases occurring five showed less mean loss, while four showed a greater mean loss in weight than the mean loss of the 10 ewes of the same breeding and on the same feed.

7. If the appearance of T.P.D. is not considered, then on the basis of the values shown, oats showed the best result, but at the highest cost. As far as body weight was concerned, a good sample of chaff did not show any significantly different result from ensilage and ensilage plus bran and green lucerne. There was little difference between the cost of chaff, ensilage, and green lucerne, but ensilage plus bran was more costly. While cereal ensilage plus a concentrate gave no better results than chaff as far as body weight is concerned, the value of ensilage for ewes with lamb at foot has not been assessed. The value of ensilage in this regard may be much greater than a dry feed, for apart from helping the ewe before lambing, by maintenance of good body tone, its succulence would assist the ewe very materially in maintaining adequate milk supplies in the absence of greenfeed.

8. For the whole series the Dorset Horn-Merino half-bred ewes responded better to hand-feeding than did the Merino ewes.

9. At this period of the year pregnant ewes will consume from $\frac{1}{4}$ oz. to $\frac{1}{2}$ oz. daily of the salt lick supplied.

10. It appears that the maintenance standards published abroad are too high under general South Australian sheep-feeding conditions by approximately the equivalent of 1 lb. of fat per week. This is most probably due to more favorable temperatures and general climatic conditions.

Acknowledgements.—My thanks are due to Dr. A. R. Callaghan, Principal, and Mr. A. R. Hickinbotham, Lecturer in Chemical and Physical Sciences, for their helpful suggestions and kind assistance, which enabled me to carry out this work and to report on the same.

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SOUTH AUSTRALIAN COMMITTEE OF AUSTRALIAN DAIRY COUNCIL.

SOUTH-EASTERN PASTURE COMPETITION, 1933.

This year another pasture competition was arranged for dairymen who milked not less than seven (7) cows in the South-Eastern districts.

Nine (9) entries were received, and these were judged between November 24th and December 6th by Mr. E. S. Alcock, Agricultural Instructor for the South-Eastern District. The soil type varied from light, sandy, and volcanic loam to the reclaimed peaty soils from Rendelsham and Robe.

Density of Sward.—With such a variation of soil type it was only natural to find some variation in the sward of pastures. On the lighter soils, subterranean clover and Wimmera rye grass gives an excellent pasture, whilst on the lower lying, peaty soils strawberry clover, black medic, white clover, and perennial rye grass are all suitable.

Quality of Pasture.—In this connection more attention could be given to frequent grazing or cutting of pasture. In this way the feed is not allowed to grow away from the animals, and thus become long, rank, and unpalatable.

Freedom from Useless Plants.—These can be controlled provided the pasture is carefully fertilised and grazed, and also by the use of the grass mower at certain times of the year. Phosphatic manures stimulate the growth of legumes such as clovers, &c. Nitrogenous manures increase the growth of the grasses. It will be found easier to establish grasses in a paddock that has carried clover for several years, because the legumes are able to extract the nitrogen from the air and store it in the soil for the use of the grasses.

General Management.—Under this heading more attention can be given to systematic grazing, so that new growth is developed over the largest period possible. Top dressing needs to be carefully carried out, and the fertiliser regularly distributed over the surface of the ground, thus promoting an even growth of pasture. Large fields should be subdivided so that they may be grazing in rotation, whilst the planting of suitable trees for shade and shelter, together with the provision of adequate water supplies, are matters requiring recognition if full pasture returns are to be secured.

Area.—Points have been awarded on the following basis according to the area submitted:—2 points for each 5 acres or portion thereof, with a maximum of 10 points. Therefore not less than 25 acres are needed to secure maximum points under this heading.

The points awarded to each competitor are shown in the following table:—

Name and Address.	Position.	Density of Sward. 30	Quality of Pasture. 25	Freedom from Useless Plants. 20	General Management. 15	Area. 10	Total. 100
Mrs. G. D. Stuckey, Rendelsham.....	1	28	23	18	12	8	89
S. Shopherd, Kybybolite....	2	26	20	19	13	10	88
W. K. Chambers, Mil Lel ..	3	23	20	20	12	10	85
F. C. Caine (1), Kongorong .	4	27	19	17	11	10	84
L. F. Coop, Glencoe West...	5	24	20	17	13	8	82
R. J. Wookey, Robe	6	25	22	17	11	6	81
W. M. Laslett, Allandale ...	—	22	19	17	13	10	81
F. C. Caine (2), Kongorong .	8	25	17	16	10	10	78
Mrs. G. D. Stuckey, Rendelsham.....	9	20	19	15	10	8	72



STAR THISTLE (*Centaurea calcitrapa* L.)

A. One of the individual flowers of which the "head" is composed.
 B. A "head" or thistle, in fruit, showing the formidable involucral bracts—hence the comparison to calthrops.
 C and D. Two extreme forms of involucral bracts.
 E. Seeds.

SAFFRON THISTLE (*Carthamus lanatus* L.).

1. Stem-clasping leaf. 2, 3, 4, 5. All stages, from a floral leaf to a bract. 6. Individual florets.
 7. Anther showing bristly appearance at upper part of filament. 8. Fruit, crowned with the pappus and the remains of a floret. 9. Extreme forms of the scales of the pappus.

IMPORTANT WEEDS OF SOUTH AUSTRALIA.

[By G. H. CLARKE, B.Sc., Botanist at the Roseworthy Agricultural College.]

NOS. 2 AND 3.—THE STAR AND SAFFRON THISTLES.

(*Centaurea Calcitrapa*, L., and *Carthamus lanatus*, L.)

In view of the confusion which exists with regard to the two above-mentioned thistles, it is proposed to deal with them together in a single descriptive article, and, in accordance with a suggestion made by the Director of Agriculture (Professor A. J. Perkins), the two have been illustrated in color on the one plate, the figures being adapted from black and white drawings of the two plants in the late Mr. J. H. Maiden's "Weeds of New South Wales."

Both plants are easily recognisable in the field, the Star Thistle by its bushy spreading habit and very numerous heads of pink or purple flowers, the Saffron by its more erect mode of growth, its greater rigidity, and by the fewer and larger heads, the individual florets of which are yellow in color. Unfortunately, the latter plant has been referred to at times as the Star Thistle, and so has come to be known to a good many farmers by a name which really belongs to an entirely different species. It is difficult to trace where this error originated, but much of the present-day confusion is due to the unfortunate wording of an Act of Parliament, passed by the Legislature in 1887 with the object of preventing the further spread of *Carthamus lanatus*, the plant being referred to, however, as the Star Thistle. Not that the misnomer was entirely without a beneficial result; for, though not intended for *Centaurea Calcitrapa*—the Star Thistle proper—the wording of the Act was such that it applied to both thistles, a state of affairs by no means undesirable, since both weeds were equally objectionable at the time.

Another factor tending to create confusion is that, from the point of view of aptness, the name "Star Thistle" can be applied equally well to either plant. In both the flower-head is surrounded by an involucre composed of a number of whorls of sharp-pointed leaves or bracts, suggestive of a star. One of the great difficulties associated with the use of vernacular names for plants is the paucity of adequately descriptive names as compared with the large number of species requiring them. It is manifestly impossible to name several thousand specifically distinct plants from a vocabulary of a few hundred terms, many of which are based upon characters common to a dozen or more species. Such names as "Milk-weed," for example, might seem to be eminently suitable for plants with a milky sap; but when it is realised that this character is present in many different species, belonging to widely different families, and with fundamentally different properties, the inadequacy of such a name for any one plant becomes at once apparent. Star-like formations of leaves or bracts are by no means uncommon, even within the thistle family, so that the name "Star Thistle" might be given to any one of a number of such forms without erring against descriptive accuracy. Actually, however, this name has come to be applied and belongs to certain species of the botanical genus *Centaurea*, and especially to the purple-flowered *Centaurea Calcitrapa*, which is so common along the roadsides during the summer months.

To refer to the *Carthamus* as the "False" Star Thistle in contradistinction to the "True" Star Thistle, is obviously an attempt to compromise with usage having its origin in confusion between the two plants. The name "Woolly Star Thistle" is also open to the objection that, despite the specific name *lanatus*, many specimens

of Saffron Thistle are not noticeably woolly. The use of such adjectives seems, to the writer, to obscure rather than to clarify the position, and so, throughout the remainder of this account, *Carthamus lanatus* will be referred to as Saffron Thistle.

The Thistle Family.—The thistles constitute a relatively small group of plants, which belong, however, to one of the largest of the families of flowering plants. This family, which comprises about 900 genera, with over 13,000 species—more than one-tenth of the total number of flower-bearing species—is, none the less, one of the best defined and most easily recognisable of the entire series. It is the family *Compositae*, and derives its name from the compound or “composite” nature of the flower-heads, structures with the outward appearance of single flowers, but composed, in reality, of a variable number of minute flowers called “florets,” all aggregated together to form a compound inflorescence. Such is the type of floral structure present in Sunflowers, Chrysanthemums, Capeweed, Thistles, Dandelions, and all other representatives of the family. The single flowers of other families are usually protected in the bud stage, each by a whorl of leaf-like structures, called the calyx of the flower; in the aggregation of flowers making up the head of *Compositae*, the calyces of the individual florets are either undeveloped, or represented by scales or hairs, frequently appearing late, and then forming a structure, called the pappus, assisting in the dispersal of the seed or fruitlet. The entire flower-head, however, is surrounded by a number of whorls of leaf-like bracts, forming an involucre, which covers and protects the head during its early stages, the involucre thus serving the same purpose, in the case of the compositous flower-head, as the calyx of a normal flower. It is on account of its star-shaped involucre of sharp-pointed bracts that *Centaurea Calcitrapa* is called the Star Thistle.

Another character of the Composite family—and one of some practical importance—is the development of the individual florets of the head in succession. The single flowers of other families ripen their seeds at the same time, so that such plants are prevented from seeding if they are cut down when in flower. But in *Compositae* the florets are of different ages in the same head, the outer ones being considerably older than those nearer the centre. In the one head some florets will have set seed, while others have not even opened, and viable seeds (fruitlets) may be liberated, when dry, from plants which were hoed out at what seemed to be an early flowering stage.

The thistles are not, strictly speaking, a botanical group. They are more or less spiny plants belonging to one of the 13 tribes into which the family *Compositae* is subdivided. This tribe, the *Cynare*—so called from the contained genus *Cynara*, of which *C. Scolymus* is the true Artichoke and *C. Cardunculus*, the Cardoon or Wild Artichoke—includes a large number of species, many of which possess a bristly or spiny involucre, as well as being spiny, sometimes, on the leaves and stems. Such plants are thistles proper; but many *Cynareae* are not spinescent, and, in fact, the same genus may contain both thistles and non-thistles. The garden Cornflower, for example, is not a thistle, even though it answers to the botanical name *Centaurea Cyanus*, and belongs to the same genus as the Star Thistle. Sometimes other plants are referred to, loosely, as thistles. These may be members of other tribes of *Compositae*, like the Sow Thistle (*Sonchus oleraceus*), or they may belong to quite different families, as is exemplified by such names as Russian Thistle and Yellow Thistle, applied to species of the Saltbush and Poppy families respectively.

THE STAR THISTLE (*Centaurea Calcitrapa*, L.).

Botanical Name.—*Centaurea* is named after the Centaur Chiron, the legendary father of medicine, who, according to Greek mythology, was supposed to have used some such plant to cure the wound in his foot, caused by the arrow of Hercules. The Romans distinguished between a Greater Centaur and a Lesser

Centaurea, two plants which they regarded as being of medicinal value. The former was most probably a species of *Centaurea*, while the latter was the plant known as Common Centaury—often corrupted to “Century”—*Erythraea Centaurium*, L., a small plant with red flowers belonging to the family *Gentianaceae*. *Calcitrapa* (from L. *calx*, *calcis*, a heel, and *trappa*, a snare) is the same word as Caltrop. The caltrop of the Roman soldiers was a round ball with four iron spikes so disposed that, three of them being on the ground, the other pointed upwards, and was thrown under the feet of the horses during a hostile cavalry charge. The spiny involucre of the Star Thistle is suggestive of a miniature caltrop.

[Botanically, the Caltrop is *Tribulus terrestris*, a small prostrate plant with pinnate leaves and spinescent fruitlets, somewhat like those of a Three-corner Jack, and, like them, capable of penetrating and wounding the feet of animals. This plant is quite unrelated to the Star Thistle.]

Description of the Genus.—The genus *Centaurea* comprises between 300 and 500 species, belonging mostly to Europe, northern Africa, and Asia. Several other species are introduced weeds in the State, e.g., *C. solstitialis*, the Yellow Cockspur, and *C. melitensis*, the Maltese Cockspur, both of which are thistles; *C. nigra*, Knapweed, and *C. repens*. The latter is a perennial with an underground stem, and is difficult to eradicate.

The *Centaureas* are herbs with entire or pinnatifid leaves, seldom prickly, and with purple, blue, or yellow flowers. The involucre is globular or ovoid, the bracts numerous, ending either in a prickle or in a fringed or toothed appendage. The outer florets are usually larger than the other, and neuter. The receptacle has soft bristly hairs between the florets; the fruitlets are smooth, and bear a pappus of simple hairs or scales, or none.

Description of the Species.—*Centaurea Calcitrapa* is a coarse green bushy annual, or sometimes biennial, 1ft. to 2ft. high, more or less pubescent or slightly woolly. Stems rather slender, pale-colored, with numerous spreading branches, sometimes forming runners. Lower leaves deeply divided, with lanceolate toothed segments, and, in young specimens, often prostrate, the contiguous segments of adjacent leaves forming a series of flat concentric circles, and giving to the young plants a peculiar cob-webby appearance; stem-leaves pinnatisect with slender lobes. Flower-heads rather small, numerous, purple or pink, sessile among the upper leaves, or in the forks of the branches. Involucre of several rows of bracts, the middle ones ending each in a stout yellow spine, $\frac{1}{2}$ in. to 1 in. long, with 4 to 6 spinules arranged pinnately at the base; or the involucre may be barren and the bracts entire, and $\frac{1}{2}$ in. to 1 $\frac{1}{2}$ in. long. Fruitlets without a pappus, streaked with brown. Period of flowering: November to January.

Properties.—The Star Thistle is entirely useless; it is of no value as a fodder, either fresh or as ensilage, and its prickly growth hinders the movements of animals and covers the ground to the detriment of other herbage.

THE SAFFRON THISTLE (*Carthamus lanatus*, L.).

Botanical Name.—*Carthamus* (from Arabic *quartam*, to paint) is in allusion to the dyes obtainable from the flowers of the best-known species, *C. tinctorius*, L., the Safflower, or False Saffron plant of India. The species name *lanatus* (from L. *lana*, wool) is on account of the woolly appearance of some specimens of the thistle. A synonym for the plant is *Kentrophyllum lanatum*, DC. (Gr. *kentron*, a spine, and *phyllon*, a leaf, alluding to the sharp-pointed leaves).

The Genus Carthamus.—There are about 25 species of the genus belonging to the Mediterranean region, northern Africa, and Asia. They are annual plants, and are characterised by their spiny leaves, and also by having the flower-heads surrounded by a number of whorls of rigid spiny floral leaves outside the involucre

proper. The most important economic species is the Safflower (*C. tinctorius*), which is cultivated in Asia for its flowers. These contain a red dye known as carthamine, insoluble in water, and also a soluble yellow pigment, saffron-yellow. The former is the basis of a rouge, prepared by mixing the dried and powdered flowers with talc. The latter is used as an adulterant of, or as a substitute for the true Saffron (*Crocus sativus*, L.). Apart from *C. lanatus*, the only other species in this State is *C. glaucus*, an introduced thistle very similar to the Saffron, but with blue instead of yellow flowers.

Description of C. lanatus.—A stiff, minutely pubescent, and sometimes woolly annual, growing to a height of 1ft. to 3ft.. Stems pale-colored and rigid, at first erect, then becoming branched from about the middle upwards, the branches terminating in yellow flower-heads with a number of whorls of floral leaves surrounding and concealing the involucre proper. Leaves tough and rigid, dark-green in color, and very prominently veined, almost stem-clasping at the base, and pinnatifid into slender, rigid, and pungent lateral and terminal lobes. Floral leaves resembling the stem ones, but passing insensibly into the lanceolate, rigid, and sharp-pointed involucre bracts. Receptacle with soft bristles between the individual florets, which are all tubular and usually fertile, and longer than the involucre proper. Fruitlets smooth, mostly 4-ribbed, flattened on the top, about $\frac{1}{4}$ in. long, and with a pappus of short, slender scales. In flower: November to December.

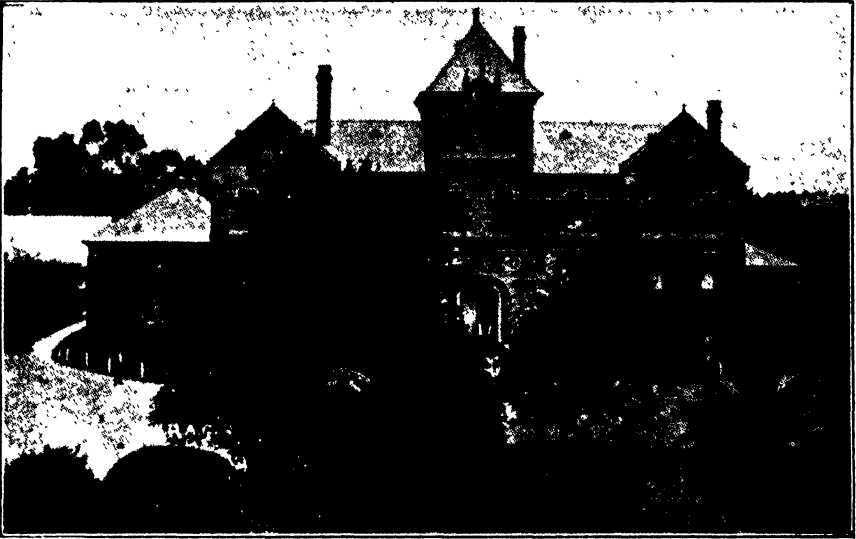
Properties.—Despite its toughness, the Saffron Thistle is said to be eaten by stock to some extent, especially in the seedling stages and in the form of ensilage. The claim has also been made that, by opening up the ground it allows moisture and air to enter, and so has a beneficial effect on the soil, and further, that a dense growth of the thistle prevents the ground from being denuded of herbage by summer winds, and favors a more luxuriant growth of grasses after the first autumn rains. But any such advantages as these are trivial in comparison with the harm done by the weed when allowed to grow unchecked. The mature growing plants are useless as fodder, and cover the ground with a prickly growth liable to cause injury to sheep and other animals. The plant seeds very freely, and is difficult to suppress unless very determined measures are taken against it before it comes into flower.

ERADICATION OF STAR AND SAFFRON THISTLES.

Both thistles are annual plants, and can be got rid of so long as they are prevented from forming seeds. As has been pointed out above, the seeds (fruitlets) of thistles are formed *successively* in the flower-head, so that the only certain way to prevent them from maturing is to cut down or otherwise destroy the plants *before* (not *during*) the flowering stage. Thoroughness is essential in such operations, and much labor may be wasted if some plants are allowed to escape, or if control measures are undertaken too late. But if the methods are conscientiously and, if necessary, repeatedly practised, there should be no difficulty with either of these thistles, provided that concerted action along the same lines is undertaken by neighboring landowners, district councils, and others concerned. In the case of the Saffron Thistle the plants retain their rigidity, even when dry, and so may be a cause of injury to grazing stock after they have been cut down. They should therefore, be burned, if possible, as soon as they are sufficiently dry.

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PURE BRED COWS COMPLETED OFFICIAL TEST

Herd Book No.	Name of Cow.	Owner and Address	Breed	Calved.
JUNIOR TWO-YEAR-OLDS.—				
34649	Hampden May Fern	J. A. J. Pfitzner, Hampden.....	Jersey	7/2/33
5370	Kiama Prettymaid	E. & A. Nicholls, Woodville	A.I.S.	20/10/32
34645	Hampden Blonde's Countess	J. A. J. Pfitzner, Hampden.....	Jersey	27/3/33
Not allotted	Murray Glen Griselda Burkeyle ..	C. J. Morris, Monteith	Friesian	11/10/32
"	Para Wirra Violet	J. H. Dawkins, Gawler	Jersey	13/1/33
"	Glen Ewin Rosebud	Jas. McEwin, Houghton	"	3/10/32
5367	Kiama Olive 5th	E. & A. Nicholls, Woodville	A.I.S.	3/3/33
34629	Pella Mercedes Kelly	C. E. Verco, Mount Compass	Jersey	10/10/32
Not allotted	Mayflower, Jellicoe 5th of Illawarra	A. Snell, Bolivar	A.I.S.	1/2/33
5297	River Glen Royal's Daisy	S. N. Bott, Murray Bridge	"	20/11/32
Not allotted	Anama Netherland Pearl	W. Hawker, Clare	Friesian	22/10/32
"	Ontario Mercedes	T. B. Brooks, Clarendon	Jersey	21/2/33
"	Eudunda Heather Lass	W. S. McAuliffe, Eudunda	"	19/10/32
"	Alinda Mercedes Dawn	A. Schulze, Paradise	"	29/9/32
"	Anama Dominoe's Belle	W. Hawker, Clare	Friesian	20/11/32
"	Cudlee Creek Viola	Mrs. W. A. Pool, Cudlee Creek	Jersey	23/2/33
"	Tuela Dewdrop	F. Coleman, Saddleworth	"	7/10/32
"	Tuela Lavender	F. Coleman, Saddleworth	"	8/10/32
35311	Austral Park Swirl	H. B. Walsh, Mount Barker	"	17/10/32
5352	The Bluff Swallow	H. B. Kuchel, Murray Bridge	A.I.S.	24/10/32
Not allotted	Murray Glen Flower Queen	C. J. Morris, Monteith	Friesian	28/1/33
23687	Eldorado Princess	Ayrbrook Farm Ltd., Aldgate	Ayrshire	30/11/32
Not allotted	Ninyeri Duchess	E. L. Goode, Narrung	Jersey	9/12/32
"	Murray Glen Netherland Sylvia ..	C. J. Morris, Monteith	Friesian	14/11/32
5350	The Bluff Searchlight's Janet ..	H. B. Kuchel, Murray Bridge	A.I.S.	11/11/32
Not allotted	Illawarra Molly	A. Snell, Bolivar	"	3/2/33
"	Wooroora Bonnie June	A. B. Sieber, Eudunda	Jersey	15/1/33
"	Tuela Flower	F. Coleman, Saddleworth	"	19/10/32
"	Illawarra Lady May	A. Snell, Bolivar	A.I.S.	7/2/33
"	Ninyeri Mayflower	E. L. Goode, Narrung	Jersey	4/3/33
5354	The Bluff Viola	H. B. Kuchel, Murray Bridge	A.I.S.	21/9/32
Not allotted	Eudunda Rhonda's Hope	W. S. McAuliffe, Eudunda	Jersey	24/1/33
5417	Northfield Royal's Blossom	Insp.-Gen. of Hospitals, Northfield	A.I.S.	27/9/32
Not allotted	Eudunda Fride's Sunshine	W. S. McAuliffe, Eudunda	Jersey	21/1/33
35763	Girrahween Beasle	A. B. Sieber, Eudunda	"	4/2/33
34527	Pella Madeira Kelly	W. P. Eckermann, Eudunda	"	2/2/33
34638	Delma Doris	R. J. Laing, Gumeracha	"	8/3/33
Not allotted	Murray Glen Netherland Pauline ..	C. J. Morris, Monteith	Friesian	21/11/32
"	Kyby Sunbeam	Government Farm, Kybybolite ..	Ayrshire	28/3/33
"	Staghorn Fancy's Countess	Mrs. D. G. Steven, Kooringa	Jersey	20/2/33
"	Para Vale Lady McEwin	A. J. Marrett, Saddleworth	"	25/10/32
34689	Wooroora Royal Gem	A. B. Sieber, Eudunda	"	1/3/33
34650	Hampden Rae's Napoleonette	J. A. J. Pfitzner, Hampden.....	"	23/2/33
Not allotted	Anama Transvaal Starlight	W. Hawker, Clare	Friesian	13/12/32
"	Para Vale Molly	A. J. Marrett, Saddleworth	Jersey	10/12/32
35305	Austral Park Sparklett	H. R. Walsh, Mount Barker	"	18/10/32
Not allotted	Para Wirra Beauty	J. H. Dawkins, Gawler	"	12/12/32
"	Kyby Beasle	Government Farm, Kybybolite ..	Ayrshire	10/12/32
"	Kyby Marge	Government Farm, Kybybolite ..	"	28/11/32
"	Glenrobin Margold	J. O. Robinson, Meadows	"	13/11/32
"	Pembroke Bonny Lotus	Mrs. C. W. Ansell, Bletchley	Jersey	5/12/32
35295	Austral Park Gold Tip	H. R. Walsh, Mount Barker	"	25/10/32
Not allotted	Glenowie Flower Patch	H. Mountstephen, Monteith	Friesian	23/3/33
"	Ferden Lady Butterfly	E. O. Traeger, Eudunda	Jersey	6/2/33
"	Para Vale Rose	A. J. Marrett, Saddleworth	"	21/12/32
5349	The Bluff Opal	H. B. Kuchel, Murray Bridge	A.I.S.	9/1/33
Not allotted	Cudlee Creek Flower	Mrs. W. A. Pool, Cudlee Creek ..	Jersey	13/11/32
5344	The Bluff Amy	H. B. Kuchel, Murray Bridge	A.I.S.	11/12/32
Not allotted	Pella Attraction Lotus	W. P. Eckermann, Eudunda.....	Jersey	13/12/32
"	Mira Chana Sheila	H. B. Peters, Mount Compass	"	12/3/33
"	Kyby Stella	Government Farm, Kybybolite ..	Ayrshire	23/10/32
5377	Kiama Viscount's Bess 3rd	E. & A. Nicholls, Woodville	A.I.S.	23/3/33
Not allotted	Para Vale Columbine	A. J. Marrett, Saddleworth	Jersey	17/12/32

FROM JULY 1st, 1933, TO DECEMBER 31st, 1933.

Age at Calving.	Total Milk.	Average Test.	Total Butter-fat.	Days Tested.	Sire.	Remarks.
Y. M. D.	Lbs.		Lbs.			
BUTTERFAT STANDARD, 230LBS.						
1 9 17	5,569½	7-22	401-04	273	Bellefairs Blonde's Aristocrat	—
2 3 13	10,126½	3-96	400-89	273	Viscount of East View	—
2 1 5	6,852	5-60	383-43	273	Bellefairs Blonde's Aristocrat	—
1 8 22	9,892½	3-69	364-89	273	River Glen Lord Echo Griselda	—
1 10 15	6,939	5-19	360-47	273	Para Wirra Sunshine Twylsh II.	—
1 9 18	6,087	5-87	357-24	273	Brucevale Lord Fancy Starbright	—
2 1 28	9,039	3-87	349-81	273	Pembroke of Greyleigh	—
1 9 3	6,991½	5-00	349-50	273	Dalebank Noble Duke	—
2 5 15	9,132	3-82	348-69	273	Wingcewah Miller	—
1 10 14	7,954½	4-28	340-21	273	Dorrie's Royal of Wangara	—
2 2 25	10,212	3-20	327-27	273	Longbeach Netherland King II.	—
1 8 27	6,703½	4-87	326-63	273	Dalebank Viola's Duke	—
1 6 25	5,292	6-10	322-80	273	Stonyfell Rambler	—
1 9 18	4,903½	6-57	322-22	273	Dalebank Mercedes Duke	—
2 2 24	9,354	3-42	319-64	273	Totara Pontiac Dainty Boy	—
1 7 14	6,007½	5-20	312-45	273	Producer 3rd of Dalebank	—
2 2 17	5,475	5-68	310-79	273	Brinkworth Chris.	—
2 2 16	6,513	4-71	306-95	273	Hampden Winsome King	—
1 7 10	5,359½	5-68	304-62	273	Trecarne Shelk	—
2 2 24	8,288½	3-66	303-38	273	Swallow's Lighthouse 3rd of Wangara ..	—
1 10 25	8,115	3-70	300-63	273	Murray Glen Netherland King	—
1 11 24	7,116	4-22	300-59	273	Perfection of The Valley	—
2 3 0	6,550½	4-53	296-86	273	Morella Mercedes Sweet Duke	—
	7,830	4-58	358-78	330		
1 9 21	7,605	3-85	292-55	273	Murray Glen Netherland King	—
2 1 19	8,341	3-46	288-66	273	Melba's Searchlight of Wangara	—
2 5 14	7,567½	3-77	284-99	273	Wingcewah Miller	—
1 7 14	5,292	5-33	282-24	273	Wollingurrie Cavalier's Silver King ..	—
2 2 20	5,713½	4-88	278-74	273	Brinkworth Chris.	—
2 4 29	6,297	4-41	277-82	273	Illawarra Handsome Hero	—
2 3 16	5,637	4-89	275-63	273	Hampden Mayflower King	—
2 1 3	7,372½	3-73	275-34	273	Swallow's Lighthouse 3rd of Wangara ..	—
1 8 5	4,501½	6-10	274-54	273	Stonyfell Rambler	—
1 11 1	7,140	3-82	272-51	273	Royal's Success of Arrawatta	—
1 8 29	6,436	5-01	272-17	273	Eudunda Star of Dawn	—
2 3 14	4,194	6-43	269-73	273	Rosecliffe Bright Star	—
1 8 1	5,394	4-09	269-36	273	Werribee Combination	—
1 8 18	5,056	5-22	264-21	273	Delma Butter King	—
1 10 17	7,023	3-75	263-27	273	Murray Glen Netherland King	—
2 0 21	5,701½	4-60	262-37	273	Gowrie Park Scottish Dandy	—
1 9 11	4,638	5-65	261-90	273	Staghorn Northlark's Masterpiece	—
1 7 20	5,587½	4-63	258-89	273	Para Wirra Cherry Pylon	—
1 8 11	4,902	5-21	255-26	273	Wollingurrie Cavalier's Silver King	—
1 11 29	4,669½	5-42	253-18	273	Bellefairs Blonde's Aristocrat	—
2 2 9	6,231	4-01	249-56	273	Longbeach Dutch Type 2nd	—
1 10 26	5,667	4-34	246-11	273	Para Wirra Cherry Pylon	—
1 8 28	4,498½	5-44	244-85	273	Trecarne Shelk	—
1 8 22	4,518	5-39	243-33	273	Para Wirra Sunshine Twylsh II.	—
2 0 17	5,809½	4-14	240-66	273	Gowrie Park Scottish Dandy	—
2 4 8	5,346	4-48	239-29	273	Gowrie Park Scottish Dandy	—
2 6 0	5,793	4-09	236-65	273	Angas Boy	—
2 3 18	4,542	5-10	235-66	273	Para Wirra Twylsh	—
1 9 21	4,405½	5-30	233-69	273	Austral Park Goldfinder	—
1 8 5	6,060	3-85	233-09	273	Glenowie Netherland Prince II.	—
1 5 20	3,951	5-90	233-00	273	Werribee Combination	—
1 10 13	4,837½	4-81	232-80	273	Para Wirra Cherry Pylon	—
2 1 20	6,071½	3-72	225-90	273	Swallow's Lighthouse 3rd of Wangara ..	—
1 10 6	4,267½	5-20	221-84	273	Producer 3rd of Dalebank	—
2 5 15	6,474½	3-34	216-21	273	Swallow's Lighthouse 3rd of Wangara ..	—
1 6 21	4,150½	5-20	215-93	273	Werribee Combination	—
1 7 0	3,751½	5-68	212-96	273	Timbungalong Larkspur's Masterlark	—
2 1 12	5,472	3-89	212-73	273	Gowrie Park Scottish Dandy	—
2 1 7	6,004½	3-47	208-15	273	Viscount of East View	—
1 10 21	4,071	5-11	208-04	273	Para Wirra Cherry Pylon	—

PURE-BRED COWS COMPLETED

Herd Book No.	Name of Cow.	Owner and Address.	Breed.	Calved.
JUNIOR TWO-YEAR-OLDS.—BUTTERFAP				
Not allotted	Kyby May Queen	Government Farm, Kybybolite ...	Ayrshire	10/2/33
34620	Brinkworth Rosebud	C. C. T. Ottens, Brinkworth	Jersey	10/3/33
Not allotted	Ontario Sweetbread	T. B. Brooks, Clarendon	"	13/3/33
34583	Alexandra Queen Clementine	A. Kelly, Milang	"	5/2/33
Not allotted	Pembroke Duchess 3rd	Mrs. C. W. Ansell, Bletchley	"	14/11/32
"	Yatala Wanda	Insp.-Gen. of Hospitals, Northfield	A.I.S.	24/12/32
"	Kyby Violet	Government Farm, Kybybolite ...	Ayrshire	25/10/32
5415	Northfield Limestone's Flirt 3rd	Insp.-Gen. of Hospitals, Northfield	A.I.S.	10/2/33
34531	Pella Twylish Queen	W. P. Eckermann, Eudunda	Jersey	25/11/32
Not allotted	Eudunda Buttercup	W. S. McAuliffe, Eudunda	"	4/1/33
"	Glenrobin Onyx	J. O. Robinson, Meadows	Ayrshire	7/11/32
"	Ontario Pansy	T. B. Brooks, Clarendon	Jersey	19/5/33
"	Brinkworth Joybell	C. C. T. Ottens, Brinkworth	"	3/4/33
"	Illawarra Gem 3rd	A. Snell, Bolivar	A.I.S.	11/3/33
5418	Northfield Royal Flirt 2nd	Insp.-Gen. of Hospitals, Northfield	"	15/1/33
Not allotted	Barina May Segis	L. H. & P. C. Giles, Auburn	Friesian	10/2/33
"	Glenrobin Neta	J. O. Robinson, Meadows	Ayrshire	25/10/32
34648	Hampden Lutimena	J. A. J. Pfitzner, Hampden	Jersey	7/4/33
Not allotted	Barina Beets Duchess	L. H. & P. C. Giles, Auburn	Friesian	18/2/33
34618	Woodside Lily's Bouquet	E. W. Pfitzner, Eudunda	Jersey	17/1/33
34640	Delma Golden Countess	E. W. Pfitzner, Eudunda	"	9/7/33
5353	The Bluff Vanity	H. B. Kuchel, Murray Bridge	A.I.S.	17/4/33
Not allotted	Long Flat Cinderella 2nd	Mrs. W. J. Spackman, Long Flat ..	"	14/8/33
"	Long Flat Mayflower 2nd	Mrs. W. J. Spackman, Long Flat ..	"	26/8/33
SENIOR TWO-YEAR-OLDS.—BUTTERFAP				
31103	Hampden June	J. A. J. Pfitzner, Hampden	Jersey	23/2/33
31080	Hampden Carissa	J. A. J. Pfitzner, Hampden	"	31/12/32
31084	Brinkworth Rhodora	C. C. T. Ottens, Brinkworth	"	27/2/33
31088	Eudunda Reno	W. S. McAuliffe, Eudunda	"	15/2/33
31108	Hampden Melody	G. D. Oster, Balaklava	"	2/10/32
31080	Para Vale Lady Starbright	A. J. Marrett, Saddleworth	"	2/10/32
34517	Para Virra Sunbeam 2nd	J. H. Dawkins, Gawler	"	11/3/33
34513	Para Virra Eileen 4th	J. H. Dawkins, Gawler	"	24/2/33
20020	Glen Alvie Sweet Dinah	A. P. Spehr, Mount Gambler	"	4/11/32
2316	The Bluff Faith	H. B. Kuchel, Murray Bridge	A.I.S.	21/11/32
31081	Para Vale Lucy	A. J. Marrett, Saddleworth	Jersey	20/11/32
2318	The Bluff Hope	H. B. Kuchel, Murray Bridge	A.I.S.	28/12/32
Not allotted	Melara Princess	Mrs. D. G. Steven, Koorunga	Jersey	10/10/32
"	Barton Croft Daphne	A. J. Marrett, Saddleworth	"	16/11/32
34562	Burnlea Blandina 3rd	J. M. Hudd, Bletchley	"	24/1/33
Not allotted	Cudlee Creek Shy Girl	Mrs. W. A. Pool, Cudlee Creek ..	"	15/3/33
2340	Northfield Limestone's Flirt II.	Insp.-Gen. of Hospitals, Northfield ..	A.I.S.	21/11/32
Not allotted	Anama Netherland Daisy	W. Hawker, Clare	Friesian	28/1/33
31037	Pella Amy Johnson	W. P. Eckermann, Eudunda	Jersey	2/2/33
Not allotted	Glen Ewin Countance	C. E. Verco, Mount Compass	"	4/4/33
JUNIOR THREE-YEAR-OLDS.—				
3310	Anama Pontiac Queen	W. Hawker, Clare	Friesian	28/2/33
2292	River Glen Ruth's Daisy	S. N. Bott, Murray Bridge	A.I.S.	9/11/32
31101	Hampden Jessamine	E. W. Pfitzner, Eudunda	Jersey	19/10/32
34667	Roseworthy Princess 41st	Agricultural College, Roseworthy ..	"	18/2/33
Not allotted	Para Virra Maglona 2nd	J. H. Dawkins, Gawler	A.I.S.	10/11/32
5368	Kiama Pembroke's Olive	E. & A. Nicholls, Woodville	"	11/1/33
Not allotted	Balaklava Griselda Violet	A. E. Middleton, Balaklava	Friesian	30/1/33
"	Cotswold Sheila	H. B. Peters, Mount Compass	Jersey	25/10/32
34671	Roseworthy Rosella	Agricultural College, Roseworthy ..	"	2/2/33
34276	Willis Vale Twinkle	A. P. Spehr, Mount Gambler	"	12/10/32
5376	Kiama Viscount's Bess 2nd	E. & A. Nicholls, Woodville	A.I.S.	14/4/33
Not allotted	Riverdale Inka Pauline	Glen Legoe & Co., Binnun	Friesian	19/11/32
"	Kyby Blossom	Government Farm, Kybybolite ...	Ayrshire	18/11/32
"	Kyby Roma	Government Farm, Kybybolite ...	"	18/11/32
"	Kyby Sheila	Government Farm, Kybybolite ...	"	25/3/33
2353	Illawarra Noble's Cinderella	Mrs. W. J. Spackman, Long Flat ..	A.I.S.	6/11/32
Not allotted	Kyby Blende	Government Farm, Kybybolite ...	Ayrshire	26/3/33

OFFICIAL TEST—continued.

Age at Calving.	Total Milk.	Average Test.	Total Butter- fat.	Days Tested.	Sire.	Remarks.
Y. M. D.	Lbs.		Lbs.			
STANDARD 230LBS.—continued.						
1 11 17	5,148	4-03	207-70	273	Gowrie Park Scottish Dandy	—
1 7 18	4,054½	5-03	203-03	273	Repulse of Somerville	—
1 8 26	4,245	4-76	201-88	240	Dalebank Viola's Duke	—
1 10 8	3,318	6-00	199-08	273	Hampden Queen's Repeater	—
1 8 13	3,510	5-47	192-11	240	Para Wirra Twylish	—
2 1 3	5,133	3-60	188-05	273	Yatala Fleetwood	—
2 1 18	4,254	4-31	183-02	273	Gowrie Park Scottish Dandy	—
2 1 1	5,161½	3-40	178-41	273	Melba's Limelight of Wangara	—
1 9 17	3,222	5-48	176-72	273	Werribee Combination	—
2 4 13	2,985	5-49	163-87	180	Stoneyfell Rambler	—
1 11 4	3,915	3-98	155-93	210	Glenrobin Mischief	—
1 8 16	3,202½	4-63	148-40	180	Dalebank Viola's Duke	—
1 11 18	2,730	5-23	142-73	180	Brinkworth Juggler	—
1 6 27	3,750	3-74	140-39	210	Wingcewah Miller	—
1 11 12	3,661½	3-76	137-83	273	Janet's Royal of Northfield	—
1 9 22	4,192½	3-18	133-19	150	Bolobek Topsail	—
2 1 17	2,985	4-30	128-26	210	Oakbank Neil	—
2 0 15	1,890	6-26	118-29	120	Bellefairs Blonde's Aristocrat	—
1 10 10	3,600	3-13	112-82	120	Bolobek Topsail	—
1 7 24	2,625	4-23	111-10	180	Anemone's Lily Oxford	—
1 10 29	1,650	5-85	96-56	90	Beauty's King of Somerville	—
2 0 23	1,935	3-90	75-54	90	Swallow's Limelight 3rd of Wangara	Exemption
1 10 29	2,085	2-86	59-02	90	Long Flat Noble's Triumph	Exemption
1 11 5	1,275	3-86	49-20	60	Wangara Ruth's Limelight	Exemption
BUTTERFAT STANDARD, 250LBS.						
2 8 22	7,080	5-83	412-88	273	Hampden Olive's King	—
2 6 3	6,937½	5-76	399-85	273	Hampden Olive's King	—
2 9 4	6,987	5-63	393-58	273	General Chris. of Penrhyn	—
2 10 14	6,145½	6-22	382-04	273	Ruby's Repulse of Hampden	—
2 6 9	6,664½	5-63	375-28	273	Hampden Olive's King	—
2 11 2	6,864	5-45	374-38	273	Brucevale Lord Fancy Starbright	—
2 10 22	9,211½	4-04	372-37	273	Banyule Pylon	—
2 9 26	6,604½	5-22	344-05	273	Banyule Pylon	—
2 10 17	6,054	5-35	323-61	273	Werribee Fancy Masterpiece	—
2 9 28	8,151	3-85	313-80	273	Swallow's Limelight 3rd of Wangara	—
2 10 14	6,541½	4-57	299-06	273	Dalebank Miklad 12th	—
2 11 5	7,575½	3-76	284-93	273	Swallow's Limelight 3rd of Wangara	—
2 9 3	5,956½	4-53	269-56	273	Melara Royal Silvermine	—
2 6 20	5,586	4-80	267-98	273	Rockness Goldsocks	—
2 7 16	4,587	5-70	261-66	273	Boroni of Rockness	—
2 7 23	4,450½	5-75	256-02	273	Wompin Master Leon	—
2 9 27	5,982	3-73	223-52	273	Melba's Limelight of Wangara	—
2 0 4	6,615	3-14	207-52	150	Totara Pontiac Dainty Boy	Withdrawn.
2 7 4	4,047	5-10	206-57	273	Dalebank Noble Duke	—
2 8 13	3,150	5-36	168-94	150	Brucevale Lord Fancy Starbright	—
BUTTERFAT STANDARD, 270LBS.						
3 5 3	13,491	3-55	478-55	273	Totara Pontiac Dainty Boy	—
3 0 19	10,531½	4-42	405-08	273	Ruth's Limelight of Wangara	—
3 4 6	6,129	6-24	382-36	273	Maid's Success of Linden	—
3 3 17	6,777	5-52	373-90	273	Merceda Sweet Duke of Glen Iris	—
3 0 5	6,804	5-28	362-36	273	Banyule Pylon	—
3 1 10	9,147	3-87	354-38	273	Pembroke of Greyleigh	—
3 3 1	10,324½	3-42	352-84	273	Glenowie Beets Griselda	—
3 2 13	6,859½	5-09	349-46	273	Duke of Dalebank	—
3 2 29	5,901	5-58	329-56	273	Merceda Sweet Duke of Glen Iris	—
3 2 6	7,155	4-55	325-77	273	Camellis' King of Willis Vale	—
3 3 1	7,800	4-07	317-14	240	Viscount of East View	—
3 3 20	9,633	3-28	315-64	273	Lucindale Paul Indi	—
3 1	6,817½	4-26	290-38	273	Loyalty of Bridge View	—
3 1	6,415½	4-49	288-08	273	Ida's Laird of Gowrie Park	—
3 1	7,536	3-79	285-42	273	Gowrie Park Scottish Dandy	—
3 0 27	6,487½	4-31	279-68	273	Noble of Illawarra	—
3 1 2	6,019½	4-39	264-29	273	Gowrie Park Scottish Dandy	—

PURE-BRED COWS COMPLETED

Herd Book No.	Name of Cow.	Owner and Address.	Breed.	Calved.
JUNIOR THREE-YEAR-OLDS.—				
2346	Northfield Limelight's Blossom	Insp.-Gen. of Hospitals, Northfield	A.I.S.	15/10/32
5413	Liberton Charm	Insp.-Gen. of Hospitals, Northfield	"	9/12/32
2306	Sunnybrook Flirt's Rose	J. J. Farrow, Gawler	"	1/12/32
2309	Sunnybrook Swallow	J. J. Farrow, Gawler	"	30/11/32
2347	Northfield Limelight's Dora	Insp.-Gen. of Hospitals, Northfield	"	27/11/32
2798	Glenlea Fl Fl 4th	E. T. Vinall, Brighton	Guernsey	6/3/33
5414	Liberton Flirt 3rd	Insp.-Gen. of Hospitals, Northfield	A.I.S.	6/3/33
2348	Northfield Limelight's Flirt	Insp.-Gen. of Hospitals, Northfield	"	24/3/33
Not allotted	Glenowie Princess Posch	H. Mountstephen, Monteith	Friesian	22/4/33
6716	Crumple of Alva	A. N. McArthur, Millicent	A.I.S.	18/3/33
SENIOR THREE-YEAR-OLDS.—				
3648	Murray Glen Inka Olda	C. J. Morris, Monteith	Friesian	20/1/33
31033	Para Wirra Millie's Goldstream 2nd	J. H. Dawkins, Gawler	Jersey	6/2/33
28157	Woorora Dorette	A. Kelly, Millang	"	9/2/33
31102	Hampden Juanita	J. A. J. Pfitzner, Hampden	"	23/2/33
28093	Pella Silver Lotus	W. P. Eckermann, Eudunda	"	11/12/32
Not allotted	Murray Glen Griselda's Mercury	C. J. Morris, Monteith	Friesian	10/11/32
"	Cotswold Gem	H. B. Peters, Mount Compass	Jersey	20/11/32
31110	Hampden Rachel	J. A. J. Pfitzner, Hampden	"	10/11/32
34675	Roseworthy Twilight	Agricultural College, Roseworthy	"	2/3/33
31156	Scrub View's Dainty's Lass	A. B. A. Weckert, Brinkworth	"	30/12/32
Not allotted	Kyby Wanda	Government Farm, Kybybolite	Ayrshire	23/12/32
31034	Para Wirra Miss Millie 2nd	J. H. Dawkins, Gawler	Jersey	28/9/32
31084	Oakhill Carnation 5th	Mrs. M. I. Dittreich, Hampden	"	10/10/32
31123	Roseworthy Floral	Agricultural College, Roseworthy	"	1/4/33
2533	Glenlea Fl Fl 3rd	E. T. Vinall, Brighton	Guernsey	29/3/33
2320	The Bluff Masher's Trinket	H. B. Kuchel, Murray Bridge	A.I.S.	24/10/32
21833	Kyby Boronia 2nd	Government Farm, Kybybolite	Ayrshire	16/10/32
Not allotted	Kyby Snowdrop	Government Farm, Kybybolite	"	16/11/32
31005	Pembroke Fashion	Mrs. C. W. Ansell, Bletchley	Jersey	1/6/33
28091	Pella Jean Kelly	W. P. Eckermann, Eudunda	"	26/1/33
Not allotted	Melvin Anemone	A. Schulze, Paradise	"	13/5/33
34666	Roseworthy Princess 40th	Agricultural College, Roseworthy	"	23/3/33
Not allotted	Barton Croft Daphne	A. J. Marrett, Saddleworth	"	2/11/33
JUNIOR FOUR-YEAR-OLDS.—				
3652	Murray Glen Netherland Buttergirl	C. J. Morris, Monteith	Friesian	23/2/33
3311	Anama Segis Bloom	W. Hawker, Clare	"	6/3/33
2332	Klama Bess 4th	E. & A. Nicholls, Woodville	A.I.S.	15/12/32
31076	Womplini Moss Rose	Jas. McEwin, Houghton	Jersey	9/12/32
31030	Para Wirra Eileen 3rd	J. H. Dawkins, Gawler	Jersey	15/3/33
31122	Roseworthy Fay	Agricultural College, Roseworthy	"	18/2/33
3653	Murray Glen Netherland Princess	C. J. Morris, Monteith	Friesian	17/3/33
28137	Balaklava Skylee's Colleen	A. E. Middleton, Balaklava	Jersey	30/10/32
3651	Murray Glen Netherland Butterfly	C. J. Morris, Monteith	Friesian	15/12/32
31125	Roseworthy Princess 36th	Agricultural College, Roseworthy	Jersey	29/1/33
24084	Kyby Maggie 4th	Government Farm, Kybybolite	Ayrshire	17/3/33
24988	Eudunda Chieftain's Lass	W. S. McAuliffe, Eudunda	Jersey	7/10/32
28094	Pella Solanum	W. P. Eckermann, Eudunda	"	2/3/33
5365	Klama Mayflower 7th	E. & A. Nicholls, Woodville	A.I.S.	9/2/33
31118	Womplini Jazz Girl	Mrs. W. A. Pool, Cudlee Creek	Jersey	15/2/33
28145	Delma Countess	E. W. Pfitzner, Eudunda	"	3/1/33
21832	Kyby Bess	Government Farm, Kybybolite	Ayrshire	20/12/32
21834	Kyby Judith	Government Farm, Kybybolite	"	2/12/32
21835	Kyby Lella	Government Farm, Kybybolite	"	22/12/32
2313	Waughope Lucy 6th	Dunleith Pas. Co., Ashbourne	A.I.S.	30/8/33
SENIOR FOUR-YEAR-OLDS.—				
28084	Para Wirra Millie's Beauty	J. H. Dawkins, Gawler	Jersey	13/2/33
24857	Woorora Bonnie Pearl	A. B. Sieber, Eudunda	"	16/3/33
31117	Womplini Belle	Mrs. W. A. Pool, Cudlee Creek	"	9/10/32
28163	Morella Belle 3rd	E. L. Goode, Narrung	"	22/1/33
28136	Barton Croft Sweetbriar	A. J. Marrett, Saddleworth	"	10/2/33
17892	Masher's Lanka of the Bluff	H. B. Kuchel, Murray Bridge	A.I.S.	8/11/32
24990	Brinkworth Myra	C. C. T. Ottens, Brinkworth	Jersey	24/12/32
17884	Primrose of Toora	Insp.-Gen. of Hospitals, Northfield	A.I.S.	3/11/32
17889	Daphne of the Bluff	H. B. Kuchel, Murray Bridge	"	16/1/33
18365	Limelight's Janet of Northfield	Insp.-Gen. of Hospitals, Northfield	"	4/10/32
31116	Cudlee Creek Lucy	Mrs. W. A. Pool, Cudlee Creek	Jersey	15/3/33
2125	Glenlea Fl Fl 2nd	E. T. Vinall, Brighton	Guernsey	1/12/32
31128	Roseworthy Roselar	Agricultural College	Jersey	20/4/33

OFFICIAL TEST—continued.

Age at Calving.	Total Milk.	Average Test.	Total Butterfat.	Days Tested.	Sire.	Remarks.
Y. M. D.	Lbs.		Lbs.			
BUTTERFAT STANDARD 270LBS—continued.						
3 0 19	5,938½	4.12	244.47	273	Melba's Limelight of Wangara	—
3 0 28	5,530½	4.12	228.01	273	Limit of East View	—
3 4 11	5,070	4.49	227.80	240	Jellicoe's Belmont of Illawarra	Dry
3 3 1	5,422½	3.69	200.10	240	Jellicoe's Belmont of Illawarra	Dry
3 1 2	5,011½	3.91	195.91	273	Melba's Limelight of Wangara	—
3 1 21	3,495	5.47	191.20	240	Glenlea Hilda's Valour II.	Dry
3 4 13	4,716	3.89	183.49	273	Mariner of Greyleigh	—
3 3 4	4,062	4.18	169.70	273	Melba's Limelight of Wangara	—
3 2 21	4,020	4.11	165.22	90	Murray Glen Prince Wooraki	Exemption
3 5 0	2,175	3.63	78.86	90	The Hermitage Spkier's Boy 2nd	—
BUTTERFAT STANDARD, 290LBS.						
3 10 7	11,745	4.33	508.29	273	River Glen Lord Echo Griselda	—
3 11 4	8,736	4.74	414.41	273	Para Wirra Chieftain	—
3 8 16	6,279	6.42	402.85	273	Wollimgurly Cavalier's Silver King	—
3 7 24	6,811½	5.24	357.01	273	Hampden Olive's King	—
3 6 29	5,685	5.70	323.79	240	Wollimgurly Cavalier's Silver King	—
3 9 13	9,654	3.34	322.62	273	River Glen Lord Echo Griselda	—
3 6 28	6,201	5.19	322.07	273	Dalebank Duke	—
3 7 18	5,515½	5.77	318.55	273	Hampden Olive's King	—
3 7 23	5,668½	5.57	315.88	273	Courtier of Dalebank	—
3 8 12	6,529½	4.83	315.49	273	Holly's King of Hampden	—
3 6 19	6,519	4.66	303.74	273	Gowrie Park Scottish Dandy	—
3 7 13	5,353½	5.40	288.88	273	Molly 5th's Audrey Twylish of Banyule	—
3 8 9	5,848½	4.92	287.96	273	Dalebank Carnation's Lad	—
3 7 25	4,320	6.06	261.69	210	Roseworthy Temp.ar	Sold
3 6 3	4,122	6.14	252.98	273	Glenlea Hilda's Valour 2nd	—
3 6 13	5,870	3.77	221.28	240	Waratah's Masher of The Bluff	Dry.
3 9 3	4,519½	4.46	201.75	273	Ida's Laird of Gowrie Park	—
3 7 0	4,500	4.22	189.80	240	Gowrie Park Scottish Dandy	Dry
3 8 25	3,705	4.61	170.96	180	Twylish of Para Wirra	—
3 11 14	3,300	5.02	165.63	210	Melford's Butter Lad of Pella	—
3 8 0	2,895	5.37	155.35	90	Retford Julian	—
3 7 28	3,255	4.42	143.74	180	Roseworthy Templar	Sold
3 6 2	930	5.00	46.50	30	Rockness Goldsocks	—
BUTTERFAT STANDARD, 310LBS.						
4 4 29	13,140	4.32	567.11	273	Longbeach Netherland King 2nd	—
4 4 7	14,572½	3.23	470.93	273	Inavale Lady's Pride	—
4 5 27	12,486	3.75	467.89	273	Sultan of East View	—
4 0 15	7,582½	6.01	455.95	273	Wompini Noble	—
4 0 0	7,579½	5.63	427.09	273	Para Wirra Chieftain	—
4 9 10	7,275	5.86	426.53	273	King Solomon of Dalebank	—
4 4 4	11,869½	3.51	416.50	273	Longbeach Netherland King 2nd	—
4 1 6	7,348½	5.66	415.72	273	Blaklava Skylee Collegian	—
4 3 3	11,467½	3.61	413.62	273	Longbeach Netherland King 2nd	—
4 2 24	6,310½	5.33	336.32	273	Roseworthy Twylish	—
4 1 0	8,347½	3.93	328.39	273	Loyalty of Bridge View	—
4 4 10	4,856	6.55	324.66	273	Myrtle Bank Kate's Chief	—
4 3 24	7,035	4.50	316.77	273	Melford's Butter Lad of Pella	—
4 0 25	8,496	3.65	309.74	273	Viscount of East View	—
4 3 13	5,188½	5.74	297.66	273	Wompini Noble	—
4 3 15	5,430	5.10	277.14	273	Thora's Renown of Hampden	—
4 1 16	6,291	3.96	249.19	273	Loyalty of Bridge View	—
4 0 24	5,293½	4.56	241.62	273	Gowrie Park Scottish Dandy	—
4 1 0	5,325	4.04	214.96	273	Gowrie Park Scottish Dandy	—
4 4 14	1,350	3.99	53.82	60	Garnet of Brush Grove	Sold
BUTTERFAT STANDARD, 330LBS.						
4 6 13	8,154	5.21	425.22	273	Molly 5th's Audrey Twylish of Banyule	—
4 9 26	8,868	4.78	423.93	273	Melford's Butter Lad of Pella	—
4 7 12	7,479	5.53	413.37	273	Werribee Masterman	—
4 8 6	8,199	4.90	401.64	273	Anemone's Chief of Morella	—
4 10 11	7,411½	5.27	390.74	273	Rambler 2nd of Linden	—
4 10 27	7,559½	4.70	369.78	273	Waratah's Masher of The Bluff	—
4 10 4	5,998½	6.03	361.49	273	General Chris of Penrhyn	—
4 9 3	7,620½	4.39	334.38	273	Iris 5th's Superb of Toora	—
4 10 20	7,927	3.91	310.34	273	Waratah's Masher of The Bluff	—
4 11 9	7,542	3.99	301.20	273	Limelight of Darbalara	—
4 6 17	6,196½	4.85	300.53	273	Producer 3rd of Dalebank	—
4 7 27	4,377	6.00	262.54	273	Glenlea Hilda's Valour 2nd	—
4 6 21	3,315	5.11	169.37	150	Roseworthy Templar	Sold

PURE-BRED COWS COMPLETED

Herd Book No.	Name of Cow.	Owner and Address.	Breed.	Calved.
MATURE COWS.—BUTTERFAIR				
17885	Ruby of Toora	S. N. Bott, Murray Bridge	A.I.S.	23 3/33
1850	Fast View Dorain Pauline	H. Mountstephen, Monteith	Friesian	31/10/32
29484	Wompini Lady Jane Grey	Mrs. W. A. Pool, Cudlee Creek	Jersey	18/1/33
17878	Lester's Daisy 3rd of Toora	S. N. Bott, Murray Bridge	A.I.S.	26/2/33
Not allotted	Glenowie Inka May	H. Mountstephen, Monteith	Friesian	23/12/32
29115	Belgonia Clementine	A. Kelly, Milang	Jersey	26/2/33
20817	Rosemary of Waterfall	A. E. Middleton, Balaklava	"	7/10/32
31096	Warendra Ragtime 4th	Mrs. W. A. Pool, Cudlee Creek	"	27/10/32
25056	Roseworthy Scintial	Agricultural College, Roseworthy	"	15/1/33
2499	Murray Glen Echo Sylvia	C. J. Morris, Monteith	Friesian	26/2/33
24701	Pella Gipsy Lotus	E. W. Pfitzner, Eudunda	Jersey	20/1/33
14633	Belle of Morella	H. R. Walsh, Mount Barker	"	31/1/33
24959	Pella Lorna Doone	W. P. Eckermann, Eudunda	"	27/2/33
18328	Olive 3rd of Kiama	E. & A. Nicholls, Woodville	A.I.S.	10/1/33
17877	Jewel of Toora	H. B. Kuchel, Murray Bridge	"	4/10/32
24974	Cumberland Twilight	E. W. Pfitzner, Eudunda	Jersey	7/3/33
Not allotted	Glenowie Echo Mercena	H. Mountstephen, Monteith	Friesian	13/2/33
8453	Mayflower Jellicoe of Illawarra	A. Snell, Bolivar	A.I.S.	28/2/33
2455	Glenowie Echo Posch	H. Mountstephen, Monteith	Friesian	30/11/32
23588	Eudunda Merden's Damsel	W. S. McAuliffe, Eudunda	Jersey	20/10/32
23603	Hampden Rae	H. A. J. Pfitzner, Hampden	"	20/1/33
20730	Sunbeam of Dalebank	J. & A. Bohme, Balhannah	"	4/2/33
Not allotted	Glenowie Echo Segis	A. E. Middleton, Balaklava	Friesian	27/2/33
8405	Minnie 4th of Hill View	A. Snell, Bolivar	A.I.S.	3/11/32
18420	Kyby Bluebell	Government Farm, Kybybolite	Ayrshire	13/3/33
24694	Pembroke Sylvia	Mrs. C. W. Ansell, Bletchley	Jersey	5/1/33
18329	Pembroke's Roma of Kiama	E. & A. Nicholls, Woodville	A.I.S.	31/1/33
14706	Kyby Bonny	Government Farm, Kybybolite	Ayrshire	23/2/33
3478	Glenowie Plus Posch	H. Mountstephen, Monteith	Friesian	12/11/32
Not allotted	Retford Thorn's Flower	H. R. Walsh, Mount Barker	Jersey	11/2/33
31006	Melvin Lady	A. Schulze, Paradise	"	5/1/33
18357	Hero's Handsome 3rd of Illawarra	A. Snell, Bolivar	A.I.S.	7/10/32
Not allotted	Glenowie Princess Triumph	H. Mountstephen, Monteith	Friesian	16/12/32
18424	Kyby Maggie 3rd	Government Farm, Kybybolite	Ayrshire	28/2/33
8404	Fortune of East View	E. & A. Nicholls, Woodville	A.I.S.	26/12/32
20786	Lady Grey 13th of Penrhyn	Mrs. A. M. Carruthers, Narrung	Jersey	27/10/32
18561	Janet of East View	H. B. Kuchel, Murray Bridge	A.I.S.	30/10/32
9017	Rose of Kybybolite	Government Farm, Kybybolite	Ayrshire	2/11/32
15037	Tot 2nd of Ben Lomond	Insp.-Gen. of Hospitals, Northfield	A.I.S.	7/12/32
17919	Pimpelton 4th of Oakhill	Mrs. M. I. Dittrich, Hampden	Jersey	18/2/33
14967	Searchlight's Somerset's Princess of Wangara	J. J. Farrow, Gawler	A.I.S.	22/1/33
3351	Bloomfield Plebe's Nancy	W. Hawker, Clare	Friesian	29/10/32
15003	Lester's Pearl of Toora	H. B. Kuchel, Murray Bridge	A.I.S.	31/1/33
1758	Glenlea Fi Fi	E. T. Vinnall, Brighton	Guernsey	3/1/33
17798	Eldorado Snowflake	Ayrbrook Farm Ltd., Aldgate	Ayrshire	11/12/32
16824	Glen Ewin Columbine's Lady 5th	A. J. Marrett, Saddleworth	Jersey	17/2/33
18205	Bess 2nd of Kiama	E. & A. Nicholls, Woodville	A.I.S.	26/2/33
23641	Morella Damsel 2nd	E. L. Goode, Narrung	Jersey	14/10/32
24846	Penrhyn Lady Marge 9th	Mrs. A. M. Carruthers, Narrung	"	14/12/32
10993	Kyby Aurea	Government Farm, Kybybolite	Ayrshire	8/10/32
17880	Toora Lucy 2nd	Insp.-Gen. of Hospitals, Northfield	A.I.S.	9/12/32
18447	Staghorn Una	A. P. Spehr, Mount Gambier	Jersey	29/11/32
17872	Cloud of Toora	H. B. Kuchel, Murray Bridge	A.I.S.	15/11/32
2344	Northfield Blossom	Insp.-Gen. of Hospitals, Northfield	"	9/12/32
18372	Madge of Elderslie	Mrs. W. J. Spackman, Long Flat	"	18/12/32
17013	Gem 16th of Darbalara	H. B. Kuchel, Murray Bridge	"	19/12/32
15184	Oakbank Alleyne	Government Farm, Kybybolite	Ayrshire	31/10/32
18198	Lady Galway of Lissie	A. N. McArthur, Millicent	A.I.S.	18/10/32
18330	Primrose of Kiama	E. & A. Nicholls, Woodville	"	24/1/33
24843	Penrhyn Lady McKwin 23rd	Mrs. A. M. Carruthers, Narrung	Jersey	26/11/32
9006	Blanche of Kybybolite	Government Farm, Kybybolite	Ayrshire	1/2/33
2654	Barina Posch's Easterdawn	L. H. & P. C. Giles, Auburn	Friesian	31/12/32
2256	River Glen Galatea Konigen	L. H. & P. C. Giles, Auburn	"	13/3/33
23569	Pella Butter Queen	W. P. Eckermann, Eudunda	Jersey	12/1/33
20627	Carnation of Hampden	J. A. J. Pfitzner, Hampden	"	21/6/33
15032	Flirt of Northfield	Insp.-Gen. of Hospitals, Northfield	A.I.S.	29/12/32
15015	Model's Lass of the Bluff	H. B. Kuchel, Murray Bridge	"	10/2/33
31044	Melvin Viola	H. A. Follett, Langhorne's Creek	Jersey	16/8/33
Not allotted	Murray Glen Segis Tulip	W. L. Scarborough, Mount Barker	Friesian	—/10/33
17929	Lady Alice of Fernden	E. O. Traeger, Eudunda	Jersey	10/8/33
17886	Spangle 2nd of Toora	S. N. Bott, Murray Bridge	A.I.S.	—/8/33
10938	Fortune 3rd of East View	Dunleith Past. Co., Ashbourne	"	29/8/33

OFFICIAL TEST—continued.

Age at Calving.	Total Milk.	Aver- age Test.	Total Butter- fat.	Days Tested.	Sire.	Remarks.
Y. M. D.	Lbs.		Lbs.			
STANDARD, 350LBS.						
6 0 25	13,887	4.34	603.17	273	Lester of Darbalara	—
8 7 21	12,556½	4.11	515.85	273	St. Alban's Helen's Woodcrest Paul	—
5 4 0	8,022	6.11	490.71	273	Werribee Masterman	—
5 10 2	11,335½	3.95	448.32	273	Lester of Darbalara	—
5 2 27	12,625½	3.53	445.49	273	River Glen Sir Pietje Griselda	—
5 1 20	7,645½	5.81	444.15	273	Aerial of Banyule	—
9 8 17	8,725½	5.07	442.67	273	Major Grey of Waterfall	—
5 11 22	7,579½	5.71	432.51	273	Kewpie of Warendale	—
5 0 27	6,721½	6.37	428.49	273	King Solomon of Dalebank	—
7 3 7	11,976	3.58	428.16	273	River Glen Lord Echo Griselda	—
6 5 1	7,942½	5.32	422.68	273	Governor Grey of Pella	—
10 0 3	8,219½	5.10	418.92	273	Chief of Klama	—
5 0 10	7,644	5.35	408.91	273	Melford's Butter Lad of Pella	—
5 0 10	11,748	3.48	408.53	273	Pembroke of Greyleigh	—
5 1 14	10,399½	3.82	396.99	273	Iris 5th's Superb of Toora	—
7 1 3	6,760½	5.83	394.21	273	King Chris of Penrhyn	—
5 3 25	1,1964	3.28	392.92	273	Glenowie Beets Griselda	—
9 0 19	9,757½	3.94	384.10	240	Fussy's Jellicoe of Hill View	—
6 11 26	10,933½	3.47	379.48	273	River Glen Lord Echo Griselda	—
5 4 10	7,227	5.15	372.45	273	Lord Merden of Eudunda	—
5 8 7	7,036½	5.26	370.32	273	Carnation's Lad of Dalebank	—
6 11 29	7,645½	4.78	365.11	273	Twylsh of Dalebank	—
5 3 29	10,365	3.48	360.72	273	Glenowie Beets Griselda	—
9 9 14	10,234½	3.52	360.48	273	Empress Kitchener of Burradale	—
5 4 15	8,416½	4.19	352.72	273	Loyalty of Bridge View	—
6 1 21	5,646	6.18	348.99	273	Triumph 2nd of Dalebank	—
6 0 13	10,044	3.44	345.82	273	Pembroke of Greyleigh	—
8 0 15	8,404½	4.09	344.12	273	Loyalty of Bridge View	—
5 11 16	9,012	3.68	331.24	273	River Glen Sir Pietje Griselda	—
8 9 23	6,084	5.44	330.97	273	Thorn of Banyule	—
5 2 20	5,490	6.00	329.66	210	Retford Julian	—
5 0 9	7,411½	4.43	328.01	273	Fussy's Hero of Hill View	—
6 0 15	8,172	4.01	327.83	273	River Glen Sir Pietje Griselda	—
5 3 0	8,133	4.03	327.76	273	Loyalty of Bridge View	—
9 0 23	9,189	3.49	321.14	273	Limit of East View	—
7 5 3	6,208½	4.93	306.00	273	Bramble's Lord of Linden	—
7 10 21	8,884	3.42	303.71	273	Belmont of Darbalara	—
12 11 18	8,244	3.65	301.71	273	Anthony of Glenelra	—
6 3 20	7,612½	3.94	300.08	273	Conjuror of Darbalara	—
8 4 28	5,064	5.91	299.42	273	Grey Sprite of Linden	—
7 10 10	6,835½	4.36	298.08	273	Searchlight of Darbalara	—
5 0 20	8,407½	3.54	297.43	273	Mutual Pearl Piebe	—
6 11 28	7,705	3.85	296.78	273	Lester of Darbalara	—
5 7 12	6,229½	4.72	294.19	273	Glenlea Vera's Valour 2nd	—
5 2 1	7,395	3.96	293.21	273	Perfection of the Valley	—
5 9 18	5,829	5.03	293.08	273	Trixie's Lad of Glen Ewin	—
6 10 21	7,585½	3.81	289.18	273	Pembroke of Greyleigh	—
5 7 12	6,793½	4.23	287.36	273	Anemone's Chief of Morella	—
6 2 3	5,566½	5.12	284.81	273	Socrates of Rockness	—
9 9 20	6,981½	4.06	281.45	273	Anthony of Glenelra	—
5 1 29	6,544½	4.05	265.22	273	Iris 5th's Superb of Toora	—
8 4 12	5,407½	4.87	263.41	273	Staghorn Madeira's King	—
5 2 26	7,251	3.59	260.06	273	Iris 5th's Superb of Toora	—
10 10 0	6,515	3.81	252.01	273	Somerset	—
5 6 29	6,345	3.91	248.35	210	Mayflower's Jellicoe of Illawarra	—
8 2 0	6,166	4.02	247.78	273	Yeoman of Darbalara	—
8 3 25	6,715½	3.67	246.34	273	Bright's Jock of Oakbank	—
8 4 14	7,260	3.33	241.60	240	Majestic of East View	—
6 6 7	6,900	3.42	235.91	240	Pembroke of Greyleigh	—
5 11 4	4,590	4.96	227.60	240	Bramble's Lord of Linden	—
14 1 15	4,909½	4.27	209.47	273	Anthony of Glenelra	—
5 8 18	6,705	3.11	208.34	180	River Glen Pietje Posch	—
8 6 9	6,225	3.81	206.15	120	Konigen Pieterje Lad	—
5 8 17	3,600	5.70	205.02	210	Werribee Starbright's Fancy	—
7 1 8	3,615	6.38	194.63	120	Carnation's Lad of Dalebank	—
6 1 13	4,417½	4.23	186.91	240	Janet's Haylis of Ben Lomond	—
6 1 17	4,865	3.31	161.27	180	Duchess' Sunrise of The Bluff	—
5 0 6	3,150	4.88	153.84	120	Repulse of Somerville	—
5 7 0	3,780	3.58	135.51	60	Glenburn Segis Griselda	—
8 9 27	1,740	4.50	78.24	60	Milkmaid 5th of Dalebank	—
5 7 0	1,530	3.70	56.63	30	Iris 5th's Superb of Toora	—
7 6 10	1,080	3.14	33.96	30	Limit of East View	—

Dry
Exemption

Sold

BUTTERFAT TESTS (OFFICIAL) FOR HALF YEAR ENDED DECEMBER 31st, 1933, OF
1933, WERE REGISTERED IN

Particulars of Registration.	Name of Cow.	Owner and Address.	Breed.
JUNIOR TWO-YEAR-OLDS.—			
C.B. only.....	Balaklava Griselda Viola	A. E. Middleton, Balaklava	Friesian
C.B. only.....	Glenowie Princess Pauline	H. Mountstephen, Monteith	"
C.B. only.....	Tresco Posch Iris	W. L. Scarborough, Mt. Barker	"
—	Overlook Remus Sunny	J. A. J. Pätzner, Hampden.....	Jersey
SENIOR TWO-YEAR-OLDS.—			
App. C.	Strathearn Prinrose	E. A. Groth, Walker's Flat	A.I.S.
JUNIOR THREE-YEAR-OLD.—			
App. C.	Strathearn Melba	E. A. Groth, Walker's Flat	A.I.S.
MATURE COWS.—BUTTERFAT			
App. D.	Gaymaid of Strathearn	E. A. Groth, Walker's Flat	A.I.S.

LAKE ALBERT HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR DECEMBER, 1933.

Herd No.	Average Ao. of Cows in Herd.	Average No. of Cows in Milk.	Milk.		Butterfat.		Average Test.
			Per Herd for Dec.	Per Cow for Dec.	Per Herd for Dec.	Per Cow for Dec.	
			Lbs.	Lbs.	Lbs.	Lbs.	%
6/B	18	17	11,733½	651-86	557-67	30-98	4-75
6/C	21-97	17-81	15,608½	710-44	647-82	29-49	4-15
6/H	22	20-52	13,593½	617-88	723-29	32-88	5-32
6/Y	12-42	10-65	7,830	630-47	320-88	25-84	4-10
6/Ir	25-23	20-58	19,171½	759-86	826-52	32-76	4-31
6/LL	23-26	19	16,005½	688-11	598-18	25-72	3-74
6/Oo	20	19	18,863½	943-18	892-74	44-64	4-73
6/Pp	14-29	13-97	10,913	763-68	552-51	38-66	5-06
6/Rr	30	26-19	28,540	951-33	1,152-59	38-42	4-04
6/Tt	18-16	16-16	14,961½	823-87	661-19	36-41	4-42
6/Xx	24-90	21-77	20,786½	834-80	871-74	35-01	4-19
6/Zz	27-55	23-97	20,069	728-46	965-00	35-03	4-81
6/BBB	28	22-48	22,112½	789-73	962-02	34-36	4-35
6/CCG	20-06	18-19	12,641	630-15	556-52	27-74	4-40
6/DDD	19	16-39	15,406½	810-87	604-77	31-83	3-93
6/EEE	24	21-03	20,805	866-87	836-51	34-85	4-02
6/FFF	22	21-77	19,770	898-63	807-32	36-70	4-08
6/GGG	24-39	18-77	19,430	796-64	778-67	31-93	4-01
6/HHH	17	15-90	11,434½	672-62	499-26	29-37	4-27
6/III	21	17-23	17,301½	823-88	720-54	34-31	4-16
6/JJJ	26	22-48	17,047½	655-67	795-87	30-61	4-67
6/KKK	39	37-55	38,058	975-85	1,489-50	38-19	3-91
6/LLL	22	17	12,276	558-00	530-18	24-10	4-32
Means	22-62	19-80	17,580-83	777-27	754-40	33-35	4-29

FOUNDATION, APPENDIX COWS, AND OF PURE BREDS WHICH ON DECEMBER 31ST,
THE CALF ROLL ONLY.

Calved.	Age at Calving.	Total Milk.	Average Test.	Total Butterfat.	Days Tested.	Sire.
	Y. M. D.					

BUTTERFAT STANDARD, 230LBS.

16/3/33	2 2 13	7,207½	3.17	228.29	240	Glenowie Beets Griselda
2/1/33	1 5 12	6,135	3.56	218.30	273	Glenowie Netherland Prince II.
12/9/33	—	3,585	3.79	135.76	90	{ Particulars not supplied by owner
21/8/33	—	2,350	4.23	99.33	120	

BUTTERFAT STANDARD, 250LBS.

29/3/33	2 8 7	2,070	4.27	88.38	90	Sunflower's Searchlight 2nd of Wangara
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BUTTERFAT STANDARD, 270LBS.

23/4/33	3 4 12	1,680	3.91	65.70	60	Sunflower's Searchlight 2nd of Wangara
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STANDARD, 350LBS.

24/4/33	5 4 17	2,880	4.06	116.88	90	Gay Boy
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NARRUNG HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR DECEMBER, 1933.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during Dec.	Per Cow during Dec.	Per Cow October to Dec.	Per Herd during Dec.	Per Cow during Dec.	Per Cow October to Dec.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
5/C	33	31.58	19,660½	595.78	1,980.68	1,008.72	30.57	101.30	5.13
5/D	34	31	17,845	524.85	1,814.04	935.91	27.53	98.54	5.24
5/E	37-19	31.55	15,103	406.10	1,589.83	765.95	20.50	83.74	5.07
5/P	35	31.61	21,409	611.69	2,175.06	1,053.57	30.10	103.87	4.92
5/R	61-29	60.26	27,758½	452.90	1,563.77	1,193.46	19.47	64.52	4.30
5/S	13	12.68	7,061½	543.19	1,881.37	350.81	26.99	91.24	4.97
5/EE	17	17	11,160	656.47	2,160.26	535.00	31.47	105.13	4.79
5/GG	18-29	15	8,110½	443.56	1,282.11	401.08	21.93	82.11	4.94
5/KK	20	13.39	9,035½	451.78	1,779.77	415.13	20.76	81.75	4.59
5/NN	16	16	8,556	534.75	1,945.91	413.47	25.34	95.44	4.83
5/QQ	15-87	12.48	6,556½	413.14	1,622.49	307.70	19.39	75.78	4.60
5/RR	21	15.39	5,480	260.95	1,194.47	293.98	14.00	66.70	5.36
5/SS	17	16.45	8,201	482.41	1,596.91	393.12	23.12	74.74	4.79
5/TT	12	11.03	7,111	592.58	2,290.87	346.97	28.83	112.21	4.87
5/VV	14	14	5,688½	406.32	1,743.50	287.75	20.55	79.25	5.06
5/WW	23	18.06	8,910	387.39	1,490.95	423.32	18.41	70.34	4.75
5/XX	17	17	8,168½	480.50	1,793.80	406.87	23.93	87.96	4.98
5/YY	14	11.81	5,066½	361.89	1,336.50	256.04	18.29	67.23	5.05
					Nov.-Dec.			Nov.-Dec.	
5/ZZ	30	29.61	16,581	552.70	1,230.93	633.62	21.12	46.22	3.82
5/AAA	19	18.55	11,576	609.26	1,064.15	571.38	30.07	52.01	4.94
5/BBB	17	17	8,044½	473.21	988.47	390.05	22.94	48.38	4.85
Means	23.08	21.02	11,289.67	489.19	1,720.55	542.03	23.49	82.57	4.80

THE HILLS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR DECEMBER, 1933.

Herd No.	Average A.O. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during Dec.	Per Cow during Dec.	Per Cow July to Dec.	Per Herd during Dec.	Per Cow during Dec.	Per Cow July to Dec.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
7/E ..	28-45	20-68	17,004½	597-65	3,131-72	650-24	22-83	123-95	3-81
7/H ..	7	6-16	5,284½	754-93	3,467-23	273-08	30-01	165-26	5-17
7/K ..	15	13-10	10,680	712-00	4,331-62	438-50	29-23	167-49	4-11
7/L ..	35-90	31-61	21,372½	595-86	3,382-12	952-83	26-56	159-17	4-45
7/P ..	25	25	15,918½	636-74	4,431-47	727-41	29-10	205-80	4-57
7/T ..	16-74	14-61	8,558½	511-26	2,608-80	371-06	22-17	113-47	4-34
7/Y ..	27	24-90	15,106	559-48	3,540-62	665-64	24-65	155-24	4-41
7/AA ..	14	14	8,020	573-50	3,306-14	342-45	24-46	140-06	4-27
7/KK ..	21-35	19-39	17,915½	839-11	4,751-68	738-73	34-60	194-08	4-12
7/MM ..	40	35-23	20,978½	524-46	4,412-44	780-58	19-51	166-23	3-72
7/PP ..	20-23	18-03	12,996½	642-43	3,641-10	633-24	31-30	189-02	4-87
7/TT ..	17-55	14-42	10,660	607-41	3,880-35	437-58	24-93	162-55	4-10
7/UU ..	20-58	17-45	12,414	603-20	2,660-15	535-26	26-01	121-99	4-31
7/VV ..	16	14-97	12,271½	766-97	4,781-55	555-24	34-70	218-20	4-52
7/XX ..	19	18-13	18,281	958-76	4,201-56	945-65	49-60	218-60	5-24
7/YY ..	25	19-10	9,193	367-72	2,210-74	392-04	15-68	97-09	1-26
7/BBB ..	69-94	61-03	30,709½	439-32	3,449-03	1,403-40	20-06	156-09	4-58
7/CCC ..	20	19-61	12,421	621-05	3,678-49	562-85	28-14	166-63	4-53
7/DDD ..	12-71	11-55	6,850	538-94	3,738-82	308-09	24-24	174-20	4-50
7/EEE ..	11	9-87	5,036	457-81	2,827-14	241-90	21-09	136-62	4-80
					Oct.-Dec.			Oct.-Dec.	
7/FFF ..	21	20	9,625½	458-36	1,846-62	420-88	20-04	82-31	4-37
					Nov.-Dec.			Nov.-Dec.	
7/GGG ..	16	13-48	6,862½	428-28	961-72	325-73	20-36	45-32	4-75
Means	22-70	20-11	13,098-00	576-95	3,628-95	577-39	25-43	160-75	4-41

EXPERIMENTAL FEEDING TESTS CONDUCTED AT
PARAFIELD POULTRY STATION.

[By C. F. ANDERSON, Poultry Expert.]

A series of feeding tests are being conducted at Parafield Poultry Station with a view to ascertaining if suitable foods which are obtainable on the majority of our farms can be satisfactorily fed to poultry. The tests are each of 50 White Leghorn pullets, and commenced on April 1st, 1933.

The feeding is as follows:—

No. 1 Test.—Morning—Wet mash composed of 1 part crushed barley, 3 parts wholemeal (by weight), ½lb. meat meal, 50 per cent. chaffed greenfeed.

Midday—1oz. wheat per bird.

Night—1oz. wheat per bird.

No. 2 Test.—Dry mash composed of same proportions as No. 1 Test.

Midday—Greenfeed.

Evening—Wheat.

No. 3 Test.—Morning—Wet mash composed of 1 part bran, 2 parts pollard (by weight), ½lb. meat meal, 50 per cent. chaffed greenfeed.

Midday—1oz. wheat per bird.

Night—1oz. wheat per bird.

No. 4 Test.—Morning—Wet mash composed of 1 part bran, 2 parts wholemeal (by weight), ½lb. meat meal, 50 per cent. chaffed greenfeed.

Midday—1oz. wheat per bird.

Night—1oz. wheat per bird.

No. 5 Test.—Morning—1½ozs. wheat per bird.

Evening—1½ozs. wheat per bird.

Greenfeed in season.

The following are the numbers of eggs laid by each pen from April 1st, 1933, to January 31st, 1934.

Definite conclusions, however, cannot be given at this juncture with regard to the various methods of feeding. It is necessary for the tests to complete the 12 months before any satisfactory opinions can be formed.

No. of Test.	No. Eggs Laid April 1st to December 31st.	No. Eggs Laid Month January.	Total Eggs Laid April 1st to January 31st.
No. 1	5,650	668	6,318
No. 2	5,262	695	5,957
No. 3	4,794	614	5,408
No. 4	5,537	767	6,304
No. 5	2,524	333	2,857

RED COMB EGG ASSOCIATION.

OFFICIAL EGG-LAYING COMPETITION, 1933-34.

Conducted at the Parafield Poultry Station under the supervision of the Department of Agriculture.

LEADING SCORES TO WEEK ENDED FEBRUARY 2nd, 1934.—FIRST GRADE EGGS ONLY.

WHITE LEGHORNS.		Eggs Laid.	Bird No.
<i>Singles—</i>			
A. G. Dawes		156	136
B. Rowe		155	105
H. H. Hefford		153	67
<i>Trios—</i>			
W. C. Slape		431	55-57
A. G. Dawes		404	136-138
B. Cooke		391	19-21
<i>Teams—</i>			
L. A. G. Pitt		735	88-93
W. A. Carter		708	13-18
B. Rowe		707	103-108

MINORCAS.			
<i>Singles—</i>			
V. F. Gameau		125	139
M. O. and C. A. Roberts		102	143

BLACK ORPINGTONS.			
<i>Singles—</i>			
A. G. Dawes		186	176
N. F. Richardson		182	205
H. H. Hefford		170	171
<i>Trios—</i>			
N. F. Richardson		468	205-207
H. J. Mills		440	187-189
H. J. Mills		431	184-186
<i>Teams—</i>			
H. J. Mills		871	184-189
S. E. Reedman		626	193-198

ANY OTHER HEAVY BREEDS.

<i>Rhode Island Reds.</i>			
<i>Singles—</i>			
H. J. Mills		143	229
B. Rowe (Barnevelders)		134	238
V. F. Gameau		131	228
<i>Trios—</i>			
H. J. Mills		350	229-231
V. F. Gameau		324	223-225
V. F. Gameau		303	226-228
<i>Teams—</i>			
V. F. Gameau		627	223-228
W. R. Williams		527	232-237

RED COMB EGG ASSOCIATION.

OFFICIAL SINGLE TEST.

EGG-LAYING COMPETITION, 1933-34.

SECTION 1.—WHITE LEGHORNS.

Competitor.	Address.	Score to Month ending January 31st, 1934.			
		Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Totals
E. F. Ashmeade	398, Magill Road, Ken- sington Park	(1) 121	(2) 64	(3) 146	331
L. R. Badcock	77, Findon Rd., Woodville	(4) 112	(5) 132	(6) 117	361
C. J. C. Burton	Mallala	(7) 102	(8) 122	(9) 67	291
C. J. C. Burton	Mallala	(10) 94	(11) 67	(12) 138	299
W. A. Carter	2, Grosvenor St., Glandore	(13) 114	(14) 142	(15) 89	345
W. A. Carter	2, Grosvenor St., Glandore	(16) 128	(17) 143	(18) 92	363
B. Cooke	Kanmantoo	(19) 146	(20) 135	(21) 110	391
H. F. Cox	Samson Road, Glanville Blocks	(22) 71	(23) *	(24) 26	97
H. F. Cox	Samson Road, Glanville Blocks	(25) 103	(26) 95	(27) 141	339
L. H. Crawford	Military Road, Grange ..	(28) 67	(29) 133	(30) 121	321
L. H. Crawford	Military Road, Grange ..	(31) 77	(32) 12	(33) 82	171
R. C. Crittenden	William Street, Kilkenny North	(34) 119	(35) 138	(36) 70	327
Chas. H. Day	Box 28, Salisbury	(37) 138	(38) 95	(39) 114	347
J. H. Dowling	Glossop	(40) 117	(41) 117	(42) 103	337
T. Duhring	Mallala	(43) 131	(44) 118	(45) 124	373
T. Duhring	Mallala	(46) 122	(47) 73	(48) 100	295
H. Fidge	313, Cross Roads, Clarence Park	(49) 110	(50) 75	(51) 93	278
V. F. Gameau	Findon Road, Woodville .	(52) 79	(53) 112	(54) 118	309
W. Chas. Slape	Magill Road, Magill	(55) 136	(56) 143	(57) 152	431
G. C. Gavin	Salisbury	(58) 109	(59) 89	(60) 137	335
G. C. Gavin	Salisbury	(61) 131	(62) 92	(63) 127	350
H. H. Hefford	McHenry St., Murray Bdge.	(64) 75	(65) 72	(66) 13	160
H. H. Hefford	McHenry Street, Murray Bridge	(67) 153	(68) 104	(69) 62	319
W. H. A. Hodgson ..	Commercial Rd., Salisbury	(70) 111	(71) 132	(72) 88	331
W. H. A. Hodgson ..	Commercial Rd., Salisbury	(73) 101	(74) 92	(75) 84	277
E. A. Lamerton	Cross Roads, Edwardstown	(76) 103	(77) 41	(78) 136	280
C. H. Lines, jun. ...	Box 75, Gladstone	(79) 116	(80) 139	(81) 44	299
C. H. Lines, jun. ...	Box 75, Gladstone	(82) 125	(83) 117	(84) 110	352
V. F. Gameau	Findon Road, Woodville .	(85) 112	(86) 87	(87) 57	256
L. A. G. Pitt	24, John Street, Payneham	(88) 143	(89) 107	(90) 101	351
L. A. G. Pitt	24, John Street, Payneham	(91) 117	(92) 147	(93) 120	384
H. A. Rasmussen	Swan Terrace, Ethelton .	(94) 38	(95) 134	(96) 100	272
H. A. Rasmussen	Swan Terrace, Ethelton .	(97) 125	(98) *	(99) 50	175
S. E. Reedman	51, Gilbert Street, Gilberton	(100) 81	(101) 129	(102) 79	289
Bruce Rowe	"St. Kevern," Two Wells	(103) 102	(104) 111	(105) 155	368
Bruce Rowe	"St. Kevern," Two Wells	(106) 124	(107) 105	(108) 110	339
H. J. Stacey	Uraidla	(109) 92	(110) 113	(111) 124	329
H. J. Stacey	Uraidla	(112) 134	(113) 125	(114) 41	300
Thomas & Elson ...	53, Clifton Street, Hawthorn	(115) 24	(116) 43	(117) 121	188
Thomas & Elson ...	53, Clifton Street, Hawthorn	(118) 110	(119) 125	(120) 116	351
H. L. Twartz	Gawler	(121) 76	(122) 145	(123) 133	354
H. L. Twartz	Gawler	(124) 100	(125) 73	(126) 122	295
F. F. Welford	1, Ludgate Circus, Colonel Light Gardens	(127) 116	(128) 128	(129) 72	316
F. F. Welford	1, Ludgate Circus, Colonel Light Gardens	(130) 144	(131) 139	(132) 41	324

EGG-LAYING COMPETITION—SECTION 1—WHITE LEGHORNS—*continued.*

Competitor.	Address.	Score to Month ending January 31st, 1934.			
		Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Totals
A. P. Urlwin	Box 80, Balaklava	(133) 93	(134) 149	(135) 145	387
A. W. Dawes	230, Portrush Road, Glenunga Gardens	(136) 156	(137) 128	(138) 120	404
Total—Section 1		—	—	—	14,391
SECTION 2—ANY OTHER LIGHT BREEDS.					
V. F. Gameau	Findon Road, Woodville (Minorcas)	(139) 125	(140) 86	(141) 73	284
M. O. and C. A. Roberts	Torrens Road, Kilkenny (Minorcas)	(142) 45	(143) 102	(144) 74	221
Total—Section 2		—	—	—	505
SECTION 3—BLACK ORPINGTONS.					
Arthur Cook ..	187, Goodwood Road, Colonel Light Gardens	(145) 146	(146) 164	(147) *	310
B. Cooke	Kanmantoo	(148) 35	(149) 11	(150) 58	104
L. H. Crawford	Military Road, Grange ..	(151) 89	(152) 90	(153) 135	314
L. H. Crawford	Military Road, Grange ..	(154) 150	(155) 150	(156) *	303
Les. Darcy	Mypolonga	(157) 150	(158) 117	(159) *	267
Les. Darcy	Mypolonga	(160) 73	(161) 116	(162) 59	248
J. H. Dowling	Glossop	(163) 89	(164) 56	(165) 23	168
H. Fidge	313, Cross Rds., Clarence Pk.	(166) 130	(167) 65	(168) 76	271
H. H. Hofford	McHenry Street, Murray Bridge	(169) 87	(170) *	(171) 170	257
F. J. Hudson	54, Willcox Av., Prospect	(172) 82	(173) 135	(174) 37	254
A. G. Dawes.....	230, Portrush Road, Glenunga Gardens	(175) *	(176) 186	(177) 77	263
C. H. Lines, jun.	Box 75, Gladstone	(178) 99	(179) *	(180) 114	213
C. H. Lines, jun.	Box 75, Gladstone	(181) 109	(182) 74	(183) 126	309
H. J. Mills	Edward St., Edwardstown	(184) 140	(185) 161	(186) 130	431
H. J. Mills	Edward St., Edwardstown	(187) 152	(188) 143	(189) 145	440
J. Rawe	Honeyton St., Seaton Pk.	(190) 147	(191) 68	(192) *	215
S. E. Reedman	51, Gilbert St., Gilberton.	(193) 107	(194) 79	(195) 119	305
S. E. Reedman	51, Gilbert St., Gilberton.	(196) 52	(197) 137	(198) 132	321
H. L. Twartz	Gawler	(199) 47	(200) 109	(201) 111	267
A. G. Dawes.....	230, Portrush Road, Glenunga Gardens	(202) 164	(203) 130	(204) *	294
N. F. Richardson ...	60, Beaufort St., Wood- ville Park, Kilkenny	(205) 182	(206) 149	(207) 137	468
W. H. L. Wittenberg	3, Rushton St., Goodwood	(208) 121	(209) 40	(210) 61	221
W. H. L. Wittenberg	3, Rushton St., Goodwood	(211) 75	(212) 122	(213) 144	341
W. Woodley	Tailem Bend	(214) 23	(215) *	(216) 99	122
W. Woodley	Tailem Bend	(217) 141	(218) 120	(219) *	261
Total—Section 3		—	—	—	6,965
SECTION 4—ANY OTHER HEAVY BREEDS.					
H. Fidge	313, Cross Roads, Clarence Park (Rhode Is. Reds)	(220) 49	(221) 62	(222) 54	165
V. F. Gameau	Findon Road, Woodville (Rhode Island Reds)	(223) 126	(224) 94	(225) 104	324
V. F. Gameau	Findon Road, Woodville (Rhode Island Reds)	(226) 90	(227) 82	(228) 131	303
H. J. Mills	Edward St., Edwardstown (Rhode Island Reds)	(229) 143	(230) 129	(231) 78	350
W. R. Williams	28, Avenue Rd., Frewville (Rhode Island Reds)	(232) 84	(233) 108	(234) 82	274
W. R. Williams	28, Avenue Rd., Frewville (Rhode Island Reds)	(235) 93	(236) 42	(237) 118	253
Bruce Rowe	"St. Kevern," Two Wells (Barnevelders)	(238) 134	(239) 101	(240) *	235
Bruce Rowe	"St. Kevern," Two Wells (Welsumers)	(241) 35	(242) 115	(243) 1	151
Total—Section 4		—	—	—	2,055

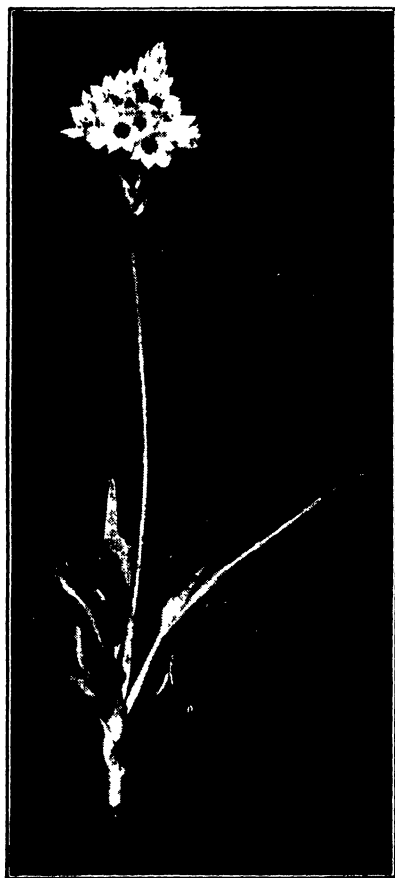
*Dead.

NOTE.—Only first grade eggs are shown above.

BLACK-EYED SUSAN, OR ROCK LILY—*Ornithogalum thyrsoides* (Jacq.).

[By A. L. WARREN, R.D.A., Field Officer.]

Black-Eyed Susan, or Rock Lily, belongs to the Lily family (*Liliaceae*), which is well represented in all parts of the world, and is most abundant in the temperate regions. A number of species are cultivated as vegetables, the shoots of asparagus and the bulbs of onions being familiar to all. Not a few are valued ornamental plants, such as the tulips, hyacinths, and many showy lilies; whilst a few contain poisonous properties, the effect being purgative, emetic and narcotic. Some of



Black-Eyed Susan or Rock Lily
Ornithogalum thyrsoides (Jacq.).

these are of use in medicine. On account of the property of tainting milk and meat, owing to the unpleasant garlic-like smell possessed by several naturalised species, they are bad weeds of both pasture and arable land.

The lilies are sometimes *arborescent* shrubs, but in temperate regions are mostly fleshy herbs, often with underground bulbs, or rhizomes. The roots are mostly shallow, but sometimes extend to considerable depths in the soil. Bulbs, root-stocks, and rhizomes are storage organs which, through being buried in the soil, are well protected, and plants so provided are most difficult to control or eradicate.

The leaves are usually long, simple, parallel-veined, and often sheathing the stem. Flowers mostly several, in spikes, panicles, or umbels, always with bracts. They are regular, perfect, conspicuous, with a perianth of six divisions, either free or united towards the base, usually arranged in two rows. Stamens are six in number, inserted at the base of the perianth; ovary superior, three-chambered; fruit, a berry or capsule.

The genus *Ornithogalum*, to which the Rock Lily belongs, is a large and well-known ornamental one, with a perianth of six segments, which are spread in the form of a star. Most of them are native to the Mediterranean region, or South Africa, and South Africa is the original home of *O. thyrsoides*. Members of this genus are not provided with the objectionable odor so characteristic of garlic. The bulbs of some species, when cooked and eaten, are said to be wholesome and nutritious. Nevertheless, when they spread out of control, they would be undesirable weeds, because they have no forage value, and choke out useful herbage. Also, they have ample provision to reproduce themselves both by means of numerous seeds and bulbs.

Two species of *Ornithogalum* have been recorded for South Australia:—

(1) *O. arabicum*, which has not established itself to any extent.

(2) *O. thyrsoides*, which has within the last few years spread over a small area near the Abattoirs, and in the Hills, at Horsnell's Gully. Near the Abattoirs it is inhabiting open country, which has in the past been cultivated. Here it has followed a slight depression in the level of the ground, from the main road towards the sea. In Horsnell's Gully it is occupying a very steep, stony, and almost inaccessible hillside, and although isolated patches occur on both sides of the valley, it does not appear in any of the cultivated land.

The history of the Rock Lily at the Abattoirs is obscure, but in the Hills it has been known to exist for many years, where it has apparently spread from an old garden, which was established in the early days of the State, and it has not covered much new ground during the last twenty years, so that it may be concluded that it is a garden escapee, which will not cause much damage in soils which are regularly cultivated, and that it will only be harmful by crowding out useful plants on pasture land.

The common name of Rock Lily has been given to *Ornithogalum thyrsoides* because it is able to maintain itself in very rocky situations, making a handsome display in places which would otherwise be comparatively devoid of herbage. Sometimes it is called Black-Eyed Susan, on account of the brownish blotch at the base of each perianth segment; but this name is more commonly applied to *Ornithogalum arabicum*. *Ornithogalum thyrsoides* is a bulbous perennial, with 5 to 8 long, fleshy, radical leaves, 6in. to 12in. in length, and 1in. to 1½in. wide. The stem, or scape—simple, erect, 12in. to 18in. long, raceme 30-50 flowered, pedicles erect, lengthening after flowering, each with a large, acute scarious bract at the base. Perianth segments ¾in. long, spreading, acute, self-colored, with a brownish blotch at the base. Filaments alternatively longer and lanceolate. Pistil inconspicuous, thus distinguishing it from *O. arabicum*. Fruit—a capsule, with many small irregular black seeds, each capsule containing about 40 seeds.

Unlike many bulbous plants, bulbs are not produced, and there is generally one bulb to each plant, and multiplication will mainly be by seed. The seeds, being small, compact, and without appendages, would not be easily carried great distances; therefore the spread to new areas would be slow. The bulbs being just below the surface of the soil, and without numerous small bulbils, ordinary tillage would facilitate eradication. This should be done before the plants reach the flowering stage. In situations where, for a variety of reasons, tillage is not possible, spraying with a 10 per cent. solution of sodium chlorate should prove effective. This operation should be carried out as soon as there is sufficient growth on the plant to hold the material.

MOUNT GAMBIER AGRICULTURAL BUREAU AND AGRICULTURAL AND HORTICULTURAL SOCIETY'S SIXTH ANNUAL CROP COMPE- TITION.

[Judged by E. S. ALCOCK (District Agricultural Instructor).]

CLASS 4—IMPROVED PASTURE COMPETITION, 1933.

The season which was not quite so favorable for the growth of vegetation as last year opened well with good autumn rains, but the winter months were much drier and colder than usual, and growth in the pastures was also shorter. Spring rains were rather light, and hot winds and frost at the end of October ripened the annual plants on the lighter land. Dry weather also affected plants on the heavier land. These conditions favored the development of the larvae of the cockchafer beetles, and they did considerable damage to many pastures. Lucerne flea was also plentiful in the district.

So far the only practical method of checking the larvae of cockchafer beetles is to break the land early in the season, either before or just after the first rain. If done before rain, the grazing capacity will not be reduced to any great extent, provided the field has been sown with annual plants. Where paddocks have been down to Subterranean clover for several years, the grubs appear in gradually increasing numbers until they reach their maximum. Where they are noticed—if the land is broken up early and then either sown down with oats or other crops—they can be checked. Ploughing destroys or exposes them to their natural enemies, or makes conditions unsuitable for them for a few years.

The pastures entered were all excellent entries, demonstrating the value of sowing suitable forage crops. Mr. Button's New Zealand Certified Perennial rye grass (mother seed) stood out as the best rye grass paddock in that district.

The suitability of Wimmera rye grass and subterranean clover for the lighter soils of this district could also be seen on Mr. W. K. Chambers Dairy Council plot at Mil Lel, and more of this rye grass will be used in future in those areas which are ploughed every few years in order to grow oats, barley, potatoes, &c.

Where weeds grow so prolifically, care and good management are necessary to keep them under control. Competitors sow suitable seeds, and provided their pastures are carefully grazed and adequately top dressed, the pasture plants will crowd out useless plants. Attention might be given to the provision for more shade and shelter for livestock. In this direction, Mr. Caine is to be commended for the work he has done, especially in such a district as Kongorong where cold winds are very severe.

Four entries were received, and these were judged on November 20th and 21st. The details of judging are shown in the following table:—

Name and Address.	Bulk of Pasture Available per Unit of Area.	Quality of Pasture.		Freedom from Useless Plants.	General Care of Pasture.	Area.	Total
		Type of Plants.	Feeding. Value.				
	30	15	10	20	15	10	100
1. F. W. Button, Yahl ...	25	14	9	19	14	10	91
2. F. C. Caine (1), Kon- gorong	28	12	7	18	12	10	87
3. F. C. Caine (2), Kon- gorong	25	12	6	17	11	10	81
4. E. J. Byrne, Glencoe East.....	27	12	7	17	12	5	80

THE PASTURES.

1. F. W. Button, Yahl, 26½ acres. No. of section, 1200. Hundred of Gambier. Three paddocks well fenced and watered; 6½ acres sown with New Zealand perennial rye grass and subterranean clover May, 1932; top dressed with 100lbs. 45 per cent. super annually.

This fine paddock had been well grazed throughout the year, and was in excellent condition. Clean and free from weeds. A good sole of rye grass was established on 6½ acres with 4bush. of certified seed or about 12lbs. per acre.

The other two paddocks had been sown with subterranean clover in 1926 and 1928, also white clover and perennial rye grass. In 1930 3cwt. crushed limestone per acre were applied. The area treated with the limestone produced earlier feed, and was also liked by the stock. Subterranean clover provided the bulk of the grazing of these paddocks with a little perennial rye grass, barley grass, sterile brome, patches of cape weed, and a few thistles. The entry presents a fine sight when compared with many other fields in this district.

The paddocks were harrowed on March 20th and then top dressed. Twenty-three milking cows have been pastured, mainly on the 26½ acres. On September 1st five more cows were brought in, and on October 20th three more head, making a total of 31 cows. The herd had occasional access to a 15-acre paddock.



Portion of Mr. Button's herd on his Pasture Competition entry, which has been kept closely grazed throughout the season.

They received some chou moullier and grass hay until the grass was well started on May 17th. The returns which Mr. Button supplied are very interesting:—

	Gallons of Milk.	Average Test.	Lbs. Butterfat.
1932.		3/3	
December	15-632	3-9	610
1933.			
January	12-052	3-9	470
February	10-439	3-9	407
March	11-028	3-9	430
April	10-198	4-2	428
May	11-791	4-3	507
June	14-016	4-0	561
July	15-225	4-1	624
August	18-392	4-1	754
September	21-627	4-0	865
October	25-602	3-9	998
November	23-166	3-9	903
Totals	189-168		7,557

2. F. C. Caine, Kongorong, 25 acres. Section 441, hundred of Kongorong.

This paddock, which was awarded first place last year, was sown in 1928 with subterranean clover, white clover, alsike clover, cocksfoot grass and Western

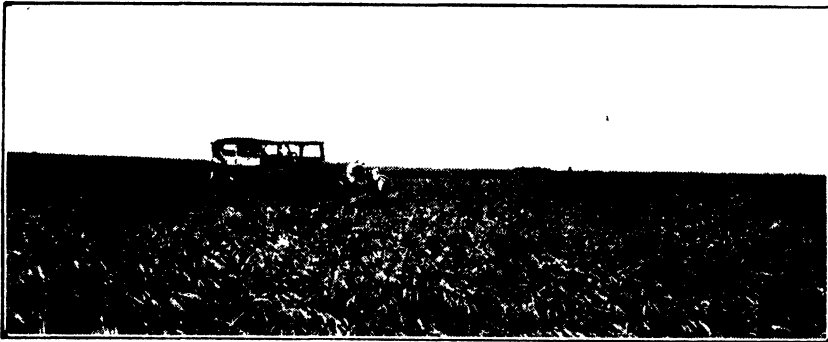
District perennial rye grass, and has been regularly top dressed with 90lbs. 48 per cent. super annually, except last year, when blood and bone manure was used. This year the paddock received 90lbs. 45 per cent. per acre. The pasture consisted mainly of subterranean clover, sterile and soft brome, a fair amount of perennial rye grass and Yorkshire fog, some cocksfoot rib grass, little slender clover, cape weed, brixia, sorrel, rooted catsear, and white clover in patches. Although very clean and free from thistles and other weeds, rather too long and rank to be a good pasture.

Sufficient use was not made of this earlier in the year, the grazing records show that it was grazed with another 35-acre paddock by 30 milking cows. The grazing results and returns of these two paddocks are given below:—

1933.		1933.	
January	300lbs. butterfat	July	830lbs. butterfat
February	260lbs. "	August	900lbs. "
March	320lbs. "	September	1,050lbs. "
April	420lbs. "	October	1,150lbs. "
May	530lbs. "	November.....	1,020lbs. "
June	680lbs. "		

Total, 7,460lbs. butterfat.

3. F. C. Caine (2), Kongorong, 35 acres.



Mr. Caine's entry in the Pasture Competition lost points on account of its rankness of growth and of insufficient stocking.

Sown with the same mixture as the previous paddock, and top dressed in a similar manner. Mainly subterranean clover, sterile brome, soft brome, perennial rye grass, cocksfoot, silver grass, a few slender thistles, and white rushes. The majority of the plants were more matured in this field, for it did not appear to have been grazed so heavily except around the gate, where the feed was much shorter and greener.

These paddocks provide an interesting example of pasture improvement, and Mr. Caine is to be congratulated on the work he has done. However, judging by the appearance of his fields, he could carry much more stock than he does.

4. E. J. Byrne, Glencoe East, 11½ acres. Part section 102, hundred of Young.

Two paddocks sown with 26lbs. perennial rye grass, 2lbs. white clover, 1lb. strawberry clover, 1lb. subterranean clover in 1930 with an oat crop. The seeds were broadcast by hand after the oats were drilled, then top dressed with 90lbs. 45 per cent. super annually, except in 1932.

The second paddock was sown a year later. A good entry on rather light land, consisting of perennial rye grass, Yorkshire fog, subterranean clover, slender clover, little white birdseye, and knotted clovers, sterile brome and brixia. These paddocks should provide a good picking for the 16 cows grazing on them for a good part of the year. Although growth was rather long and somewhat rank when inspected, it was intended to run the mower over it. The pastures were also very clean and free from weeds. A good entry showing what improvement can be effected with light land.

VARIABILITY IN STOCK-POISON PLANTS.

(*Peculiarities in the behavior of certain plants with regard to their poisonous properties under changed conditions of climate, soils, localities, &c., are discussed in an article by F. N. Howes in Bulletin No. 7, 1933, of the Royal Botanic Gardens, Kew. Apart from its scientific value, the bulletin is of more than usual interest to livestock owners, and much of the information contained in it may apply to conditions within our own State. Extracts of the article are published below.*)

Continuous overstocking does much to increase the incidence of plant poisoning, for animals are then prone to consume unwholesome or harmful plants, which, under more normal conditions, they would not touch. Overstocking frequently results in a steady diminution in some, if not all, of the more desirable species while others (which may be toxic) gradually increase.

With improved stock the possibility of vegetable poisoning assumes a more serious aspect and deaths resulting therefrom involve greater financial loss. Low grade native stock require considerably larger quantities of certain poisonous plants to produce fatal results than do well bred animals. Imported animals are often less discriminating than those locally bred and may consume harmful plants that are left untouched by other animals.

Losses appear to be greatest in the more arid subtropical parts of the world. In parts of South Africa, Australia, and the South-western United States of America, the aggregate mortality is without question higher and of greater seriousness than in pastoral regions in temperate countries. In some areas of the United States the annual losses due to poisonous plants are regarded as being considerably in excess of those caused by infectious diseases or by predatory animals.

It is in arid or semi-arid areas, where the vegetation is subject to unusually varied climatic and edaphic conditions, with irregular rainfall and often prolonged conditions of drought, that the question of variability in toxicity among poisonous plants (*i.e.*, variability in the same species) is becoming so apparent.

Intensive experimental work has been, and is being, carried out on stock-poisoning plants in various countries, especially South Africa, Australia, and several parts of the United States. Diagnosis in vegetable poisoning is often complicated by the fact that the symptoms produced by some plants are closely similar to those caused by certain bacterial diseases or other pathological disorders. It is believed by veterinarians and others that many of the obscure affections of livestock that at present baffle solution will eventually be traced to plant agency. Some species of poisonous plants affect the animal in a distinctive and characteristic manner, the effects being quite unlike those produced by other poisonous plants. On the other hand different species occurring in different countries may cause a strangely similar type of poisoning. This is becoming increasingly noticeable among plants whose toxicity is of the cumulative type, *i.e.*, where poisoning does not take place until a fairly large quantity of the plant has been consumed continuously over a lengthy period which may extend to several weeks or months.

Among the several factors liable to influence the toxicity of poisonous plants two of the most important have been shown to be the season of the year when consumed and the area where grown. Seasonal variation in toxicity has now been closely studied in a number of troublesome plants and some interesting facts ascertained.

sheep, is only toxic during some two or three months of the year. Another

In South Africa, *Tribulus terrestris* L., the cause of a serious malady with plant (*Pachystigma pygmaea* Schltr.) Robyns, is responsible for a sheep disease

and is known to vary a great deal in toxicity from season to season. In some seasons the disease is quite absent whereas in others mortality is high. Another sheep disease, prevalent in drier areas, has been shown to be due to grazing on certain species of *Geigeria*, among which are *G. passerinoides* Harv., *G. aspera* Harv., and *G. Zeyheri* Harv. These shrubs have to be consumed for several weeks before symptoms develop and it has been shown that they vary considerably in toxicity throughout the year. Certain species of *Cucumis*, e.g., *C. myriocarpus* Naud and *C. Africanus* L.f. have been found to be troublesome in sheep in the winter months, but not in the summer in South Africa.

In regions subject to a distinct or pronounced dry season the incidence of plant poisoning is often highest at that period when the dry season finishes and the first rains commence. This may be due to the fact that at this particular period there is a shortage of pasturage and harmful plants not normally eaten are consumed. In these regions it is often found that in seasons when the rains are late mortality is noticeably higher than in normal seasons. A factor which may, and often does, account for this is that the poisonous plants in question may be of a succulent or bulbous nature and not so dependent on the rains for the commencement of growth as are the grasses or other pasturage plants. The result is that the noxious species appear in leaf first and may be eaten in quantity by browsing animals, particularly as herbage is scarce at that period.

The stage of growth when consumed is an important factor with some species in determining whether they are likely to be toxic to animals. Some plants have been shown to be harmful only in the very young stage, others only when flowering or in fruit, and others only when in a wilted condition. Plants poisonous only when wilted or in the young stage frequently owe their toxicity to the presence of cyanogenetic glucosides. Some plants, however, which are poisonous only when very young are not cyanogenetic. *Chenopodium atriplicinum* F. Muell. affords an instance of toxicity in the young stages only. This saltbush is a common herbage plant in parts of Australia and is frequently grazed by sheep with no ill effects. In some seasons, however, it has been strongly suspected as the cause of heavy mortality. Work in Australia now shows that when fairly large quantities are consumed the plant is liable to prove fatal, though only when the plant is in the young stage. *Echinopogon ovatus* Beauv., the "Noogoora Burr" is another Australian plant regarded as poisonous only in the young (two-leaf) stage.

There appears to have been a marked divergence of opinion regarding the danger to livestock of *Lotus australis* Andr., a plant widely distributed in Australia. From material examined at the Imperial Institute it was found that immature plants contained a cyanogenetic glucoside, but fully developed plants contained nothing of a toxic character. This fact no doubt explains the contradictory reports that exist regarding the plant.

In the case of *Dichapetalum cymosum* (Hook) Engl. in South Africa the young growth is considerably more toxic than the old and as little as ½ oz. of the leaves have been proved to be sufficient to cause the death of a sheep. It is unusual among stock-poison plants for such small quantities to constitute a lethal dose. With the bulk of the important stock-poisoning plants of the world, i.e., those that actually cause heavy losses, comparatively large quantities have to be taken by an animal before harmful or fatal results occur. This is contrary to popular belief.

There is increasing evidence to show that plants which are toxic in one area may, although plentiful, be innocuous or but slightly toxic in another. *Tribulus terrestris* L., previously referred to, does not appear to be associated with stock-poisoning in any country except South Africa. Among Australian plants there are several examples of this variation in toxicity attributed to locality. *Euphorbia Drummondii* Boiss., a common weed, has been found to be toxic in some localities, but not in others.

Diseases of sheep in Australia known as "staggers" or "shivers," often resulting in death, are caused by certain alien species that have become completely naturalised (*Stachys arvensis* L., *Malva parviflora* L., and *Lamium amplexicaule* L.). These plants are natives of European countries, but do not appear to have come under suspicion in regard to poisoning in their native habitat. There are also good reasons for suspecting that *Lantana crocea* Jacq. and *L. Camara* L. may vary in their degree of harmfulness to stock in different parts of Australia.

It is reported that in 1891 Russian peasants of Saratov suffered from "lathyrism" as a result of large quantities of a commonly cultivated pulse (*Lathyrus sativus* L.), being imported from India and used in the preparation of bread owing to the shortage of wheat at that time. It is of interest in this connection that in Canada, where *Lathyrus sativus* is cultivated and the seeds used as food, toxic symptoms do not arise.

The succulent *Cotyledon orbiculata* L. or "pig's ear" causes death in fowls and sheep in South Africa. It has been found that the toxicity varies in different areas and this variation is believed to be due to soil conditions.

Generally, the active poisonous principle exists in greater concentration in some particular organ of the plant. In a large number of species the roots or rootstocks are poisonous and there are occasions, such as after heavy rain, when the roots may come away from the soil on the first tug of grazing. Rootstocks may be washed up or exposed along watercourses as is believed in the case of *Cicuta occidentalis* the "poison parsnip" or "water hemlock" in the United States.

The species of animal, its age, and condition are important factors in determining the effect produced on an animal, particularly in the case of prussic acid. Generally speaking young and immature animals are far more susceptible than the older ones.

Feeding habits are sometimes responsible. Sheep are more selective feeders than cattle or horses and often leave plants that are eaten indiscriminately with the other herbage by larger animals. Species of *Ranunculus* when in flower may poison cattle and horses, but not sheep, which are better able to avoid them. Sheep have been recorded as avoiding a plant one day which they may partake of copiously the next. Furthermore some sheep may be observed feeding freely on one species that other sheep in the same flock will avoid. Among animals of the same breed, age, and state of health it has been found that the quantity of a given plant required to kill one animal may be four times as great as that required as a lethal dose for another. One species may be harmful or fatal to one class of animal, but harmless to another. Others may be harmful to more than one class of animal, but produce different symptoms in those respective classes.

The action of *Leucaena glauca* Bth. affords an interesting example of a plant harmful though not fatal to some classes of animal, but harmless to others. In tropical and subtropical countries it is used as a soiling crop, fodder, or hedge plant and the leaves and shoots are readily eaten by most grazing animals, and the plant affords nutritious hay. In the West Indies and elsewhere horses, mules, donkeys, and pigs feeding on the plant lose their hair (in varying degrees), but cattle, sheep, and goats consume it without perceptible effects. It has been suggested that in ruminants the process of mixing the food with saliva and slowly digesting it may cause the poisonous principle to be neutralised, and these animals therefore escape injury.

Numerous instances of immunity in wild animals are known.

The curious effect of certain plants in acting harmfully only on animals with unpigmented skin or those breeds without pigmentation is well known in such plants as *Hypericum perforatum* L., St. John's Wort; *Fagopyrum sagittatum* Gilib., Buckwheat; *Medicago denticulata* Willd., Trefoil Burr; and certain species of *Trifolium*. The ingestion of such plants by stock in sufficient quantity leads to

photosensitisation with the development of dermatitis and later necrosis of the unpigmented surfaces of the body on exposure to sunlight. Those animals in which the exposed parts are pigmented are quite unaffected. Sunshine is necessary for the development of the malady, and if dull weather accompanies or follows feeding of the plant or if animals are kept out of sunshine, symptoms do not appear. Photosensitisation in sheep is due to St. John's Wort, and at one time it was thought that possibly only the mature plant was harmful, but it has now been shown that this effect may be caused in the early stages of growth. Buckwheat has been known to cause the same trouble in various classes of livestock in the United States.

Poisoning from the presence of compounds of hydrocyanic acid in plant tissue is of common occurrence and no doubt occurs more frequently in the *Gramineae*. Species of *Sorghum* have been long known to be liable to contain dangerous amounts of such glucosides and to have been the cause of serious fatality among various classes of stock. It has been found in *Sorghum* and many other plants that danger exists chiefly in the early stages of growth, *i.e.*, during the period of rapid formation of new tissue or when the plants are in a wilted or damaged condition. With most cyanogenetic plants a fairly large quantity of material must be consumed by the animal within a comparatively short time for death to occur. Many pasture plants, regarded as excellent stock feed when consumed under normal grazing conditions, *i.e.*, eaten at intervals and grazed along with other plants, may cause death if eaten extensively in a short period of time.

Certain leguminous plants, normally nutritious fodder plants, may sometimes show evidence of hydrocyanic acid and that this is liable to considerable variation. Among these is the European species *Lotus corniculatus* L., which may be completely devoid of any cyanogenetic substance in one year, but may possess a considerable quantity the next. Stunted drought forms exhibited a more abundant development of the substance than did forms of a more luxurious growth.

Many fodder plants which may be cyanogenetic, such as "Johnson's grass," *Sorghum halepense* Pers., and other species of *Sorghum* are commonly regarded as quite innocuous when dried or made into hay, the cyanogenetic substance being often of an unstable nature and free hydrocyanic acid rapidly disappearing on drying.

Variations in cyanogenesis has now been shown to be a feature of many Australian plants dangerous to livestock. One of the best examples is probably that afforded by *Euphorbia Drummondii* Boiss. This plant has long been suspected among some stockowners in Australia as the cause of death in stock, whereas others have always contended that the plant is harmless. Out of a total of 113 specimens examined from various localities in New South Wales only 11 were found to contain a cyanogenetic substance (hence the diversity of opinion). Certain species of *Acacia* in Australia are also known to be cyanogenetic, but to be devoid or nearly devoid of the requisite enzyme for liberation of prussic acid. Among other dangerous cyanogenetic plants of Australia are *Cynodon incompletus* Nees, "blue couch"; *Heterodendrum oleifolium* Desf., "rosewood"; *Lotus australis* Andr., "birdsfoot trefoil"; *Silybum Marianum* Gaertn., "variegated thistle" (possibly); and *Chenopodium carinatum* R. Br.

The importance of saponins in plants as the cause of several obscure stock diseases in many parts of the world is now well recognised. In the majority of cases it is only by the prolonged ingestion of these saponin-containing plants that injurious results are caused. Other substances such as tannin may completely counteract any ill-effects from the saponin. In parts of Australia *Atalaya hemiglaucæ* F. Muell. causes "walkabout" disease of horses, due to the presence of saponins. Plants quoted in other parts of the world are *Solidago rigida* L., *Solidago canadensis* L., *Aster Parryi* A. Gray, *Senecio Jacobaea* L., *Senecio latifolius* D.C.

Ewart states "Little attention has been paid to the effect of the prolonged ingestion of plants containing saponin upon grazing stock, but it is quite possible that certain obscure diseases of stock, and more particularly of horses, in various parts of the world may be due to this cause."

In Australia "walkabout" disease of horses, due to the "whitewood" *Atalaya hemiglauc* F. Muell. is stated to occur only north of the nineteenth parallel, whereas the tree occurs abundantly down to the twenty-fifth parallel.

Ewart states "Many other cases are known in which a poisonous plant becomes harmless near its southern or northern temperate limit owing to its developing little or none of its poisonous principle under less favorable temperature conditions, and this effect will be increased if the plant under these conditions produces more of a protective substance such as tannin, or forms a variety of the poisonous principle which is more readily decomposed in the alimentary canal."

There are many instances where it is known that deficiencies in the soil of certain minerals result in similar deficiencies in the plants growing in these soils and that these in turn may be responsible for maladies in grazing stock, such maladies being commonly known as "deficiency disease." It is therefore possible that a plant or community of plants may afford a wholesome and adequately balanced stock food in one area, while in another it may, in the course of time, be responsible for a deficiency disease owing to the shortage of a certain mineral under altered soil conditions. The lack in the pasturage of any one of the essential minerals may cause only a mild disorder in the animal, such as unthriftiness or lack of condition if of mild degree, but if of greater intensity it may lead to more grave disorders and to the death of the animal. The insufficiency of such minerals as phosphorus, calcium, iron, and iodine has been shown to cause some of the worst forms of deficiency disease in different areas.

Phosphorus deficiency in pasturage is particularly acute in parts of Australia and southern Africa. It has been found that European grasses growing in Australia have a lower average phosphorus content than when growing in Europe, but are nevertheless markedly richer in phosphorus (when grown in Australia) than are the indigenous Australian grasses.

A common symptom in grazing animals of mineral deficiency in the pasturage is in the development of depraved appetite. In the case of phosphorus this leads to the chewing of old bones and carcass debris, often resulting in carrion poisoning. (In South Australia this subject has been frequently dealt with by Veterinary Officers of the Stock and Brands Department.)

Depraved appetite may develop in stock through causes other than mineral deficiency. In the United States a malady ("loco" poisoning) due to certain species of *Oxytropis* and *Astragalus* does not become manifest until prolonged feeding on the plant has taken place, some animals acquiring such a liking for the plant that they refuse to eat anything else right up to the time of death. "Horses formerly quite gentle become uncontrollable and shy violently at imaginary objects or leap high over some slight obstruction. Generally speaking a "locoed" horse can be neither led nor backed, and when put in motion cannot easily be stopped or turned, but may continue until it runs against a fence or other obstruction." It is stated to be almost impossible to drive in any one direction a flock of sheep that have been "locoed."

From the facts outlined in this article it is apparent the term "poisonous plant" when used in connection with the pasturage of food plants of grazing animals, has come to assume a wide significance. It is now commonly used not only for those species that are acutely poisonous, but also for plants that in any way disturb the health of stock. There can be little doubt that those plants that must be consumed in quantity over a long period before harmful results to the animal appear, which, of course, includes those causing deficiency diseases, are of far greater moment to the livestock industry throughout the world than are the more rapid-acting drastically poisonous species.

ADDITIONS TO THE WEED FLORA OF SOUTH AUSTRALIA.

[By G. H. CLARKE, B.Sc., Botanist at the Roseworthy Agricultural College.]

- (1) *Ajuga Iva* (L.) Schreb.; an Introduced Species Related to Bugle, *Ajuga australis*, R. Br.

This plant, a native of the Mediterranean region and hitherto unrecorded for South Australia, has been growing for some years at the Roseworthy Agricultural College, where it now covers a few acres of ground on what was at one time the College Sports Oval. That it escaped recognition has been partly due to confusion with another species belonging to the closely related genus *Teucrium*, namely *T. sessiliflorum*, Benth. It has also been due to the fact that, during the earlier part of the year the plants produce more or less imperfect "winter flowers" from which it is impossible to determine the exact form of the corolla, an important character in this particular genus. Specimens in flower of *Teucrium sessiliflorum*



Ajuga Iva.

Ajuga australis.

were found by the writer early in October of last year, and it then became evident that the species growing at the College must be an introduced form, and this was found to be the case when specimens with normal flowers became available during November last.

Botanical Name.—The plant is known botanically as *Ajuga Iva* (L.), Schreb.; *Ajuga* (a, privative, and *jugum*, a yoke), referring to the absence of a distinct posterior lip to the corolla, and *Iva* from the similarity of the odour of the flowers to that of another plant, *Iva axillaris*, which—by a singular coincidence—was recorded for this State only a few months ago.

Botanically the genus *Ajuga* belongs to the same family as that which includes such plants as Sage, Mint, Thyme, Rosemary, and Lavender. This family is called the Labiatae, and derives its name from the lipped or "labiate" condition of the

tubular corolla formed by union of the normally five flower petals. In most Labiates the corolla has two well-marked lips, an upper or posterior, and a lower or anterior. In *Ajuga* the posterior lip is very short or rudimentary, while the anterior lip is long and comprises three well-marked lobes.

Another character present in many members of the Labiate family is an arrangement of the flowers in apparent whorls or clusters at the nodes of an erect scape, the whole forming a more or less leafy spike with the flower-clusters at intervals. This arrangement, which is well seen in such plants as Wild Sage (*Salvia Verbenaca*), Horehound (*Marrubium vulgare*), Pennyroyal (*Mentha Pulegium*), and many others, is, however, by no means universal, and may be subject to variation within the limits even of a single genus, and such, indeed, is the case with the genus *Ajuga*. *Ajuga* comprises some 50 species spread over Europe, Asia, Africa, and Australia, but not present in America. Of the two species endemic in Australia, one, *A. australis*, R.Br., known as "Bugle," is quite common in this State and has the type of flower arrangement referred to. It also shows a marked distinction between the lower or "radical" leaves and the upper or "stem" leaves (see illustrations on the right). *Ajuga Iva* (see illustrations on the left) shows a different type of flower arrangement, the flowers occurring singly in the leaf axils; also there is no clear distinction between radical and stem leaves, all the leaves being more or less alike both in size and shape.

Common Name.—No common name has been found for this species. The name "Bugle" is sometimes applied indiscriminately to any species of *Ajuga*, but strictly it belongs only to those having the flowers in whorls of six or more, which species comprise the section *Bugula* of the genus. Thus the name may be used for *A. australis*, or for *A. reptans*, a weed in pastures in Europe and introduced into America, or for *A. pyramidalis*, which is grown in gardens; but it cannot be applied legitimately to *A. Iva*.

Botanical Description.—A perennial with faintly scented flowers, 2in. to 5in. high, woody at the base, the whole plant villous with white septate hairs; stems at first erect; then ascending and branching from the lower nodes, very leafy above, becoming bare and with longer internodes separating the swollen nodes at the base; leaves opposite, obscurely six-ranked, $\frac{1}{2}$ in. to 1 $\frac{1}{2}$ in. long, $\frac{1}{2}$ in. to $\frac{3}{4}$ in. wide, villous on both surfaces, mostly linear- or oblong-lanceolate and sessile, the margins revolute, entire or with 1 to 5 coarse teeth or lobes towards the summit, the midrib prominent on the under surface; flowers solitary in the axils; calyx about $\frac{1}{2}$ in. long, villous, with 5 triangular-lanceolate subequal teeth shorter than the tube; corolla $\frac{1}{2}$ in. to 1in. long with the anterior lip, villous externally and in the lateral part of the throat, the tube $\frac{1}{2}$ in. long, funnel-shaped, almost glabrous inside except for a ring of cilia near the base, the upper lip truncate and very short, the lower with two narrow obtuse lobes and a large broad notched anterior lobe, purple in color the rest of corolla whitish with purple spots in the throat; stamens 4, in pairs, exserted from the upper lip and arched over corolla, the anterior pair longer than the posterior; filaments ciliate; style shortly bifid, with two flattened triangular antero-posterior stigmatic lobes; nutlets reticulate-rugose, $\frac{1}{2}$ in. long, obovate, curved, with an oval scar on attachment on the concave side two-thirds as long.

The local form differs from the European in having the flowers longer, instead of shorter, than the subtending leaves, and the leaves erect rather than spreading; also, some European forms have the flowers 2 to 4, instead of solitary, in the axils.

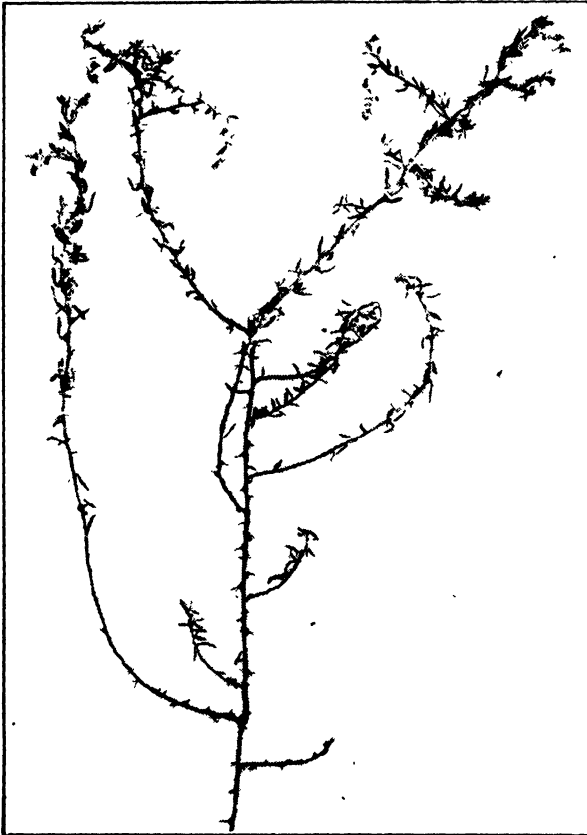
Properties.—The plant does not appear to be of much consequence. It is tough and hairy, and probably useless as a fodder. On the other hand there is no record of its having any seriously harmful properties, its chief offence being that it occupies space that would otherwise be available to more nutritious pasture plants. It does not appear to spread rapidly, though forming an abundance of seed-like fruitlets. But, like its Australian relative Bugle (*A. australis*), which has earned some slight reputation as a weed at Naracoorte and certain other parts of the State, it does grow particularly well in dry and arid situations, and for this reason it is desirable to record its presence as a potential weed capable of becoming established in many parts of South Australia.

(The writer's thanks are due to Mr. J. M. Black for confirming the identification.)

(2) Bindy-eye as a Potential Weed on the Adelaide Plains.

Bassia quinquecuspis, F.v.M., var. *villosa*, Benth.

Many people are inclined to suppose that all weeds are alien plants which have been introduced from overseas, but such is not invariably the case. The great majority do belong, it is true, to this category; nevertheless, there are a few instances where the offenders are plants native to Australia. The case of *Ajuga australis* has been mentioned above; but a much better example is afforded by certain species of *Bassia*, a genus of plants allied to the Saltbushes and comprising a number of species of intricately branched shrubs with spinescent fruits, inhabiting the drier parts of the Commonwealth. The name "Bindy-eye" is



Bassia quinquecuspis, F.v.M., var. *villosa*, Benth.

applied in the North to those species in which the spines are rather long and penetrating, and so belongs to several *Bassias* in addition to the one forming the subject of these notes. Two very similar and closely related species, *Bassia Birchii*, F.v.M. and *Bassia quinquecuspis*, F.v.M., known to New South Wales farmers as "Galvanized Burr" and "Roly-poly" respectively, are listed as weeds in the Farmers' Handbook of New South Wales, and have been proclaimed noxious weeds in certain districts of that State. A hairy variety of the latter of these plants, *Bassia quinquecuspis*, var. *villosa*, Benth., is growing in great abundance at present along the fences and in some stock paddocks adjoining the Main North Road, near Parafield, whither it has evidently been brought by stock from the

North or from the Eastern States. The species belongs to the drier parts of Queensland, New South Wales, and Victoria, and probably also to the north-eastern and eastern parts of South Australia.

Description of Plant.—The plant is an intricately branched spreading shrub, from 1ft. to 3ft. high, more or less hairy all over. The leaves are alternate, almost flat, narrow, pointed at both ends, and from ½ in. to 1 in. long or sometimes longer. The flowers are solitary, each being attached by a broad oblique base to the stem in the angle made by a leaf. The flower is provided with from 4 to 6, usually 5, spreading spines, of which three are about ½ in. long, while the other two are shorter and almost united at the base. When the leaves fall the stems appear to be armed at intervals with groups of slender prickles due to the attached and spinescent fruits. The fruits subsequently become detached as burrs, each burr containing a single seed. The accompanying photograph will give some idea of the appearance of portion of a plant.

When dry the stems are very brittle, and the parts above ground easily break away. The spiny branches tend to cling together and the detached parts are rolled over and over by wind action, gathering up fragments of other and similar plants, so that compact balls are formed. These are driven along the ground and come to rest at fences and other obstructions, and it is along the fences that the plants are most numerous and conspicuous. Such behavior has given rise to the name "Roly-poly," which name, however, is usually applied in this State to the related *Salsola Kali*, a plant which behaves similarly in this respect.

Properties.—Owing to its tough and spiny character *Bassia quinquecuspis* is useless as fodder, for stock refuse to touch it. But the burrs readily adhere to wool or hair, so that stock spread the weed without checking the growth of individual plants. For these reasons it is obviously a matter of importance to get rid of this plant while it is possible to do so without great expense. This could be done by cutting and burning the existing plants and any young ones that subsequently appear.

(The writer's thanks are due to Mr. J. M. Black for confirming the identification.)

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ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on January 31st, there being present Messrs. A. M. Dawkins (Acting Chairman), P. J. Baily, J. B. Murdoch, F. Coleman, S. Shepherd, A. L. McEwin, Professor A. J. Perkins, Dr. A. E. V. Richardson, and H. C. Pritchard (Secretary).

Apologies were received from Messrs. A. J. Cooke, R. H. Martin, H. N. Wicks, and G. Jeffrey.

Change of Name of Branch.—Approval was given to the change of name from Kuitpo Industrial Colony to Kuitpo.

New Branches.—Approval was given to the formation of Branches at Hope Forest and Dingabledinga (Women's) and Yundi. In both instances the Board decided that those members resident in the Hope Forest and Yundi Settlements should be exempted from subscription to the *Journal of Agriculture* for two years. The following were enrolled as foundation members:—Hope Forest and Dingabledinga Women's—Mesdames A. T. Jeffris, F. Finchen, L. Osborne, H. Justin, M. Bates, F. Bowen, C. Nicol, C. H. Fisher, W. C. Catlin, E. Muldoon, G. Watson, C. Jackson, E. Peterson, H. Nielson, A. Searle, P. Willaston, C. Barclay, F. Eve, S. G. Coad, A. V. Lewis, Misses I. Barclay, E. Edmunds, M. and E. Searle, and M. Coad. Yundi—C. Sandstrom, A. F. Muirson, J. C. Normandale, T. J. Hart, C. Guthridge, A. Garvis, E. B. Gliddon, W. R. Hedger, B. Whittington, R. H. Smith, G. W. Sykes, J. V. McGinnis, G. Lomax, R. W. McAlister, W. C. Jones, J. O. Marshall, W. M. Field, and T. R. Smart.

Life Members.—The following members were approved as Life Members of the Agricultural Bureau:—Messrs. W. Manser (Mount Gambier), A. W. Magery and A. V. Mills (Berri), and W. Patching (Angaston).

New Members.—The following members were added to the rolls of existing Branches:—Clare Women's—Mrs. R. M. Hawker; Mundalla Women's—Mrs. H. Wiese; Mundalla—W. Miatke; Brinkley—Roy Forrest; Parilla Women's—Miss S. McCormack; Mypolonga—L. Rosser, N. Geuc, R. Llewellyn, A. Wedd, W. Vogt; Penwortham—S. L. Wayman; Belalie Women's—Mrs. W. J. Goodes; Barmera—A. J. West; Shoul Bay—G. Osterstock, A. J. Turner; Macclesfield—J. Schmidt; Belalie Women's—Miss M. McLeod, Mrs. M. Fife; Adelaide—George Bain; Parilla Women's—Mrs. C. Schumacher; Clarendon—Ron. Spencer, Max. Harper, John Langsford, Cecil and Verran Smart; Greenock—M. Schluter, M. Martin; Blyth—M. R. Williams; Kybolito Women's—Mrs. H. J. Williams; Black Rock—A. C. Smith; Wirrilla Women's—Miss C. Evans; Parilla Women's—Miss P. Foale, Miss P. Dauncey, Mrs. Carman; Blackwood—J. H. and D. H. Mellor; Inman Valley—S. Crittenden.

No. of members for approval, 37; present No. of Branches, 334; present No. of members, 8,050.

Several items were discussed in Committee.

DAIRY AND FARM PRODUCE MARKETS.

MESSRS. A. W. SANDFORD & CO., LIMITED, reported on, February 1st, 1934:—

BUTTER.—Trade in butter throughout January fluctuated considerably, and owing to the extremely hot spells experienced the turnover lessened, but responded again when milder conditions set in. Whilst an improvement in local values was recorded during the month, the British market continued weak, and rates there touched new record low levels. This was very disheartening to producers and shippers, and was brought about through the Control Board's fixation of prices earlier in the season being above the price at which British traders were prepared to buy. At date the following local prices were ruling and London values for choicest Australian were then 63s. to 64s. per cwt. Choicest creamery fresh butter, in bulk, 1s. 1½d.; prints and delivery extra. (These prices are subject to the stabilisation levies.) Store and collectors', 4½d. to 5d. per lb. at store door, less usual selling charges.

EGGS.—The supplies of eggs kept up fairly well throughout the month, and with exporting having ceased, greater quantities were available for the local and interstate markets. Some limited shipments were made to Victoria and New South Wales, but

the bulk of the consignments were sold locally or placed into pulp for winter use. Values continued steady throughout. Ordinary country eggs, hen or duck, 3½d. per dozen; selected eggs, 1½ozs. and over, 6½d. to 7½d. per dozen.

CHEESE.—Production is now rapidly declining, as conditions in the South-East have been drier than for many years past, and this has had a serious effect on the flow of milk. There was no alteration made in these values and overseas exporting has now ceased. Local and Western Australian trade was maintained and stocks generally cleared from week to week. New makes, large and mediums, 5½d. to 6½d.; loaf, 6½d. to 6¾d.; semi-matured and matured, 9d. to 9½d. per lb.

BACON.—As usual during heat spells, bacon met with considerably reduced turnover. However, as an offset to this, cooked hams and bacon factory smallgoods met with increased turnover; but considerable stocks of bacon in process of curing are held by the factories. Rates were steady throughout the month. Best local sides, 9½d. to 9¾d.; best factory-cured middles, 10½d. to 11d.; large, 9d.; rolls, 8d. to 8½d. Hams, 1s. to 1s. 0½d. per lb.; cooked, 1s. 2d. to 1s. 2½d. per lb. Lard, prints, 6s. per dozen.

ALMONDS.—The quantities sent in to the open markets were not heavy, as most growers have ere this quitted the old season's stocks. However, the consignments which arrived met with steady sale, and buyers are now interesting themselves in the new season's crop. Softshells and Brandis, 8d. to 8½d.; hardshells, 4½d. to 5d.; kernels, 1s. 10½d. to 1s. 11d. per lb.

HONEY.—An improved demand for honey set in early in the new year, interstate buyers showing a little more interest in this commodity. The fact also of this season's "take" being likely to be a small one no doubt had an influence in this respect. Values continue without any alteration. Prime clear extracted in liquid condition, 3d. to 3½d. per lb.; lower grades, 1d. to 2d. per lb.

BESWAX.—Supplies offering were not extensive, but there was no difficulty experienced in quitting lots as they arrived. Values continued on an even keel: 1s. 0½d. to 1s. 2d. per lb., according to sample.

LIVE POULTRY.—As usual at this season of the year, a large number of poultry farmers are quitting the old season's hens, and the majority of the birds submitted at recent sales have been only in poor to medium condition and of the lighter breeds. Whilst clearances were effected from day to day, the prices for the poorer sorts were easier, but for prime quality heavy-weight stock in all classes of poultry there was a maintained demand at satisfactory prices. We advise consigning. Crates loaned on application. Prime roosters, 3s. 9d. to 5s.; nice-conditioned cockerels, 3s. 2d. to 3s. 8d.; fair-conditioned cockerels, 2s. 6d. to 3s. 1d.; chickens lower; heavy-weight hens, 2s. 5d. to 3s.; medium hens, 1s. 7d. to 2s. 2d.; light-weight hens, 11d. to 1s. 3d.; couple of pens of weedy sorts lower; geese, 2s. 9d. to 3s. 9d.; goslings lower; prime young Muscovy drakes, 2s. 9d. to 3s. 9d.; young Muscovy ducks, 1s. 9d. to 2s. 6d.; ordinary ducks, 1s. to 1s. 9d.; ducklings lower; turkeys, good to prime condition, 10d. to 1s. 2d. per lb. live weight; turkeys, fair condition, 8d. to 9½d. per lb. live weight; turkeys, poor and crooked breasted, lower; pigeons, 3d. to 4d. each.

POTATOES.—New season's, 6s. 3d. per cwt.

ONIONS.—New season's, 5s. 6d. per cwt.

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RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department show the rainfall at the subjoined stations for the month of January, 1934, also the average precipitation for January, and the average annual rainfall.

Station.	For Jan., 1934.	Av'ge. for Jan.	For Year 1933.	Av'ge. Annual Rain-fall.	Station.	For Jan., 1934.	Av'ge. for Jan.	For Year 1933.	Av'ge. Annual Rain-fal'.
FAR NORTH AND UPPER NORTH.					LOWER NORTH—continued.				
Oodnadatta	0.13	0.57	3.67	4.69	Brinkworth	0.58	0.49	15.34	15.83
Marree	0.10	0.40	3.82	5.93	Blyth	0.54	0.65	15.94	16.80
Farina	0.34	0.49	3.61	6.48	Clare	0.62	0.84	20.89	24.56
Copley	0.10	0.54	4.87	7.93	Mintaro	1.00	0.59	21.65	23.47
Beltana	0.09	0.65	5.71	8.53	Watervale	1.46	0.88	21.22	26.91
Blinman	0.06	0.90	7.33	11.92	Auburn	0.94	0.95	22.25	24.00
Hookina	—	0.47	5.72	11.46	Hoyleton	0.51	0.70	16.08	17.35
Hawker	—	0.57	9.37	12.31	Balaklava	0.26	0.66	13.73	15.49
Wilson	—	0.58	10.40	11.82	Port Wakefield ..	0.16	0.54	12.01	12.96
Gordon	—	0.60	8.53	10.59	Terowie	0.30	0.68	10.69	13.40
Quorn	0.08	0.63	9.30	13.29	Yarcowie	0.53	0.66	11.50	13.63
Port Augusta	0.27	0.51	8.34	9.46	Hallett	0.52	0.67	15.13	16.48
Bruce	0.04	0.44	6.89	9.95	Mount Bryan	0.48	0.52	17.47	16.81
Hammond	—	0.59	8.60	11.27	Koorunga	0.43	0.71	12.98	17.92
Wilmington	0.50	0.79	11.62	17.43	Farrell's Flat ...	0.39	0.71	15.12	18.63
Willowie	0.07	0.46	11.35	12.28	WEST OF MURRAY RANGE.				
Melrose	0.76	1.13	19.59	22.94	Manoora	0.95	0.58	18.31	18.93
Booleroo Centre	0.54	0.72	14.10	15.23	Saddleworth	0.66	0.73	18.90	19.61
Port Germain ...	0.81	0.60	11.61	12.55	Marrabel	0.74	0.69	20.89	19.94
Wirrabara	0.63	0.65	16.78	19.34	Riverton	0.79	0.73	20.71	20.81
Appila	0.75	0.61	11.59	14.66	Tarlee	0.40	0.73	16.52	18.13
Cradock	0.02	0.57	10.51	10.83	Stockport	0.36	0.70	14.04	16.97
Carrieton	0.09	0.73	9.11	12.29	Hamley Bridge ...	0.30	0.73	13.40	16.61
Johnburg	0.03	0.57	9.68	10.59	Kapunda	0.50	0.80	17.90	19.82
Eurelia	0.18	0.74	9.70	12.85	Freeling	0.49	0.70	15.37	17.88
Orroroo	0.24	0.94	11.20	13.23	Greenock	0.75	0.74	19.54	21.57
Nackara	—	0.63	10.17	11.18	Truro	0.95	0.68	16.44	19.95
Black Rock	—	0.68	9.41	12.43	Stockwell	0.59	0.66	18.71	20.17
Oodlawirra	0.26	0.46	11.84	11.67	Nuriootpa	0.70	0.73	21.02	20.72
Peterborough	0.17	0.79	10.81	13.27	Angaston	0.66	0.75	20.24	22.47
Yongala	0.24	0.64	12.87	14.47	Tanunda	0.64	0.81	21.34	22.03
NORTH EAST.					Lyndoch	0.50	0.72	20.62	23.46
Yunta	—	0.59	9.08	8.54	Williamstown ...	1.17	0.85	27.81	27.77
Waukaringa	—	0.48	6.45	7.97	ADELAIDE PLAINS.				
Mannahill	0.22	0.62	7.55	8.21	Owen	0.15	0.33	15.65	14.53
Cockburn	0.14	0.58	7.17	7.98	Mallala	0.28	0.63	14.79	16.59
Broken Hill, N.S.W.	0.21	0.65	8.92	9.57	Roseworthy	0.49	0.69	17.73	17.39
LOWER NORTH.					Gawler	0.38	0.71	14.31	18.97
Port Pirie	0.37	0.59	10.38	13.26	Two Wells	0.34	0.63	15.35	15.75
Port Broughton.	0.44	0.57	12.03	13.92	Virginia	0.34	0.66	17.44	17.18
Bute	0.49	0.55	14.82	15.49	Smithfield	0.43	0.50	17.34	17.65
Laura	0.62	0.68	15.62	17.99	Salisbury	0.32	0.68	17.17	18.59
Caltowie	0.87	0.67	16.01	16.75	Adelaide	0.46	0.70	22.12	21.15
Jamestown	0.78	0.66	14.26	17.75	Glen Osmond	0.75	0.88	26.64	26.03
Gladstone	0.86	0.64	13.98	16.33	Magill	0.51	0.81	22.64	25.60
Crystal Brook ...	0.55	0.63	13.70	15.82	MOUNT LOFTY RANGES.				
Georgetown	0.81	0.65	16.55	18.41	Teatree Gully ...	0.59	0.79	22.63	27.33
Narridy	0.59	0.53	12.65	15.88	Stirling West ...	1.89	1.48	48.54	47.05
Redhill	0.41	0.55	15.67	16.61	Uraidla	1.65	1.28	44.17	44.19
Spalding	0.35	0.57	15.71	18.99	Clarendon	0.82	1.06	32.30	32.80
Gulnare	0.66	0.60	17.79	18.71	Morphett Vale ..	0.33	0.73	21.73	22.68
Yacka	0.50	0.48	14.88	15.40	Noarlunga	0.27	0.58	18.44	20.41
Koolunga	0.75	0.57	13.21	15.43	Willunga	0.70	0.75	25.73	26.03
Snowtown	0.46	0.57	17.57	15.71	Aldinga	0.30	0.54	19.73	20.28

RAINFALL—*continued.*

Station.	For Jan., 1934.	Av'ge. for Jan.	For Year 1933.	Av'ge. Annual Rain- fall.	Station.	For Jan., 1934.	Av'ge. for Jan.	For Year 1933.	Av'ge. Annual Rain- fall.
MOUNT LOFTY RANGES—<i>continued.</i>					WEST OF SPENCER'S GULF—<i>continued.</i>				
Myponga	1.32	0.65	26.62	29.68	Rudall	0.38	0.51	13.66	13.12
Normanville	0.58	0.54	18.47	20.73	Cleve	0.17	0.50	17.50	14.79
Yankalilla	0.59	0.53	20.23	22.90	Cowell	0.11	0.44	8.61	11.12
Mount Pleasant ..	0.74	0.81	26.63	27.24	Miltalie	0.33	0.50	15.08	13.64
Birdwood	0.67	0.97	27.70	29.24	Darke's Peak ...	0.16	0.52	14.11	15.23
Gumeracha	1.00	1.03	31.80	33.44	Kimba	0.19	0.28	11.58	11.84
Millbrook Res.	1.32	0.98	32.28	34.82					
Tweedvale	1.28	0.96	36.80	35.97					
Woodside	1.09	0.94	32.75	32.30					
Ambleside	1.00	1.05	35.21	34.90					
Nairne	0.88	0.91	30.70	28.17					
Mount Barker ..	1.00	1.00	31.43	31.97					
Echunga	1.15	1.02	35.31	33.26					
Macclesfield	1.07	0.87	29.96	30.44					
Meadows	1.26	1.01	34.03	36.21					
Strathalbyn	0.41	0.68	18.62	19.32					
MURRAY FLATS AND VALLEY.					YORKE PENINSULA.				
Meningie	0.51	0.60	14.85	18.42	Walleroo	0.20	0.52	13.39	13.99
Milang	0.21	0.59	11.57	14.97	Kadina	0.25	0.49	12.94	15.69
Langhorne's Ck. .	0.39	0.45	13.69	14.90	Moonta	0.33	0.49	12.75	15.10
Wellington	0.32	0.68	12.37	14.70	Paskeville	0.30	0.47	13.94	15.52
Tailem Bend	0.27	0.46	14.59	15.08	Maitland	0.48	0.59	16.44	19.97
Murray Bridge ..	0.19	0.54	9.40	13.64	Ardrossan	0.22	0.47	13.29	13.98
Callington	0.31	0.65	13.63	15.22	Port Victoria ...	0.33	0.44	12.82	15.49
Mannum	0.35	0.49	9.17	11.53	Curramulka	0.36	0.56	14.30	17.95
Palmer	0.45	0.42	18.34	15.55	Minlaton	0.29	0.49	14.58	17.85
Sedan	0.49	0.54	12.45	12.11	Port Vincent ...	0.19	0.39	12.30	14.50
Swan Reach	0.59	0.36	11.44	10.62	Brentwood	0.47	0.33	14.69	15.58
Blanchetown	0.45	0.63	10.12	11.03	Stansbury	0.25	0.54	15.59	16.84
Eudunda	0.81	0.65	16.32	17.18	Warooka	0.23	0.42	14.50	17.53
Sutherland	0.46	0.33	9.51	10.88	Yorketown	0.22	0.45	13.87	16.94
Morgan	0.36	0.48	7.22	9.21	Edithburgh	0.27	0.48	14.71	16.40
Waikerie	0.30	0.33	8.14	9.70					
Overland Corner	0.58	0.45	7.19	10.37					
Loxton	1.53	0.46	8.91	11.65					
Renmark	0.52	0.44	7.13	10.49					
WEST OF SPENCER'S GULF					SOUTH AND SOUTH-EAST.				
Eucaly	0.18	0.58	8.52	9.98	Cape Borda	0.33	0.58	22.35	24.86
Nullarbor	0.02	0.36	7.77	8.84	Kingscote	0.38	0.43	18.00	19.16
Fowler's Bay	0.01	0.36	12.55	11.93	Penneshaw	0.37	0.39	16.96	19.02
Penong	0.03	0.29	12.76	12.23	Victor Harbor ..	0.54	0.66	19.21	21.42
Koonibba	0.06	0.28	12.60	12.11	Port Elliot	0.36	0.63	18.50	19.95
Denial Bay	0.07	0.23	9.43	11.52	Goolwa	0.44	0.63	16.11	17.87
Ceduna	0.03	0.21	10.28	10.16	Copeville	0.55	0.34	10.31	11.57
Smoky Bay	0.04	0.23	11.28	10.51	Meribah	1.01	0.48	9.51	11.46
Wirrulla	0.14	0.11	10.98	10.50	Alawoona	1.01	0.42	11.05	10.29
Streaky Bay	0.08	0.39	14.67	14.88	Mindarie	0.45	0.46	11.48	12.22
Chandada	0.06	—	14.44	—	Sandalwood	0.45	0.50	12.27	13.73
Minnipa	0.17	0.55	16.17	13.87	Karoonda	0.40	0.45	12.42	14.48
Kyancutta	0.10	—	12.34	—	Pinnaroo	0.57	0.40	10.94	14.57
Talia	—	0.26	15.14	14.63	Parilla	0.34	0.42	9.83	14.01
Port Elliston	0.04	0.37	18.45	16.50	Lameroo	0.39	0.52	11.95	16.10
Yeelanna	—	0.23	14.53	16.02	Parrakie	0.45	0.41	14.07	14.64
Cummins	0.05	0.36	17.31	17.61	Geranium	0.49	0.43	15.92	16.53
Port Lincoln	0.19	0.53	18.27	19.43	Peake	0.45	0.51	13.05	16.13
Tumby	0.07	0.28	13.63	14.14	Cooke's Plains ..	0.25	0.51	9.83	15.43
Ungarra	0.16	0.30	15.86	16.87	Coomandook	0.37	0.46	13.66	17.20
Port Neill	0.08	0.31	11.53	13.16	Coomalpy	0.62	0.63	21.16	17.53
Arno Bay	0.08	0.37	13.28	12.63	Tintinara	0.39	0.46	18.24	18.73
					Keith	0.35	0.40	16.67	17.96
					Bordertown	0.92	0.68	16.54	19.26
					Wolseley	0.49	0.57	17.12	18.52
					Frances	0.34	0.65	24.48	20.01
					Naracoorte	0.72	0.78	24.42	22.63
					Penola	0.22	1.01	23.65	26.05
					Lucindale	0.42	0.69	25.77	23.29
					Kingston	0.29	0.71	19.26	24.37
					Robe	0.21	0.77	23.91	24.68
					Beachport	0.28	0.84	27.05	27.07
					Millicent	0.21	0.95	28.75	29.81
					Kalangadoo	0.23	1.13	30.58	32.38
					Mount Gambier ..	0.24	1.32	23.36	30.55

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

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		Feb.	Mar.			Feb.	Mar.
Adelaide	†	—	—	Geranium	*	24	31
Alawoona	*	—	—	Gladstone	*	23	30
Allandale East	†	23	30	Gladstone Women's	†	20	20
Alma	*	—	—	Glencoe	*	13	13
Appila-Yarrowie	896	2	2	Goode	*	—	—
Arthurton	899	—	—	Goode Women's	*	—	—
Ashbourne	*	28	28	Greenock	898	5	5
Auburn Women's	*	23	30	Green Patch	900	22	29
Balaklava	*	26	26	Gumeracha	*	26	26
Balhannah	*	—	—	Hanson	*	27	27
Balumbah	*	—	—	Hartley	*	28	28
Balhannah Women's	912	—	—	Hindmarsh Island	*	—	—
Balumbah Women's	*	7	7	Hope Forest	904	5	5
Beetaloo Valley	897	26	26	Hope Forest (Wom's)	†	—	—
Belalie Women's	*	13	13	Hoyleton	*	19	19
Berri	*	—	26	Inman Valley	*	15	15
Belvidere	*	—	—	Jamestown	*	21	21
Blackheath	†	1	1	Jervois	*	8	8
Black Rock	897	6	6	Kalangadoo Women's	*	10	10
Black Springs	*	—	—	Kalangadoo	*	10	10
Blackwood	*	12	12	Kalyan	*	21	21
Blyth	†	23	23	Kangarilla Women's	*	15	15
Booborowie	*	26	26	Kanni	*	—	—
Booleroo Centre	*	23	30	Kapinnie	*	—	—
Boolgun	*	22	22	Kapunda	*	9	9
Boor's Plains	*	4	—	Karoonda	*	28	28
Borrika	*	—	—	Keith	*	22	29
Bowhill	*	26	26	Kelly	*	24	31
Brentwood	*	1	1	Ki Ki	*	—	—
Brinkley	*	28	28	Kilkerran	*	22	29
Brinkworth	*	26	26	Kongorong	*	26	26
Brownlow	*	—	—	Koolunga	*	—	—
Buchanan	*	—	—	Koonibba	*	22	29
Bute	*	15	15	Koonunga	*	—	—
Butler	*	R	—	Koppio	*	27	27
Caliph	*	6	6	Kringin	*	26	26
Caralue	*	28	28	Kulkawirra	*	13	13
Carrow	*	28	28	Kyancutta	*	6	6
Charra	*	—	—	Kybybolite	894	22	29
Cherry Gardens	†	—	—	Kybybolite Women's	*	—	—
Chilpuddie Rock	*	—	—	Lameroo	*	24	31
Clare Women's	†	—	—	Langhorne's Creek	*	21	28
Clarendon	*	26	26	Laura	*	24	31
Cleve	*	2	3	Laura Bay	†	13	13
Collie	*	7	7	Laura Bay Women's	913	13	13
Coomandook	*	23	30	Lenwood and Forest Range	*	—	—
Coonawarra	*	22	29	Light's Pass	†	—	—
Coonawarra Women's	912	21	21	Lipson	*	24	31
Cummins	*	9	9	Lone Gum & Monash	†	28	28
Cungena	*	1	1	Lone Pine	*	26	26
Currency Creek	*	26	26	Lowbank	*	28	28
Dudley	*	—	—	Loxton	*	9	9
Elbow Hill	*	22	29	Lyndoch	*	27	27
Eudunda	*	5	5	McLaren Flat	*	—	—
Eurelia	*	10	10	McLaren Flat Wm's	*	1	1
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Farrell's Flat	*	23	30	MacGillivray	904	27	27
Finnis	*	—	—	Mallala	*	19	19
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Milang	906	24	31	Roseworthy	*	—	—
Millicent	*	23	30	Rudall	*	27	27
Millicent Women's ..	*	R	—	Saddleworth	*	23	30
Miltalie	*	24	31	Saddleworth Women's ..	*	6	6
Monarto South	903	—	—	Scott's Bottom	*	24	31
Moorlands	*	—	28	Shoal Bay	*	27	27
Morchar d	*	23	30	Smoky Bay	*	—	—
Morchar d Women's ..	914	2	31	Snowtown	*	9	9
Mount Barker	*	19	19	South Kilkerran ..	*	6	6
Mount Bryan	*	—	—	Springton	*	7	7
Mount Compass	*	—	—	Stanley Flat	*	19	19
Mount Gambier	†	9	9	Stockport	*	—	—
Mount Hope	*	27	27	Strathalbyn	*	14	14
Mount Pleasant	906	9	9	Streaky Bay	*	23	23
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Mundalla	*	—	—	Tailm Bend	*	1	8
Mundalla Women's ..	915	22	29	Talia	*	23	30
Murray Bridge	*	—	—	Tantanoola	*	3	3
Murraytown	*	—	—	Tantanoola Women's ..	920	7	7
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Myponga	*	15	15	Taplan Women's ..	*	—	—
Myrla	*	28	28	Taragoro	*	22	29
Nantawarra	†	22	29	Tarlee	*	—	—
Naracoorte	*	10	10	Truro	*	19	19
Narridy	*	—	—	Tulkineara	*	22	29
Nelshaby	*	—	—	Tweedvale	*	15	15
Nelshaby Women's ..	*	—	—	Ungarra	*	1	8
Netherton	*	28	28	Upper Wakefield ..	*	—	—
Nunjikompita	*	22	29	Uraidla and Summer- town	*	5	5
Nunkeri	*	28	28	Waddikee Rocks ..	*	24	31
O'Loughlin	*	12	12	Waikerie	*	9	9
Overland Corner	*	28	28	Wallala	*	14	14
Owen	*	12	12	Wanbi	*	28	28
Palabie	*	—	—	Wandearah	*	27	27
Parilla	*	20	20	Warcowie	*	27	27
Parilla Women's	916	21	21	Warcowie Women's ..	*	—	—
Parilla Well	*	26	26	Warramboo	*	27	27
Parilla Well Women's ..	*	27	27	Warramboo Women's ..	*	—	—
Parrakie	*	—	—	Wasleys	*	8	8
Parrakie Women's ..	916	27	27	Wasleys Women's ..	*	1	1
Paruna	*	2	2	Watervale	*	19	19
Paskeville	*	27	27	Wauralte	*	27	27
Pata	*	2	2	Weavers	*	12	12
Penola	*	3	3	Wepowie	*	26	26
Penola Women's	*	—	—	Wepowie Women's ..	*	R	—
Penwortham	*	28	28	Williamstown Wm's ..	*	7	7
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Petina	*	24	24	Wilmington	*	13	13
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Pygery Women's ..	*	—	—	Yadnarie	*	27	27
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Redhill	*	—	—	Yeelanna	*	28	28
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Riverton	*	12	12				

* No reports received during the month of January. † Held over. R In recess. ‡ Formal.

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

[Branch Secretaries are reminded that the following are exempt from payment of the Annual Bureau subscription:—Life members, Branch Secretaries, members appointed before August 1st, 1930, and new members who reside in the same house as (a) a life member, (b) Secretary, or (c) another member who already subscribes.

The subscription for all other members is 2s. 6d., commencing from August 1st in each year, provided that—subject to the above exemptions—nominations forwarded during the months of January to June must be accompanied by a payment of 1s. 6d. each nomination for that period.]

MEN'S BRANCHES.

SOUTH-EASTERN DISTRICT.

FRANCES (Average annual rainfall, 20.01in.).

December 6th.—Attendance, 14.

HANDLING A YOUNG HORSE.—The monthly meeting was held in the railway yards, where Mr. W. Pfizner gave a demonstration of handling a young horse, and prefaced his remarks by saying that a horse treated with kindness was made a servant for the rest of its life, but if treated roughly it might possibly develop into a horse that could never be trusted. The correct time to break in a horse was between the ages of two and four years. The horse, a two-year-old draught filly which was used for the demonstration, was caught, and Mr. W. B. Pfizner advanced very gently and quietly to the horse's head, when a halter was then put on. The next operation was to handle her legs, which was done with the assistance of a rope, one front foot being held up until the horse stopped straining, and immediately the horse stopped the foot was lowered to the ground. This was done so that the horse would allow its foot to be picked up without struggling or straining. All feet were treated in turn in the same manner. The moulthing was done with a bridle, so that the horse could see everything that was being done to it and not be frightened. It was not very long before Mr. Pfizner was able to make the filly answer to the rein and lead. (Secretary, C. Koch.)

KYBYBOLITE (Average annual rainfall, 22in.).

October 10th.—Attendance, 22.

HISTORY OF WHEAT IN AUSTRALIA.—Mr. L. Darcy read the following paper:—“Although Australia's first wheat crop was harvested as long ago as 1789, it was many years before the new settlements could rely on sufficient local production for local needs in all years. There were several reasons for the slow progress in wheat production during the early days of the different colonies. The main causes in New South Wales and Victoria were that the early colonists were pastoralists and not interested in agriculture. In South Australia the land boom—almost as soon as the province was founded—delayed the development of farming until land values had found their natural level. The States on the mainland were relying on the supply of wheat and flour imported from Tasmania, the first importation taking place in 1815, Tasmania thus being the first State to export wheat; and again in 1820 Tasmania made history by exporting the first wheat overseas, a shipload being sent to Brazil. The first wheat to be grown on the mainland was at Rosehill, New South Wales, in 1789, and the crop returned 200 bushels, which was set aside for seed purposes. Wheat-growing made very slow progress, and in the next 18 years the area under crop had only increased to some 6,000 odd acres. In 1806 the crops failed and wheat rose to £4 a ton. The selling rate was regulated by garrison order, and it became necessary to guard the wheatfields with armed sentinels. The high price of wheat during the famine years which followed—the shortage lasted until 1815—caused a great deal of activity in agriculture, and a far greater area was put under wheat. Victoria especially paid far greater attention to wheat growing, the earlier settlers—being mainly pastoralists—getting their wheat or flour from other States. South Australia has been an agricultural area throughout the whole of its history. The first crop grown in South Australia was at Hilton, 20 acres being sown in 1838. A crop failure in the

eastern States about this time, and wheat rising to 20s. a bushel, greatly assisted the early settlers of this State, and by 1841 the area sown had risen to about 4,000 acres. The discovery of copper in South Australia in 1843, and the Victorian gold rushes of 1850, caused a big increase in the population, which made a big demand for wheat and flour, which put South Australia on its feet as a great wheat-growing State. From £73,000 in 1851 the value of South Australian exports of wheat and flour to other States jumped to £212,000 in 1852 and £556,000 in 1856. The first export of wheat to Great Britain was made in 1845.

It seems strange that mining did so much to increase agriculture in the eastern States, while in Western Australia very little wheat-growing was done, and until mining started to decline, agriculture made very little progress, and as late as 1899 Western Australian exports of wheat only amounted to 1,600 bushels. It has made very rapid progress, however, and is now one of the leading wheat-growing States. The large-scale wheat farming of to-day owes its beginning chiefly to the passage in Sir John Robertson's Land Bill of 1861, which allowed Crown lands to be purchased on extended terms. The small farmer soon came into his own, and the wheat industry progressed very rapidly. By 1871 the Australian harvest totalled 11,000,000 bushels and rose to 21,000,000 in 1882-83.

Another factor in the development of the wheat industry was the use of phosphatic fertilisers which came rapidly into use between 1880-5 after many years of experiment in different parts of the Commonwealth. The construction of new railways, subdivision of large holdings, and the opening up of mallee country in South Australia and Victoria did much to increase the wheat production of the country. All over the Commonwealth wheatgrowers were suffering very heavy losses owing to rust and drought, and the present-day wheatgrower owes much to William Farrer, who after years of experimenting at his own expense produced a rust-resisting wheat, 'Federation,' which was put on the market in 1900. The value of this wheat can be judged, that in 1889 alone the loss by rust was estimated at £2,500,000.

The yield for the Commonwealth in 1900 was approximately 48,000,000 bushels, but by 1910 had almost doubled that amount, reaching 95,500,000 bushels, and the record harvest for Australia, 1930-1, which reached the total of 213,000,000 bushels. Last season Western Australia, Victoria, and New South Wales had about 3,500,000 acres each under wheat and South Australia just over 4,500,000 acres. At the present

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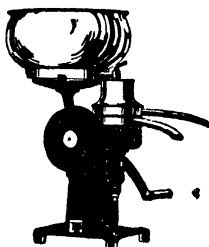
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time there are some 1,156 varieties of wheat listed in the Commonwealth, but the majority of them have never been heard of by the average wheatgrower, and only 272 of them are grown commercially.

In breeding they are a cosmopolitan lot. Some 20 different countries are represented in the breeding of some types of wheat in Australia.

The value of wheat as a source of income to Australia is very great, and last year's wheat harvest was valued at approximately £28,000,000, at an average of 2s. 3d. a bushel." (Secretary, A. Shepherd.)

WOLSELEY (Average annual rainfall, 18.52in.).

December 18th.—Present: 18 members.

ARE THE AGRICULTURAL BUREAUX WORTH WHILE?—Paper read by Mr. W. Butler:—"The above question must be answered yes. The Bureau has been established for 43 years, and from a small beginning has become a force to be reckoned with on account of the very large number of members, with Branches in nearly every place of any importance. In the early part of its career, the meetings were mostly held on a Saturday, when all the young folk wanted to be at the football match; but when they altered the time to 8 p.m. it was very soon seen that the young men were interested, and a far greater interest was manifest. Before the advent of the Bureau, matters were looking serious, and then scientists came to the rescue and showed the producers that the soil was in need of fertilizers, and the Agricultural College, by experiments, and the Bureau, through its meetings, enabled producers to obtain an increased yield in return for their outlay. By bare fallow well worked and a fair amount of super, it revolutionised cereal production. The crop competitions brought about improved conditions and increased yields per acre; they promoted a keenness to be the winner of the shield for the champion crop, and Parliament assisted the enterprise by subsidy, and the S.A. Farmers' Union have given the competitions a great lift with a splendid donation. Wonderful results have been obtained by top dressing and sowing different grass and clover seeds. Another grand feature in connection with the Bureau are the many Branches of the Women's Bureau, which are both very interesting and instructive to all; and we appreciate the splendid help that has been given by the Agricultural Instructors." (Secretary, A. Sharrad.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Wolseley	14/11/33	15	Address—H. H. Orchard	E. Sharrad
Mount Gambier	8/12/33	10	Address—J. E. Morphett.	G. Gurry
Allandale East .	26/1/34	7	Discussion	J. Laslett

UPPER NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

APPILA (Average annual rainfall, 14.69in.).

October 6th.—Attendance, 12.

FENCING.—Mr. R. Harvie read the following paper:—"When erecting a fence, first procure well-seasoned split gum posts. I prefer either red or blue gum, although both have faults. Red gum is inclined to rot in the ground and the blue gum is subject to white ants. All posts should be of the same height, placed in a straight line, and at equal distances apart. A fence 3ft. 6in. is high enough to keep most livestock in bounds, but an extra 2in. is desirable for the boundary fences. The wires should be spaced as follows:—10in. between the barb and top plain wire; then 8in., 7in., 6in., and 5in. between each succeeding wire, with the bottom wire 6in. off the ground. If the bottom wire is too close to the ground silt and rubbish drifts underneath the fence; gradually the bottom wire becomes covered and soon rots. Strainers should be about 6ft. 6in. in length 3in. to 4in. above the ordinary posts to allow for the straining of the barb wire. Always try to obtain strainers without too straight a grain. Good struts play a very important part in the fence; they should be 9ft. to 10ft. long and kept fairly close to the top of the strainer. A good plan is to put in a post about 10ft. from the strainer and place the strut against the bottom of it. When boring the posts see that the holes are bored in the direction which the fence is running. This will obviate trouble when pulling in big wire through the holes. In stony country iron posts can be used with advantage. For division fences I favor

two droppers, in boundary fences one dropper to a post. T iron posts make the strongest job, but flat ones are more economical for a two-dropper fence; the wooden posts should be 27ft. apart. Make each strain about 15 chains long. The less strainers there are in a fence the fewer broken wires there will be. If notice is taken of a fence that has been up for a time, it will be observed that the wires when broken are rusted through at the strainer. There is no trouble in straining wires at this distance because one can tie the wires on the strainer and then strain from the middle. There is no trouble in getting the wires tight if the joints are securely fastened. The thick wire which has rusted seems to cause the most trouble. If a new piece of wire is joined in between the old it will not be so inclined to break. When tying the barb on top of the posts, use galvanized wire; it is not so likely to rust the barb as black wire. It is also unnecessary to twist the wire around the barb half a dozen times; one and a half rounds is quite sufficient." (Secretary, E. Wurst.)

MIDDLE-NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

FIELD DAY- AT BEETALOO VALLEY.

A tour of the Beetaloo district was made on the afternoon of October 30th by members of this Branch, accompanied by Messrs. E. L. Orchard and J. B. Harris (District Instructors). Messrs. J. Halse's and P. Curtin's orchards were first inspected, where grey scale was found to be very prevalent. The party then visited Mr. P. Curtin's farm. A crop of wheat, Sword variety, which was one of the best in the district, was expected to reap 10 bags or cut 3 tons to the acre. Messrs. Ryan Bros.' orchard was then inspected. It was in excellent condition. Stone fruit, apples and oranges were "setting" well. Mr. Ryan's glass-house tomatoes showed indications of bearing a prolific crop. The next places called on were Mr. J. Arthur's and Mr. B. Giddings's orchards. Mr. Arthur had a very good crop of oranges, and his two-year-old orange trees (about 200) were doing remarkably well. Mr. B. Giddings's oranges were looking well; the crop was light, but next year's showing was very promising. Apples, pears, and a crop of potatoes came in for very favorable comments. His hay crop was also a splendid cut, consisting of Waratah wheat and Early Burt oats. In the evening Mr. Harris addressed a well-attended meeting, and spoke on the "Control of Garden Pests and Diseases."

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Koolunga	9/10/33	14	Address—J. O. Hatter....	I. Jones

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

BLACK SPRINGS.

October 6th.—Attendance, 16.

FARM SIDE LINES.—Mr. N. Heinrich read the following paper:—"A farm is not complete unless it has a certain number of main side lines, such as sheep, pigs, cows, poultry, &c. At the present prices a farmer cannot make wheat-growing pay. In order to regain his position side lines are the only help, unless he deals in horses or sheep, but the success of this activity is by no means certain. About six to eight cows would be sufficient to keep the home. I prefer Jerseys or Shorthorns; the former produces the richest cream but does not give quite the amount of milk as the other breed. If it is decided to keep poultry, both White Leghorn and Black Orpington are good layers. The rearing of pigs would be another avenue of revenue. Suckers can be bought for very reasonable prices, and this pays better than breeding. Crushed wheat, oats, or barley and bran are suitable feeds for pigs. On a 1,000 acre farm about 300 sheep could be run on an average throughout the year, breeding lambs or keeping a flock for shearing, and disposing of the surplus in a suitable market."

Mr. R. Heinrich read a paper, "Farm Pests," and Mr. J. Howard gave an address on "Bulk Handling." (Secretary, K. Dunn.)

GREENOCK (Average annual rainfall, 21.57in.).

December 4th.—Present: 27 members.

THE DRYING OF FRUIT.—Paper read by C. F. Wilksch:—"Fruit drying is a very old industry. In history books we read of the ancient Greeks, Turks, and Egyptians drying figs and dates; but however old the industry, a person can never use too much care in the cleanliness and soundness of his fruit. A gardener must ask himself, 'Is it as clean, sound, and appetising a product as is possible to produce.' He must remember that fruit which does not taste fresh and sweet in its natural state cannot possibly be a first-class article; in fact, it should not be dried for human consumption at all. Cleanliness is an important factor. See that the trays are clean and free from dust. All fruit should be dried off the ground on wire trellises to escape all dust caused by walking among the trays. Another advantage of this is that in stacking no dirt or dust adheres to the bottom of the tray, which would be shaken on to the fruit on the tray beneath. It also eliminates a lot of stooping, and this enables the operation of stacking or spreading to be completed easier and quicker. On no account allow the fruit on the trays to get wet or damp; it will make it darker and spoil the appearance. Care should be taken in taking the dried fruit off the trays. The fruit should not be hard and brittle, but soft and pliable. When taking off fruit, any discolored, dirty, or blemished fruit should be discarded, to facilitate grading and packing operations. *Apricots.*—The fruit should be quite ripe, but firm, to stand handling and keep a perfect shape. Cut and remove stone and stem, placing the fruit level on to the tray to hold the juice and prevent sticking when dry. Sulphur as soon as possible. Never allow apricots to stand all day before sulphuring. From 5 to 6 hours in a good even sulphuring should be sufficient. A day or two in the sun should dry off the juice, after which, if stacked, the fruit should be a good color. The ideal for apricots would be to pick, cut, and sulphur the same day; but if a grower who has anything like a big garden did this, the apricots would soon get ahead of him, and he would lose a lot of fruit. *Peaches and Nectarines.*—The same treatment as apricots, with perhaps a little more sulphur. Windfalls may be used if they fall on soft soil and are not bruised. If parts show black and are bitter, they should not be used. Clean the windfalls thoroughly with a brush or water squirted on them with good pressure. Peaches can be peeled either after sulphuring or after dipping into boiling water. They are very nice done that way, but it is not a paying proposition. Last year the A.D.F.A. only offered 1d. lb. more for them than the unpeeled, and taking into consideration the loss of time and weight, it does not pay. *Prunes.*—Ripe, but firm; not over-ripe, as then they lose weight. Dip as soon as possible in a solution of boiling water and caustic soda, approximately $\frac{1}{2}$ lb. soda to 10 gallons of water. Some varieties need more or less, but this can be told by trying a few. The dipping cracks the skin, causing the prune to dry more quickly, and prevents bloating or boiling. Dry in the stacks after a few days of sun, to improve the color and texture. When about half dry, loosen or stir them on the trays; this will prevent sticking and mould forming on the underside, and result in a more even drying. When dry, to shine up, dip in hot or boiling water and a little wattle gum and glycerine. *Plums.*—The same treatment as prunes, but in the case of light plums 6 or more hours of sulphur must follow immediately after dipping. If in drying plums such as Golden Drop, the skin of the dipped fruit should dry before sulphuring, a light sprinkling of water is very beneficial. *Pears.*—Pears are the hardest of all fruits to dry, to get them to a pale-yellow color is a difficult thing. Very often they turn a brownish or a pinkish tinge. Pick when fully developed but still green in color. If left on the tree until yellow, the centres usually turn black. After picking, store to ripen. For quick and even ripening, paper line the cases. When cutting be sure to remove all the stem, blossom, and core, as the cores show up white when dry, and spoil the appearance of the pear. Sulphur as soon as possible for about 8 to 10 hours, or longer, until they are that soft that it is hardly possible to pick them up intact. Spread the trays in the sun for a few days, then stack. If dried in the sun altogether, they turn dark and crinkled. Should dull and rainy weather set in, watch for vinegar, flies, or mould on the freshly-cut pears, and at any signs of either, a slight dose of sulphur will remedy the defect. Do not allow them to get too dry nor take them off too soft, but a nice pliable condition without being shifty. *Apples.*—It does not pay to dry apples, but if there is no market for them, it is better than letting them rot or feeding them to the pigs. Peel and core the apple and slice into rings. On no account use a salt solution, but meta-bi-sulphate, a crystal which turns the apple a very nice color. Place singly on galvanized-wire trays if available. If not, wooden trays will do, but they must be clean, as apples, being white, show any signs of dirt. The disadvantages of wooden trays are slower drying and the apples are apt to stick to the wood. If at all possible, apples are better for being dried the same day as cut. *Currants.*—Be sure the currants are ripe. If not, the fruit will be reddish instead of black, and

will not have such a good flavor and texture as the ripe fruit. Dry in the shade on racks. If no racks are available, spread on trays, but have the trays well blocked to allow plenty of ventilation. If spread on trays an occasional spreading in the sun will help to dry quicker without hurting the fruit. When dry enough to rub off the stems, pass through a buck currant riddle, to remove coarse stems and bucks, and they will then be ready for the packing shed. Any farmer or townsman who has some fruit trees on his property and has more fruit than he can use fresh, should try his hand at drying the surplus. A few trays can be purchased from a carpenter or made out of packing cases. These, if taken care of, would last for many years. The sulphur box will not be a great expense. A framework of wood covered by bagging, with a few coats of whitewash, will fill the bill. This with an occasional whitewashing or a replacing of bagging will also last for years. Any amateur who does not quite understand the treating of some varieties could get any advice from the nearest fruitgrower." (Secretary, A. Schubert.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Truro.....	18/9/33	12	Address—W. C. Johnston	L. Davis

YORKE PENINSULA DISTRICT.

ARTHURTON (Average annual rainfall, 16in. to 17in.).

November 27th.—Present: 27 members.

BULK HANDLING OF WHEAT.—The meeting took the form of an inter-Branch visit, and the following paper was read by Mr. T. Rodda:—"This subject is of vital importance to farmers. The difference between production cost and the selling price is the farmer's profit. We are unable to raise the price of wheat; therefore we must seek to lower the cost of production if we are going to be successful wheatgrowers at the present time. There has been a great advance during the last 30 years in our methods of cultivation. However, the marketing and handling of produce is hopelessly out of date. Bulk handling is a step in the right direction to improving our marketing and handling. In the first place, it will raise our standard of wheat. Under the present system all kinds of wheat go in the same stack, *i.e.*, smutty wheat, wheat with too much barley in it, and in the new country, mallee leaves. If any wheat be docked, it is all stacked with f.a.q. wheat, and must have a tendency, when shipped to other countries, to lower our standard in that particular country. A reduced price is obtained than would have been the case had it gone through the bulk system, when all docked wheat would be stacked separately, and would be marketed separately, or used for home consumption. Second, there would be less damage from weather, mice, and rats. A great quantity of new cornsacks is required for rebagging, and so much extra work that could be done away with under bulk handling; mice and rats can do very little damage to wheat stacked in bulk. Third, less handling costs. The Western Australian scheme has shown how costs can be reduced. I have included the report of the Royal Commission that investigated the costs of the scheme, which was attacked by grain merchants, those interested in cornsacks, and others handling the farmer's wheat; but the figures incontestably proved that the pool could save the farmers 3d. a bushel each year through handling wheat in bulk. Handling costs could be greatly reduced here as well as in Western Australia. Fourth, a saving in freight and loading. There have been shipments of bulk wheat sent from Port Adelaide which have proved a saving in freight and loading. In New South Wales a vessel commenced loading at 8 a.m. and at 10 p.m. it was completely loaded with 7,500 tons. The same vessel when loaded with bagged wheat on a previous trip required 16 days. Fifth, a saving of cornsacks. We have sent £1,000,000 out of this State during the last 2 years for cornsacks, and over £5,000,000 from the Commonwealth. One of the biggest objections which might be raised against bulk handling is that of unemployment. Mr. J. G. Boyle, president of the Wheat Growers' Union of Western Australia, said that although his organisation had at first viewed the scheme with a very critical eye, it had come to the conclusion that it was one of the finest for the reduction of costs. The cornsack bill of Western Australia was over £2,000,000 a year, while exchange amounted to over £500,000. If this amount is kept in Australia, it would more than compensate the men who would be thrown out of employment. It may be said that the scheme would be too costly; but a scheme that will pay for itself in 10 years, and save between 2d. and 3d. a bushel to the wheat grower, is one which growers ought to study and discuss." (Secretary, T. Howlett.)

WESTERN DISTRICT.

GREEN PATCH (Average annual rainfall, 19.43in.).

November 30th.—Attendance, 8.

CARE OF FARM IMPLEMENTS.—Paper read by Mr. H. Reschke:—"To work a farm of average size, exclusive of power, the plant costs between £500 and £750, whether motor or horses are favored. Unfortunately this price is not realised when selling the plant, and so it depreciates in value. The scrap value is very low in comparison with the initial cost and so this value must be allowed for yearly, to have some money laid aside to purchase further machinery when necessary. Often the depreciation of machinery is as high as 20 per cent., and thus it becomes a heavy charge upon production costs, and it must be taken into consideration as its depreciation is brought about by wear and tear in gaining a profit. This very high rate of depreciation is usually due to careless use of implements, and it must be admitted that a method by which production costs can be lowered is to bestow a greater amount of care upon tools and implements. One of the chief ways by which this can be done is by housing. It is very frequently seen where a harvesting machine costing, say, £250, is left in full exposure to the weather from the completion of one harvest to the commencement of the next, or the inadequate shelter of a tree is given, but it must be apparent to any casual observer that if the machines were housed, well oiled to prevent rust, and kept in a better state of repair, they would be more efficient and last longer. To save £50 in depreciation means a saving of 3d. a bushel for 4,000 bush. of wheat—quite a consideration when the amount of money obtained for wheat is a question of vital importance.

Many experts have said that the actual average lives of binders and harvesters are one-half of what they should be. Why is this? Exposure to weather for 10½ to 11 months does more damage in adding to the depreciation than the actual wear and tear for one to one and a half months. The care of farm machinery thus readily divides itself into three heads:—(1) housing or protection from weather; (2) repairing; (3) painting.

1. *Housing.*—The necessary equipment needed to operate a farm should be regarded as capital invested in a business and made to earn as large a profit as possible. If this equipment is exposed to the weather it is not likely to do good work for more than a very few years, but if adequately protected should last for more than double the time. This means a great reduction in depreciation and a factor we must consider, as it can definitely be seen what a great saving will result by properly housing implements. The objections of many people may be aroused by the cost, but an expensive shed is not necessary, and by utilising the rough timbers available in many districts a serviceable shelter could be constructed for £50. If a man is careless his depreciation may be 20 per cent.; if careful, say 8½ per cent. This means that if the cost of plant is £750, the depreciation at 20 per cent. is £150 per annum, whereas if 8½ per cent. it is only £62 10s. This saving, that is £97 10s., is brought about by housing, so the shed is more than paid for in one year by its saving of depreciation.

2. *Repairs.*—It is impossible for a machine to render efficient service when in a bad state of repair or badly adjusted, for it means that the wear and tear is increased considerably and depreciation increased. Thus it is advisable to keep all wearing parts properly adjusted and repaired. These repairs should be made systematically, and at times when there is no urgent work requiring attention. Urgent repairs—breakages made when machines are actually working—should be executed immediately. It is no good using binder twine and fencing wire, or inefficient working will be the result. A careful operator will note, while using the machine, repairs which are necessary when the season's work is completed and keeping a record of these attached to the machine on cardboard, or something of that type, will know definitely what jobs are to be performed to put the machine in good order for immediate work. This overhauling is conveniently done in winter when it is too wet for outdoor work. Duplicate parts should be ordered early and repairs which cannot be performed in the workshop completed as soon as possible. If left to a later period near the time one intends repairing the plant, it is found the parts are missing, and so much valuable time is lost. Thoroughly clean all machines when overhauling, for in this way many defects are noticed which normally would be overlooked. Wearing parts will be detected, and if it is impossible to take up this wear, new parts should be ordered and put in. This not only reduces depreciation, but also may be the means of avoiding a breakdown during the busy season, when a few days delay may prove to be very expensive.

3. *Painting.*—Unless a house is painted it does not present a finished appearance. The same applies to vehicles or implements. A greater point, however, than its appearance is that paint is an excellent preservative. It resists the decaying influences

of air and moisture on woodwork and protects metals from rust. It is often true that working parts of a machine suffer more from rust than wear. Thus it is essential to keep wearing parts well oiled as well as looking after the painting of other parts. Generally farmers can mix their own paints cheaper and more satisfactory, using red lead as a base for rough jobs and white lead with suitable colors for finer work. A coat of hot tar is a very effective preservative and is particularly good for naves and felloes of wooden wheels. A thin coat of boiled oil gives an excellent protection to metal surfaces, preventing rust, and also renews old woodwork where the paint has faded, but not lost its color or body. When applying new paint it must be remembered that the surface must be dry and thoroughly clean. Upon new or very dry wood the first coat should be one of raw linseed oil only. The cost of painting material is very small, but its value in prolonging the life of farm implements is considerable.' (Secretary, C. Whillas.)

ROBERTS AND VERRAN.

November 1st.—Attendance, 23.

THE LOCAL AGRICULTURAL BUREAU.—The meeting took the form of an inter-Bureau visit. Mr. T. Winters (Secretary of the Taragoro Branch) read the following paper:—“This subject is one which should bring forth in the general discussion many suggestions for the benefit of Branches, which should retain, at least, if not stimulate, interest of all members. The Bureau can only prove helpful to farmers if our interest is keen. The two Branches met here to-night on this our first inter-Branch visit are only small units of a State-wide organisation. The success of our Branches lies entirely in the hands of its members. The writing of papers appears to be a drawback. The choice of subjects to go on the syllabus can be improved if the members come prepared—at a meeting previously arranged—to do so. The choice of subjects is better left to the writer who is responsible for the paper, for he will suggest for the syllabus and select a subject with which he is conversant. Farming provides so many and varied subjects to suit all members that drawing up a syllabus or writing a paper should not provide such a drawback. The papers and discussions provide much benefit to other members, for very few of us hold the same ideas or opinions, and thus the expressing of them opens fresh views for other members. The Bureau, by

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the medium of papers and discussions, assists us to express our views, &c. The discussion enables us to speak and understand how to address the Chairman, &c. By this means alone it assists all members to overcome any fears or shyness in public speaking. The discussion is an education in expressing our views concisely. The local Bureaux provide a very helpful education to farmers. Another fact is that we are enabled to enjoy lectures and read bulletins by officers of the Department of Agriculture on many different subjects dealing with primary production. The election of officers is another outlet for fresh talent. Officers should be changed more often, for by so doing interest may be better maintained, and it gives everyone a chance of taking a fresh responsibility in the affairs of the Branch. Because an officer has held a position for three years that is no reason why another member should not be put in office. The Secretary is the most important officer and on that account he should be relieved by some other member capable of doing the job. The same change should be effected in the other officers. The Branch would possibly be much improved by this change. Another point is the selection of delegates for the Annual Congress held each year. The member who has been most regular at meetings should have first chance. As he is interested enough to attend his own Branch, he will certainly carry his interest to Congress and be able to give a comprehensive report on his return." Discussing the paper Mr. O. Guy thought some members often failed to be of assistance to their Branches because they would not listen to other views and did not take part in the subject open for discussion. Mr. E. Polke said meetings of this kind should stimulate interest in the Bureau. He asked members to give a little serious thought of the benefits obtained by association with the Bureau. Mr. J. Crooks considered inter-Branch meetings should stimulate interest in the future. Members who wrote papers should be allowed to choose their own subject, because they could write about something with which they were conversant. When a member consented to write a paper he should not allow other meetings to interfere, but fulfil his duty to the Branch. He should always give of his best by giving plenty of time to write and also study other subjects by being prepared. This always meant a better discussion. Agricultural officers could be invited to attend meetings and so help to make the Branch more lively. Mr. S. Barber thought changing of officers was not for the best interest of the Branch. If fortunate enough to have good officers, why not keep them as long as possible? New subjects should be introduced which would materially increase the information. There was too much repetition of subjects. Mr. Crabb disagreed with the writer regarding his ideas of choosing members for Congress. If this idea was put in practice the most regular attendant may not be a man suitable to go. He considered anyone who was acting should realise his duty to the Branch and make determined efforts to gain as much knowledge for that Branch. Mr. J. Pahl did not advocate the changing of officers; it was difficult to get suitable men to carry out the job successfully, especially the Secretaryship. Mr. M. Guy said such meetings would greatly benefit both Branches and create more interest. Mr. C. Masters agreed with the writer as regards changing officers. He favored the Vice-President becoming Chairman next year. He would understand it was his turn and would naturally try and fill the position to the best of his ability. Drawing up a syllabus should not be very difficult if every member came prepared with suggestions instead of the Secretary giving suggestions and others adopting what he said. The Bureau itself was an education by which they could benefit. Lectures by agricultural officers were frequently given free of charge, also useful information on all subjects was printed in the *Agricultural Journal*, which at 2s. 6d. was the cheapest paper farmers had printed for their use. Mr. E. James said the Bureau was an essential and all farmers should become members and keep the Branch active. Mr. R. Jonas believed punctuality was essential. Members would be well advised to give this more consideration, which would help to run a Branch more successfully. Mr. H. Smith said members should always endeavor to attend and do something to help maintain interest in the Branch. More interest was taken when experts were invited; why not always attend other meetings and make them interesting? (Secretary, C. Masters.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Laura Bay	14/11/33	14	Address—W. H. Brown-rigg	W. Edson

EASTERN DISTRICT.**(EAST OF MOUNT LOFTY RANGES.)**

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

November 18th.—Attendance, 26.

OBJECTS OF CULTIVATION.—Paper read by Mr. W. Giles:—"Good cultivation is necessary to get the best results out of the land. In early times the operations of ploughing and harrowing were usually badly performed, partly owing to the lack of proper implements and often through carelessness. In 1733 an English farmer, Jethro Tull, called attention to the large crops which he obtained by thorough cultivation. Tull even claimed that good cultivation was of itself sufficient to maintain the fertility of the soil and that where it was practised the need for manures would never arise. In 1933 the reports of the agricultural experts on the crop growths and conditions in all districts of our State was the same, namely, that the crops on well-worked fallow were standing up to the adverse conditions admirably, whereas those on stubble and poorly worked land went off. *Ploughing*—This is usually the first step in cultivation. The object is to loosen the soil and then invert it, thus exposing a fresh surface to sun and air. In the result the soil is left loose, so that water and air can enter freely. Ploughing also affords a means of burying weeds, crop residues, and farm-yard manure under the surface, so that they are converted into humus at the place where they do the most good. The proper depth to plough depends upon circumstances and the depth may vary from 3in. to 7in. Generally it is inadvisable to go deeper than the surface soil, which can be distinguished by its darker color from the subsoil, which is poor in organic matter and has been imperfectly weathered. By bringing up large quantities of subsoil to the surface, a soil may be injured for years. Soils with a loose, sandy bottom do not necessarily require such deep ploughing as stiff clay, which it may be necessary to loosen to permit free passage of air. When ploughing is done early in winter, the operation can be performed deeper, because winter rains will wash down the finer particles, forming a fairly dense seed bed, through which the water will rise to the crop during dry weather. If ploughing is done late, then such deep working is not advisable because the soil is left so loose that plants growing on the surface may receive little water from below. Late ploughing should usually be shallow. The best results in ploughing depend upon a suitable



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wetness of soil; this applies more particularly to heavy lands. If too wet, clay land will be more or less puddled, the crumbly nature being broken down, and the ground may dry in hard lumps. There is less injury caused by ploughing too wet in early spring than there is in spring, because the frequent wetting and partial drying in winter tends to break down the lumps and reproduces that crumbly nature so desirable in heavy soils. There are also drawbacks to ploughing land too dry. The land is less effectively pulverised by the plough and, moreover, horse labor is very greatly increased. Cultivators are used for scarifying the surface and preparing a loose mulch on fallows during spring and summer, and for loosening up the surface previous to seeding. For these purposes a depth of 2in. to 3in. is sufficient. Where the ground has set hard, a spring-tooth cultivator can be used with advantage, because it leaves rather a coarse mulch, which is more effective than a fine one. In all cultivator work it is a mistake to go too deep because it is desirable to retain a firm seed bed at the depth at which the seed will be planted. Harrows are used to form a mulch where the surface is already fairly loose. They are relatively light of draught and a large area can be covered in a day. Also ploughed ground is usually broken down by harrows. Light harrows are also used for covering the seed and sometimes for killing weeds which have just germinated and before they have much grip of the ground. In districts where red land occurs, if rain falls after the drilling operation is completed, it is often necessary to harrow the land in order to break the soil crust which becomes too hard for the young wheat plant to break. Rolling is sometimes done in order to break clods and thus prepare a tilth in preparation for seeding. Rolling is also sometimes desirable, either before or after drilling a crop, in order to compact the soil and enable it better to draw up moisture from below. In order to reduce moisture by evaporation, a light harrow sometimes follows the roller to create a light surface mulch—a hard rolled surface being particularly favorable to loss of water by evaporation.” (Secretary, C. Altmann.)

SOUTH AND HILLS DISTRICT.

HOPE FOREST.

December 4th.—Attendance, 23.

GENERAL FARMING.—Mr. Muller, of Myponga, read the following paper:—“As in all other newly settled areas in the southern districts of the State, the first thing that requires attention is the sweetening of the soil, and the quickest method to do this is to plough the land and leave it for no less than 12 months. A slower way is to plant it with Subterranean clover. Never try and do too much; it is better to prepare a small acreage and do it well, because the land must be planted with the first rains to ensure the germination of the seed. A point that must not be lost sight of is to never overstock. Always give the pastures adequate fertilizer—about 2cwt. to the acre is recommended. It will improve the land, feed, and the stock. The outbuildings, such as cowsheds, horse stables, pig sties, &c., should always face the east, and be on high and dry land. See that they are free from draughts, with dry floorings, built high and wide, so that they will be cool and provide plenty of room. For perennial pastures, I suggest and have had the best returns from Subterranean clover, rye grass, *Phalaris tuberosa*; for annual crops, Cape barley and Algerian oats; and Planters’ Friend for the autumn.” (Secretary, A. Eve.)

MACGILLIVRAY (Average annual rainfall, 19in. to 20in.).

November 30th.—Attendance, 9.

IMPROVING FLOCKS.—Mr. M. Rowsell read the following paper:—“It is an accepted principle in sheep breeding that improvement begins when the flock-owner decides to use pure-bred rams of the breed found to be the most suitable for his district. If all owners of small flocks followed this rule instead of using rams—the breeding of which they know little or nothing—they would soon have sheep showing a similar type, quality, and grade of wool. Well-bred sheep eat no more and often less than nondescripts, and on that score alone they must be more profitable. To obtain best results, ewes must be carefully culled, and there is no better time to do this work than at shearing or just before. Then the animals that are bad ‘doers,’ carry faulty fleeces, are weak in constitution, can easily be detected and a cull mark put on them. Particular care should be taken to see that the ewes have sound, good udders and perfect teats. In shearing, many lambs have their teats injured, and later cannot suckle a lamb properly. The cull ewes should be

fattened and sold for slaughter. By regular culling and disposing of all the objectionable ewes and keeping all the best ewe lambs instead of selling them, the flock will steadily improve on the soundest lines. To get the best results from such ewes, rams should always be typical of the favored breed. In buying rams it is advisable to purchase direct from the breeders 'in the wool.' This in itself is a guarantee regarding their breeding and the class of stock they are likely to throw. Buyers of shorn rams at country sales often pay higher prices than they would have paid for better sheep in the wool direct from the breeder earlier in the season. Wool, shape, and constitution are the three necessary points the buyer of rams has to consider, and those who neglect to buy early cannot expect to get rams of the best type, seeing that the pick are always sold first. Many people have the wrong idea that any sort of ram will do. Every breed has its special qualities, and each does well when kept under conditions suitable for its proper development." Mr. Lines, of C.S. and I.R., spoke on "Coast Disease." (Secretary, J. Wood.)

Roseworthy Agricultural College.

JERSEY BULLS FOR SALE

ROSEWORTHY PRETTY DUKE 7589.

Born, May 19th, 1929. Tattoo Ry. 032.

Sire—King Solomon of Dalebank 1699 by Makarini (Imp.) 995.

Dam—Pretty May of Dalebank 23560 by Duke of Dalebank 2642.

G.Dam—May 3rd of Dalebank 13845 by You'll Do of Dalebank 1711.

G.G.Dam—May 2nd of Dalebank 6626 by Pretty Mike 787.

Record of Dam.—As Junior 4 years old—Milk, 5,845½lbs.; average test, 5.30 per cent.; butterfat, 310.02lbs.

ROSEWORTHY SPRITE—Entered in Herd Book, Vol. 20

Born April 15th, 1930. Tattoo Ry. 041.

Sire—King Solomon of Dalebank 1699 by Makarini (Imp.) 995.

Dam—Roseworthy Fairy 19077 by King Solomon of Dalebank 1699.

G.Dam—Fairy Queen III. of Linden 7525 by The Chief of Linden 1065.

G.G. Dam—Fairy Queen II. 5528 by Admiral 1062.

Record of Dam.—	Lbs.	Per cent.	Lbs.
As Junior 2 years old . . .	6,000	5.24	314.18
Junior 3 years old . . .	7,270½	5.44	395.56
Junior 4 years old . . .	8,098½	5.40	437.87
At 5 years	10,108½	5.64	570.68

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MOUNT PLEASANT (Average annual rainfall, 27.18in.).

September 8th.—Attendance, 6.

RABBIT DESTRUCTION.—Mr. D. Learmonth read the following paper:—"The law in regard to rabbit destruction is worthy of more serious consideration than it generally receives. One District Council does its job and sees to the destruction of the pest, another Council does not seriously tackle the work and, in consequence, their district proves to be a breeding ground for the rodents. There are landholders in all districts who consistently kill their rabbits, and their efforts are nullified because their neighbors do not take any action. There is only one way to overcome this pest, every landholder to tackle the job in a determined way and all working at the same time. There is no doubt about the necessity for killing the rabbit. A grazier told me recently that he had killed 9,000 rabbits since December, 1932, and he estimated that five rabbits ate as much as 1 sheep. If that is correct, it means that if these 9,000 rabbits were left alive they would have consumed the feed which would have kept 1,800 sheep. Again, to have left those 9,000 rabbits for 1 year would have increased the number at a low estimate by 100,000. The revenue to Australia for export rabbits and skins is sometimes referred to. Nearly 108,000 carcasses were shipped recently, in one shipment. Put these down at an average net return to Australia of 6d. each, which equals £2,700. Again, take five rabbits to a sheep and in place of those 108,000 rabbits, an extra 21,600 sheep could have been kept. Put the wool from those sheep down at ten pounds per head at 1s. a pound and £10,800 is the result, thus showing a dead loss to Australia of £8,100. There still remains the carcasses of the sheep, which if, valued at 10s. off shears, gives £10,800, making a profit in favor of sheep as against one shipment of rabbits £18,900. The Australian landholder gets no return from the production of rabbits. He loses his grass, his crop, and usually has to pay to have the rabbits destroyed. What is the best way then, to get rid of rabbits. This depends on the class of country. Level country without many rocks should be fairly easily cleared. Dig out all warrens. If this has not been done for some years it will fairly expensive, but to get rid of rabbits their homes must be destroyed. If possible, have dogs and hunt up any rabbits that are out, then close up all entrances except that one where digging is commenced. If possible put the top spadeful aside and when the warren is finished, or next day, put the earth back in the warren with the grass on top." Discussing the paper, members thought the warren should be left open for several days. In rough ground with big rocks, the rabbits' home was much harder to destroy. Wire-netting could be used with advantage members thought and stones broken up to the size of road metal and the holes filled in. In sandy ground the entrances should be dug well back and the holes fumigated. Other suggestions were for the Government to pay a bonus on rabbit skins to make them a payable price say an average of 1s. 6d. a pound, it would soon be returned in extra wool and meat, or subsidise the rabbit killing, as was already done by the Government in placing boys with farmers. Mr. Vigar of Mount Hope Branch said that they could not get along on the Peninsula without the poison cart in summer and traps when the crop was beginning to grow. All agreed that every landowner must co-operate if much good was to be done in the way of rabbit destruction. (Secretary, D. Smith.)

MILANG (Average annual rainfall, 14.97in.).

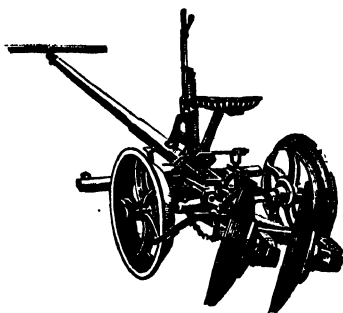
DAIRY HERD IMPROVEMENT.—Paper read by Mr. C. Lund, Strathalbyn:—"In dealing with this subject, the five following points are of utmost importance:—(1) Breeding. (2) Feeding. (3) Testing. (4) Culling. (5) Pasture management. (1) *Breeding.*—The first consideration in breeding is to secure a good sire. Breed from the best producers and set a standard in the herd and try and breed from cows that are above that mark. Keep the bull in good health and condition. Line breeding is better than in-breeding. Line breeding means that the blood of the sire in use is not lost after the first 3 years when ordinarily the bull would be on his daughters. Keep the herd up to breed characteristics and at all times remember that the better the sire the better the future herd. (2) *Feeding.*—A cow cannot do justice if she is not fed to her liking. Feed for production, but always remember that over-feeding of concentrates is not payable if carried to extremes. It is better to put it in the bucket than on the cow's back, but do not stint the cow when she needs it. Always watch the cow and feed her accordingly." The speaker also dealt with ensilage, chaff, and natural pastures and recommended linseed, crushed oats, bran and pollard. (3) *Testing.*—This is perhaps one of the most important factors in dairying, for without the true record of each cow it is not possible to say which cows are profitable. Weigh the milk each day and enter the results on a chart. Endeavor to join an association

or, if this is not available, do the testing on the farm. (4) *Culling*.—After testing, culling can be carried out. An excellent idea is to set a standard, say 200lbs. butter-fat, and cull out all cows which are not doing this and so gradually raise the standard of the herd. (5) *Pasture Management*.—Have the pastures so arranged that the herd will come on to fresh feed each week. This can only be done by having small paddocks, so that when one is almost eaten out the herd can be moved on, and followed with dry stock to clean up the pastures. The young growth is always the sweetest and best, try and have the cows coming in a rotation of 1-6 weeks. Prepare the pasture by top-dressing, harrowing the ground at early stages of the season, and planting grasses where rainfall permits." Mr. Lund then discussed at length how the Dookie Agricultural College Ayrshire herd in Victoria (of which he was manager for a considerable time) was raised from 215lbs. butter-fat to 507lbs. This was done by culling, feeding, and testing. (Secretary, L. Yelland.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Adelaide	11/1/34	15	Address—W. N. Rule....	J. R. Hewland
Blackheath	4/1/34	9	Paper from <i>Journal</i>	E. Paech
Cherry Gardens	30/12/33	22	Homestead Meeting	A. Stone
Macclesfield	21/12/33	13	Addresses—Messrs. Scott and Barton	H. Ross
Milang	27/1/34	11	Address—E. E. Newell ..	L. Yelland
Cherry Gardens	27/1/34	15	Exhibit Night	A. Stone

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WOMEN'S BRANCHES.

THE FOOD VALUE OF MILK.

The following is the first of a series of extracts, taken from Bulletin No. 340, issued by the Connecticut, U.S.A., Agricultural Experimental Station. Other extracts will appear in subsequent issues of the Journal.

Milk has been used as a food for man for many centuries, because practical experience taught that it was an extremely valuable adjunct to the human dietary. A sound scientific explanation for this age-old custom has been obtained in recent years, and we now understand why races accustomed to the use of liberal quantities of milk are unusually sturdy. Designed by nature to meet the requirements of the rapidly growing new-born, milk also finds a place in the dietary of the adult; more than any other single food, it meets the needs of the human body.

At what time man began to use the milk of domesticated animals may never be known, but this certainly occurred at a very early stage of civilisation. The place of origin of our domesticated cattle is not known with certainty, but they appear to be closely related to the wild aurochs or urus of Europe, Western Asia, and Northern Egypt. It is probable that the original domestication did not occur in Western Europe, but that the ox was brought from Asia by neolithic man in his migrations. Records found in tombs, caves, and camp sites indicate that the Aryans of Asia were among the earliest herdsmen; that the Swiss lake dwellers had domesticated the cow; and that the Egyptians kept cattle as early as 3500 B.C. References to milk or milk products in the Bible are so incidental as to indicate its common use from prehistoric times.

Although the cow is probably the most widely used source of milk for human food, many other species are likewise employed by man. Goats supply milk for the Arabs, South Europeans, Latin Americans, and the Spaniards. The camel supplies the Egyptians and the Arabs; the mare, the Tartars and the Mongols; and the reindeer, the Lapps and Eskimos. The inhabitants of Asia, especially those of India, milk the zebu, or Indian cow; and the Chinese and the Filipinos use the water buffalo. Sheep are milked in the Netherlands, in Greece, in Czecho-slovakia, in Italy, and in the Balkan States. The yak, belonging to the bison family, supplies the natives of Mongolia and Tibet, and milk from the llama, a relative of the camel, is used extensively in South America. However, in many countries even these substitutes for the cow are lacking. Under such conditions the tendency is to prolong the period of normal nursing, sometimes to an extraordinary extent; thus the mothers in some Indian tribes, among the Eskimos, and the poorer Chinese and Japanese nurse their children four to six years, or even longer.

In recent years evidence has accumulated rapidly to show that milk contains substances indispensable to life.

THE COMPOSITION OF MILK.

Milk is a fluid elaborated and secreted by the mammary glands from nutrients brought by the blood stream to the gland cells. It contains a mixture of several proteins, a carbohydrate, fats, inorganic salts*, vitamins, and water in such proportions and combinations that it makes an ideal food for the young of the species. The milk sugar, lactose, and the chief milk protein, casein, are found nowhere else in the vegetable or animal kingdom.

Although all milks contain similar, or at least closely analogous, chemical substances, each species of animal produces a milk peculiar to itself. The species characteristic is largely a matter of the relative proportions in which the different

*The inorganic salts contained in milk comprise what is left when a sample of milk is evaporated and the residue is heated until all combustible components have been burned away. The residue is also frequently referred to as the ash, or sometimes as the mineral salts of the milk.

components occur, as is shown in Table I. From these data it will be readily appreciated that the food value or the composition of milk must be discussed in terms of the species from which the milk is obtained.

TABLE I.—*The Average Percentage Composition of Different Milks Used by Man.*

Species.	Water.	Casein.	Albumin.	Fat.	Lactose.	Ash.
Man	87.41	0.91	1.23	3.76	6.29	0.31
Cow	87.27	2.95	0.52	3.66	4.91	0.69
Goat	84.14	3.04	0.99	6.00	5.02	0.81
Sheep	81.90	4.57	1.26	6.52	4.82	0.93
Buffalo	82.14	4.29	0.49	7.44	4.81	0.83
Camel	87.04	3.49	0.40	2.76	5.57	0.74
Horse	90.68	1.27	0.75	1.17	5.77	0.36
Ass	89.88	0.73	1.31	1.50	6.09	0.49
Reindeer	68.2	8.4	2.00	17.1	2.08	1.5

Table II., compiled in Germany in 1899, indicates an interesting and plausible relationship between the protein and the inorganic salts content of the milk and the time required for the new-born of different species to double their weight at birth.

TABLE II.—*The Composition of Milk in Relation to the Growth of the New-Born.*

Species.	Period in which Weight of New-Born is Doubled.		Salts.	100 Parts Milk Contain--	
	Days.	Protein.		Lime.	Phosphoric Acid.
Man	180	1.6	0.2	0.033	0.047
Horse	60	2.0	0.4	0.124	0.131
Cow	47	3.5	0.7	0.160	0.197
Goat	22	3.7	0.8	0.197	0.284
Sheep	15	4.9	0.8	0.245	0.293
Pig	14	5.2	0.8	0.249	0.308
Oat	9.5	7.0	1.0	—	—
Dog	9	7.4	1.3	0.455	0.508
Rabbit	6	10.4	2.5	0.891	0.997

COMPOSITION OF VARIOUS MILK PRODUCTS.

The various products obtained from milk are in such general use in many homes to-day that it is of interest to know how they compare in composition and in food fuel value with the original milk.

TABLE III.—*The Composition of Various Milk Products.*

Product.	Water. Per cent.	Protein. Per cent.	Fat. Per cent.	Carbo- hydrate. Per cent.	Inorganic Salts. Per cent.	Food-Fuel Value Per lb.
						Calories.
Whole Milk	87.0	3.3	4.0	5.0	0.7	315
Skim Milk	90.5	3.4	0.1	5.1	0.7	165
Cream	74.0	2.5	18.5	4.5	0.5	880
Butter Milk	91.0	3.5	0.5	4.2	0.8	160
Condensed Milk (sweetened)	28.0	7.8	9.0	53.5	1.7	1480
Condensed Milk (unsweetened)	73.0	7.0	8.0	10.5	1.5	645
Skim Milk Powder	4.0	35.0	2.0	51.0	8.0	1640
Whole Milk Powder	4.0	25.0	29.0	36.0	5.5	2300
Butter	13.0	1.0	83.0	—	3.0	3410
Cheese (American Cheddar)	33.5	26.0	35.5	1.5	3.5	1950
Cheese (Swiss)	31.4	27.6	34.9	1.3	4.8	1950
Cottage Cheese	69.8	23.3	1.0	4.0	1.9	535
Whey	93.4	0.8	0.3	4.8	0.7	115
Kephir	89.6	3.1	2.0	4.5	0.8	220
Kumiss	90.7	2.2	2.1	4.1	0.9	209

THE COMPOSITION OF PROTEINS.

The foundation of our knowledge regarding milk was laid by finding out the composition of a large number of different proteins. These substances are the flesh-growing materials of the body, and form an indispensable part of all the vital body fluids. This work revealed for the first time their great variety, and the fact that a nearly identical percentage composition of their elements (nitrogen, carbon, oxygen, hydrogen, sulphur, and sometimes phosphorus) went along with wide differences in composition and in physical and chemical properties; furthermore, that in the same food material, whether animal or vegetable, two or more proteins of quite different quality were usually found together.

The investigations of research workers showed that a protein is no such simple thing as salt or sugar, but is usually made up of about 18 different complexes, or nitrogen-containing groups, called amino-acids, each of them a complicated structure in itself.

In view of the great differences in the comparative composition of proteins, the question arose: Have the proteins nevertheless about the same food value, as has been assumed, or have they not? If they have not, the principles on which the whole art of animal feeding have been founded in the past are clearly unsound.

The only way to settle this question was to study the effect of each protein, when fed by itself, on growth, maintenance, and production.

Before the work at this Station was begun all experimenters who had endeavored to feed animals on diets composed of pure nutrients had failed. Both mature and young animals promptly declined in weight on such artificial diets. At the present time there is so much clearer an understanding of the influence of food on growth that, merely by changing a single constituent of the diet, one can stop the growth of a young animal at any stage of its development, maintain it for many months without growth, and later cause it to grow again at a normal rate to full maturity. Furthermore, the rate of growth of animals is, to a large extent, subject to direct experimental control.

It was the use of milk, or of milk products, in the earlier attempts to feed animals under experimental conditions that led to the first successes and to the development of the methods of feeding, and these early experiments have given rise to what is to-day the well-founded science of nutrition.

The first attempts at this Station to make an animal grow on a mixture of pure protein, fat, carbo-hydrate, and inorganic salts were no more successful than were those of other investigators; but it was soon found that animals which failed to thrive on artificial diets could be restored promptly to excellent condition by giving them a mixture of dried milk, starch, and lard, and that control animals, fed on a similar diet from weaning, grew normally to full maturity, and re-produced. Although the artificial diets were almost exactly like the milk diets in respect to the kind and proportion of the then-known nutrients, the milk diet was apparently entirely adequate as a food, whereas the artificial diet was wholly inadequate. Wherein this profound difference lay was a mystery. By a process of elimination the conclusion was finally reached that the water-soluble portion of the milk contained something that was essential for life, and later that the fat component contained something that was indispensable for long continued growth. The discovery that milk contained at least two hitherto unsuspected substances, now designated as vitamins B and A respectively, made it possible for the workers at this Station to become pioneers in the study of various problems relating to growth and maintenance. The field of study thus opened has been cultivated by numerous investigators in this country and abroad, with results of far-reaching importance.

The experiments here to be described were made with albino rats, because these small animals are omnivorous, their life span is relatively brief, and their small size permits the preparation of the required quantities of purified dietary constituents in the laboratory without undue expense. To ensure perfect accuracy, it is necessary that the rations shall consist of ingredients that are chemically pure; and to prepare such rations in quantity is very laborious and costly. The question may be asked: Are the results of experiments in feeding rats, or other of the lower animals, applicable to human beings? Although the foods suited to different species of animals may differ widely in their appearance and physical properties, the digestible nutrients contained in them are very much alike in their chemical characters, so that by the processes of digestion quite similar products result from apparently different kinds of food. Such differences as exist are in proportion rather than in kind. Furthermore, the tissues of the different types of animals are chemically even more alike than their foods, and, consequently, the nutritive requirements are in principle much more nearly the same than those unfamiliar with the chemistry of nutrition might suppose.

The conditions in feeding farm animals are necessarily so complex that it is generally impossible to recognise the influence of any individual constituent of the ration. In the experiments with rats, on the contrary, the conditions were so simplified that definite conclusions could be drawn regarding the role of each factor involved. Thus, if two series of animals are fed on mixtures of protein, fat, carbohydrate, and inorganic salts, which are identical except for the kind of protein used, and the animals in one series grow normally whereas the others fail to grow at all, it is obvious that the protein alone is the growth-determining element in the food. By means of large numbers of such experiments, extending over a period of several years, the nutritive values of many proteins, several fats, and some of the inorganic salts have been fixed. Also, a number of combinations of natural food products, both of animal and vegetable origin, which are extensively used in the daily rations of man or domestic animals, have been studied.

(To be continued.)

1933

CALENDAR

1933

SEPTEMBER

OCTOBER

NOVEMBER

DECEMBER

1934

CALENDAR

1934

JANUARY

FEBRUARY

MARCH

APRIL

MAY

JUNE

JULY

AUGUST

SEPTEMBER

OCTOBER

NOVEMBER

DECEMBER

BALHANNAH.

November 15th.—Attendance, 12.

CHRISTMAS RECIPES.—The following Christmas recipes were discussed:—*Christmas Cake.*—3 cups flour, 1lb. each currants, raisins, sugar, and butter, $\frac{1}{2}$ lb. lemon peel, 1 cup fig jam, 8 eggs, 2 teaspoons mixed spice, a little nutmeg, $\frac{1}{2}$ cup chopped nuts, 1 teaspoon carb. soda. Dissolve in warm water, and bake 3 $\frac{1}{2}$ hours. *Tomato Paste.*—2 large tomatoes, 2ozs. grated cheese, 4ozs. breadcrumbs, 1 egg, 1oz. butter. Pepper and salt to taste. Skin tomatoes by scalding, cut up, and fry them mixed with rest of ingredients. Fry until thick; take off and put in jars. *Christmas Pies.*— $\frac{1}{2}$ lb. gravy beef boiled tender, 1lb. each currants and raisins 1 $\frac{1}{2}$ lbs. sugar, $\frac{1}{2}$ lb. lemon peel, $\frac{1}{2}$ lb. beef suet, 1 $\frac{1}{2}$ apples, $\frac{1}{2}$ pint brandy, 1 grated nutmeg, essence lemon, mixed spice. Put ingredients through mincer and place in air-tight jar. When ready to bake, use puff pastry. *Christmas Sweets.*—Dissolve 2lbs. sugar with water, add flat teaspoon cinnamon, ground cloves, allspice, 4ozs. glucose. Boil 242 degrees. Pour in bowl, add 3ozs. rasins, currants, almonds, 1oz. mixed peel, 1 dessertspoon brandy. Beat until it creams. Knead well, make into 4oz. balls. (Secretary, Miss D. Spoehr.)

COONAWARRA.

December 13th.—Attendance, 23.

FRUIT DESSERTS.—Paper read by Mrs. L. Redman:—“Prepare fruit, wiping, peeling, coring, &c., as necessary. When stewing fruit of any kind, make the syrup first and when boiling put in the fruit. (By syrup is meant water and sugar, $\frac{1}{2}$ lb. sugar to one pint of water). The syrup should be enough to barely cover the fruit. Directly the fruit is put into the boiling syrup, cook gently so as not to mash the fruit. The longer the fruit cooks, as a rule, it will be a better color. A little sago may be added to the syrup to thicken it. Sago should be well washed and added to the fruit half an hour before dishing or longer. Pour into a mould until cold and it sets like a jelly. Pears peeled and cut in halves or quarters. The pips may be left in as they improve the flavor and appearance. A few drops of cochineal added to the syrup improves the color if time is limited. Dried prunes, pears, apples, apricots, peaches, require different treatment. Wash the fruit carefully, soak overnight, allowing 1qt. cold water to $\frac{1}{2}$ lb. fruit. Boil rapidly with lid off the saucepan until the fruit is quite tender. Add sugar and cook a few minutes longer. Long soaking and rapid boiling give a flavor like fresh fruit. Prunes are improved by the addition of a little lemon juice which should be added at the same time as the sugar. *Green Apricot Tart:* This is an elegant and delicious dish. Put the apricots into a stewpan with one-third of their weight in sugar, and a few spoonfuls of water. Stew gently 15 minutes or until the fruit is tender, then turn out to cool. Make a paste, line the edge of the tart dish, fill with the apricots and cover. Bake half hour. Ice it and serve hot or cold. *Strawberry Jelly:* 1lb. of ripe strawberries, 1 pint of water, 2ozs. sugar, 5 sheets of white leaf gelatine. Put the strawberries, water, sugar, and gelatine into a pudding basin, tie down and steam for 1 $\frac{1}{2}$ hours. Color to a pale pink with cochineal if required, stir thoroughly, but so gently that the berries are not broken. Pour into a damp mould and set aside to cool. Mulberries and small soft fruits may be used in this way. Steamed fruit retains its flavor and color much better than that which has been stewed. *Apricot Gâteau:* One tin apricots, 3ozs. sugar, 1oz. gelatine, 12 almonds. Take the fruit out of the syrup and make up to 5 gills with water, soak gelatine in it 10 minutes, add sugar, and boil 5 minutes. Blanch the almonds and shred, arrange fruit in a mould, sprinkle the almonds over it, strain the syrup, pour over, and set. This can be made with fresh fruit which must be cooked in syrup until tender. *Gâteau of Prunes:* 1lb. of prunes, juice of lemon, 1 pint of water, 3ozs. sugar, $\frac{1}{2}$ oz. of leaf gelatine. Wash the prunes, soak overnight, cook with the water and sugar until quite soft. Next stone them, put back in the pan, add rind and juice of lemon, gelatine, a few drops of cochineal, and boil from 15 to 20 minutes. Rinse out a border mould with cold water then pour in the mixture and leave until it is set. Turn out on to a glass dish and pile whipped cream in the centre. *Peach Tapioca:* 1 can peaches, $\frac{1}{2}$ cup sugar (caster), 1 cup tapioca, boiling water, $\frac{1}{2}$ cup sugar, $\frac{1}{2}$ teaspoon salt. Drain peaches, sprinkle with powdered sugar and stand 1 hour. Soak tapioca $\frac{1}{2}$ hour in cold water to cover. To peach syrup add enough boiling water to make 3 cups. Heat to boiling point. Add tapioca drained from cold water, sugar and salt. Cook in a double boiler until transparent. Line a mould or pudding dish with peaches cut in quarters, fill with tapioca and bake in a moderate oven 30 minutes. Cool slightly, turn on a dish and serve with cream. *Pineapple Snow* (Mrs. W. Pounsett): 1 tin of pineapple, about 8 sheets gelatine dissolved in 1 pint cold water, add juice of pineapple and boil. Beat together until light, 2 cups sugar and juice of 2 lemons. Pour hot gelatine over mixture, stir well then add pineapple cut into small pieces. Put in cool place to thicken a little, add stiffly beaten whites of 2 eggs, beat 10 minutes, put

into mould; serve with cream. *Banana Trifle* (Mrs. W. L. Redman): Put banana, then sponge, then banana in dish. Pour jelly over, let set, then pour custard over before it cools, add little butter to it. Cool, decorate, and serve with cream. *Date Trifle* (Mrs. W. L. Redman): Place layer of dates, then layer of cake. Pour over custard. Custard—Beat 1 egg yolk, 1 teaspoon sugar, and 1 cup milk, pour into piedish and place in another containing water, bake until set. Beat egg whites, pile on top. Decorate with dates and cream. *Summer Trifle* (Mrs. Reschke): ½ lb. stale sponge cake, 1 small packet jelly crystals, 1 tablespoon custard powder, ½ pint milk. Lay cake in glass dish, dissolve jelly crystals and when cool, pour over cake. Make custard of powder, milk, and a little sugar, pour over other when cool and jelly has set. A sliced banana put on jelly before adding custard is an improvement. Serve with stewed or preserved fruits. *Summer Pudding* (Mrs. Reschke): Cut thin slices bread, not too new, and line pudding basin with them. See that every part is covered with bread. It may be moistened with milk to make it stick well. Take any kind of fresh fruit and boil with sufficient sugar until cooked, fill basin, cover with plate and stand in cool place until next day. Turn out carefully and serve with cream or custard. *Alpine Pudding* (Miss D. Modistach): Place 8ozs. breadcrumbs in dish, add 2 cups boiled milk whisk, add 2 tablespoons sugar and beaten yolks of 3 or 4 eggs, and essence. Bake ½ hour or until set. Add layer jam or stewed fruit. Beat egg whites stiffly with ½ teaspoon salt and fine sugar to sweeten. Pile on top and brown in oven. *Passion Fruit Delight* (Mrs. O. Skinner): Pulp of 12 passion fruits, 2 tablespoons sugar, 1 dessertspoon gelatine, ½ cup warm water, jar cream. Dissolve gelatine and sugar in water; add to passion fruit; whip cream, and when other is cool stir in; put aside to set. *Spanish Cream* (Mrs. E. G. Alder): Take 1½ pints milk and ½ packet gelatine, 3 eggs, 4 tablespoons sugar, and 1 teaspoon essence lemon. Mix milk and gelatine—dissolved in 1 cup hot water; add egg yolks, stirring quickly until they come to boil; add rest of ingredients and stir briskly for a few minutes; pour into moulds which have been rinsed with cold water; set aside to cool. *Apple Snow* (Mrs. E. G. Alder): 6 pieces sponge cake, ½ pint stewed apples, ½ pint custard, rind and juice 2 lemons, 6ozs. sugar, whites 3 eggs. Make custard with yolks of eggs; place cake in dish, pour custard over; whisk whites to stiff froth, add apples, sugar, lemon rind and juice, whisk all together until white and stiff; pile on top of dish. *Peach Slices and Milk Gelatine* (Miss O. Lear): Open 1 jar preserved peaches, place layer evenly in bottom of round mould and set in place with a little jelly; 1 pint milk, ½ oz. gelatine, 2ozs. or 3ozs. sugar, flavoring; put milk in lined saucepan; add gelatine, sugar, and flavoring; when quite dissolved pour into mould very gently on top of jellied peaches. (Secretary, Mrs. F. Skinner.)

LAURA BAY.

November 14th.—Present: 10 members.

SPONGE CAKES.—Miss L. Blumson read the following paper:—"In making sponges first of all prepare the fire and have it burning for at least an hour before baking the cake, otherwise the oven will not be thoroughly and evenly heated. The oven heat should be a little higher than for fruit cakes, and slightly cooler than for scones. An oven in which scones have just been quickly and successfully cooked is ideal for sponges when it burns down a little. Keep an even, steady heat, and do not open the oven door for at least five minutes, unless absolutely necessary. Extra wood added during baking generally spoils a cake. Prepare the tins and have all ingredients ready, because once the eggs are beaten, the sooner the sponge is in the oven the better. If the eggs are left to stand after being beaten, the cake will not rise so well, and will probably be tough and leathery. Grease the tins and sprinkle lightly with flour. This gives the cake a nice appearance, and it turns out easily. Break the eggs into the mixing bowl and beat with a pinch of salt for a few minutes, then add sugar and beat until the mixture is quite thick, and light in color. Beat for at least from 10 to 15 and up to 20 minutes. The length of beating generally depends on the type of beater used. When the eggs and sugar are sufficiently beaten, add flour and cream of tartar, sifting in a little at a time, and fold in with the lightest possible touch. On no account stir, and finally, with the same light touch, add the soda dissolved in boiling water. Pour at once into tins and bake in a moderate oven for 10 to 15 minutes. When cooked, the sponge shrinks slightly from the edge of the tins, and can be tested by pressing lightly with the finger. If no mark is left the sponge is cooked. Turn out carefully on a cake stand or folded towel, and do not fill until quite cold. Other hints to make sponge cake light: Beat eggs well before adding sugar, and add one to two tablespoons of cold water to the eggs after beating. To save time in beating a sponge, break the eggs on the sugar 1 hour before making. Stir with a fork (do not beat). This melts the sugar and less beating is required. For a sponge roll: Heat the jam and spread immediately it comes from the oven, and the roll never cracks, providing it is done quickly. For chocolate

sponge roll it is necessary to roll first and when cold unroll and spread with butter icing, otherwise the icing cools the cake and makes it crack when rolling. Also the icing seems to penetrate into the hot cake. In the blow-away sponge it is necessary to follow the method very closely, and do not beat eggs first as for other sponges; only beat eggs and sugar 8 minutes. *Recipe:* Half-cup cornflour, two teaspoons plain flour, three eggs, half-cup sugar, one teaspoon cream tartar, half-teaspoon soda. Bake in moderate oven. *Sponge lilies:* 4 eggs, 1 cup each sugar and flour, 1 teaspoon cream of tartar, $\frac{1}{2}$ teaspoon soda, 2 tablespoons cold water. Beat eggs and water for five minutes, add sugar, and beat 10 more minutes. Then add flour and cream of tartar, and lastly soda dissolved in boiling water. Put on greased oven tray in dessertspoonfuls, allowing room to spread. Cook in fairly hot oven seven to ten minutes. Leave slide in the oven and, with a knife, remove one at a time and fold into shape. Fill with whipped cream and jelly. *Rainbow sponge roll:* 6 eggs, $1\frac{1}{2}$ cups each sugar and flour, $1\frac{1}{2}$ teaspoons of cream of tartar, $\frac{1}{2}$ teaspoon soda. Beat as for an ordinary sponge. Take about quarter of the mixture, halve that and color one half brown and the other pink. Cook colors first. When cooked cut into three both colors, and jam brown and pink together alternately. Then cook the remainder on oven slide. Spread with jam and roll quickly round the colored pieces and roll in sugar. *Sponge sandwich with butter:* 4 eggs, $\frac{1}{2}$ cup sugar, 1 cup flour, 1 teaspoon cream of tartar, $\frac{1}{2}$ teaspoon soda. Beat as for other sponges and mix and then lastly stir in 1 dessertspoon of butter dissolved in $\frac{1}{2}$ cup of boiling water. Always use same cup for measurements, and fold flour in gently. Have melted butter ready to put in as soon as the sponge is mixed. This cake will keep moist longer than other sponges."

December 4th.—Attendance, 11.

DAIRYING.—Paper read by Miss Hoffrichter:—"Dairying is a profitable sideline and one which can be managed with comparative ease. The first and most important factor is the care of the cows. Every farmer should have a haystack or a supply of chaff and oats. This the cows need twice daily; first while milking in the morning and next, after milking at night. During the day and after feeding at night, the cows should be grazed in a good grass paddock; in the summer time stubble paddocks are preferable. The water trough should be kept clean and full. Running the cows home to be milked does a good deal of harm. Before milking, the hands and the cow's teats should be washed with warm water, the side of the cow brushed to remove loose hair, &c., which might fall into the bucket. After milking, the buckets must be thoroughly washed, scalded, and placed in a sunny position to dry. The separator should be kept well oiled and free from dust. Use warm water containing soap or borax when washing the utensils and a brush in preference to a cloth; the cloths harbor dirt and cannot clean the crevices. When washed, the utensils are best scalded and drained. The main point in the handling of cream is cleanliness. A patch of rust in the can will deteriorate the cream very quickly and so will the lid close shut overnight. When making butter at this time of the year, procure the coolest place possible and do the work early in the morning. The cream will need to stand at least 24 hours before turning into butter. To commence, salt the pats, butter board, and scale tray in cold water, rubbing well in. The greatest care is necessary to see that the articles used are free from any particle of dirt. After each piece of butter is measured to 1lb. it is placed on the salted board and formed into an oblong shape with the butter pats, thence on to a sheet of butter paper and wrapped up neatly. To keep it firm a good plan is to wrap a wet cloth around it and put it in a cement fireplace if there is no cellar." (Secretary, Miss D. Morrison.)

MORCHARD (Average annual rainfall, 13.59in.).

November 22nd.—Attendance, 10.

MUSIC IN THE HOME.—The following paper was read by Miss McCallum:—"Most people realise the advantage as well as the pleasure of music in the home. It is everyone's duty to try and learn to play some musical instrument, providing they have the opportunity of doing so. Once anyone has attained proficiency it will be a source of pleasure to many other people. To have a really good knowledge of music often proves the beginning of companionship with many people whom one would not meet with otherwise. Those who are fortunate enough to have a thorough musical training realise what an asset it is to home and social life, and the pleasure it gives to others is well worth while the time spent in practising. For those who have no musical instrument in the home, the wireless provides endless pleasure. No matter how tired or low-spirited one is feeling, good music will help to make things more cheerful. Most people derive much pleasure from an evening spent in playing and singing in the home. Young folk of to-day who have so much more opportunity of bringing song and music into their homes are much happier for it." (Secretary, Mrs. C. Schulz.)

MUNDALLA (Average annual rainfall, 19.26in.).

November 30th.—Attendance, 14.

WASHING DAY.—The following papers were read:—Mrs. W. Golding: "I generally rise at 4.45 a.m. on washing day, light the fire, and dispose of breakfast. Then I put the first lot of clothes in the copper and start them boiling. While they are boiling I milk two cows, and by that time the clothes are ready to come out and another lot is put on to boil. After separating, the clothes are rinsed, blueed, and then hung out. Next the colored clothes are put into soak and the birds and pigs fed. The next work is the washing of the separator and breakfast dishes, sweeping the kitchen, washing being finished by nearly 10 a.m. The bedroom is then attended to and a cold dinner prepared. After dinner the clothes are folded, left for about two hours and then ironed." Mrs. M. Sabey: "My method is as follows:—Fill copper, put a good fire under same. Then cut up about 3in. of soap. When soap is dissolved and water hot enough I take out two buckets and put into tub for fine colored clothes. Then put some more water in another tub from copper and soak the white clothes; add some more water to copper and then proceed with the washing of fine colored clothes. This should take about quarter of an hour, by which time the whites are sufficiently soaked. Wash and put in copper and boil 10 to 15 minutes. While these are boiling wash face and tea towels so that they are ready to go in copper when white clothes are taken out. Rinse and blue white clothes and hang on line to dry. By this time towels should be ready to come out. Proceed in same manner. Give the dark colored clothes the first wash in the water in which the towels were rinsed; then take some hot water from copper, add sufficient cold water to make it comfortable to work in, wash until clean, and rinse in clean luke-warm water. I do my washing with two ordinary pieces of soap and usually finish by about 10.30 a.m. I never ring bed quilts; they keep their shape better if hung out wet." Mrs. K. Dinning: "First thing on rising Monday morning I take off the bedclothes and turn the mattress. Then light the fires and sort the clothes. By this time the cows have had their chaff and are ready to be milked. While the milk is being separated and the pigs and calves fed, I make the bed, which has been sufficiently aired. Breakfast is then prepared. Breakfast cleared away and dishes and separator washed, I rub the white clothes, and whilst they are boiling rub all the rest. By this time I take out the first boiling and put second lot on, using cold water and home-made soap. While the second lot is boiling I prepare vegetables and put on the meat to cook. All clothes being put out, I wash out troughs and then scrub floor. If any clothes are dry enough, they are brought in and folded. By dinner time the clothes are all folded ready to start ironing as soon as dishes are washed. I damp all starch clothes, and leave until next day, as they iron much easier and look nicer. After ironing is done and clothes mended, aired, and put away I spend a while in the garden. By this time I have two cows to milk and separator to be washed again." Mrs. D. Kemp: "The ease with which one can accomplish washing and usual household routine depends very much upon the weather. To get an early start it is essential that clothes are sorted and fire set the previous day. Rise about 5 a.m., light the kitchen fire, and then milk cows, feed fowls, &c. Then it is advisable to light the copper so that hot water is ready after breakfast. Before commencing to wash, dismantle separator, pack dinners, and clear the table. Next wash out tablecloths, pillow slips, handkerchiefs, &c., having previously added borax and Witch soap to luke-warm water in copper. While the first copperful is boiling, quarter to half-hour, rub out the second. When the first copperful is ready, drain well, rinse, blue, and starch, then hang out to dry while lot No. 2 boils. It is most convenient to have lunch at this period, and after making the beds, I resume washing colored clothes and woollens, using the Witch soap jelly already prepared. Change the water frequently or else wash this group twice. After putting through rinsing water and blue, hang stockings and silk underclothes on limbs of a large almond tree under which I wash, as they are then in the shade and there is no fear of pegs causing runs. Other garments go on the line. Dirty dungarees, if very old and very dirty, I put in the copper, but if possible I prefer to wash in the tub and save the copper water for scrubbing buckets, brooms, troughs, &c. As a rule there is then time to wash dishes and separator, sweep kitchen, and bring in clothes dry enough to fold for ironing. Dinner is easily arranged, consisting either of Sunday left-overs or perhaps cold meat and boiled rice, cinnamon bread, or some other simple dish. I wash-up while the irons are heating and then iron and fold."

SIMPLE SUMMER DESSERTS.—Milk Jelly. (Miss M. Knowling).—Sweeten 1 pint of cold milk, dissolve 2 dessertspoons of gelatine in hot water and add to milk. Set in mould half hour, serve with fruit. *Cinnamon Bread* (Miss M. Kemp).—Dip fingers of bread in egg and milk, fry and sprinkle with cinnamon and sugar. *Rice or Rhubarb* (Mrs. H. Wiese).—Add cinnamon and sugar, currants or sultanas to boiled rice. Add sultanas, lemon and ginger, sage, to stewed rhubarb. *Poor Man's Biscuit* (Mrs. Sabey).—4 cups flour, 1½ cups sugar, 1 cup dripping or butter, ½ cup milk, 1 teaspoon

soda, 2 teaspoons cream of tartar. *Method*: Put sugar, milk, and soda in saucepan, boil until all melted, stand to cool, then mix with flour and butter. Roll out thin and bake in hot oven until golden brown. One tablespoon custard powder added to flour improves mixture. *Soap Recipe* (Mrs. H. Wiese).—6lbs. fat, 2galls. water, 2 table-spoons borax, $\frac{1}{2}$ lb. resin, $\frac{1}{2}$ bottle cloudy ammonia, 1 large packet Lux, 1 tin caustic soda; add cloudy ammonia and Lux when boiled half-hour. *Hints*.—A pinch salt added to rhubarb saves sugar. Add 1 lump sugar to cabbage water to improve flavor. Spread coffee grounds on stove to drown odor of onions, cheese, or fish. (Secretary, Miss M. Kemp.)

PARRAKIE (Average annual rainfall, 14.64in.).

November 28th.—Attendance, 14.

HOME NURSING.—Paper read by Mrs. W. Herbert:—"Bruises are not as a rule serious, but they are painful. The best treatment is to apply pads of cotton-wool soaked in cold water to relieve pain and prevent discoloration. *Cuts*.—The flesh should be pressed up towards the cut to encourage bleeding, which will help to clean it. Then it can be bathed with cold water and disinfected and bound with a bandage. On no account should adhesive plaster be put right on it; a cut needs frequent examination to make sure that the healing process is going on satisfactorily. *Scalds* should be treated by the application of cold compresses which at once will ease the pain. The child should be treated for shock by giving a warm bath and a little light nourishment. He should be kept warm and quiet until the arrival of the doctor. It is important to keep as calm as possible, because the child may take fright from the mother's alarm. *Grazes* continuously occur on the knee and need careful treatment, especially if the child has fallen down on the road. Any wound, however slight, that has been in contact with soil needs very thorough disinfecting. First wash the wound very thoroughly, and when clean, finish the process with iodine, friar's balsam, or any reliable antiseptic. Iodine is the disinfectant commonly recommended, but it may burn the surrounding skin; friar's balsam has no such disadvantages. When the wound has been thoroughly disinfected, smear some antiseptic ointment on a piece of lint and strap loosely in place. Grazes heal more rapidly if the surface is kept soft. If a hard scab is allowed to form, there is the risk that it will crack and be knocked off, and the trouble start afresh." (Secretary, Miss J. Halliday.)

PARILLA (Average annual rainfall, 14.01in.).

December 17th.—Present: 17 members.

SUMMER SWEETS.—*Lemon Snow* (Miss P. Foale).—Boil together $\frac{1}{2}$ cup sago, 4 cups water, 1 cup sugar, and grated rind of 2 lemons. When boiled, add juice of 3 lemons; when nearly cold add well-beaten whites of 4 eggs. *Charlotte Russe*.—Line a mould or basin with strips of stale sponge cake, each piece overlapping the other. Have made 1 pint jelly, and pour some of this over cake. Beat 1 cup of cream lightly, add to remainder of jelly, which should be cold, beat well and pour in mould. Turn out when set and decorate with strips of almonds, or decorate mould with cherries and angelica before putting in cake. *Siberian Cream and Dates* (Mrs. F. Kerley).—2 dessertspoons gelatine, $1\frac{1}{2}$ cups milk, $\frac{1}{2}$ cup hot water, 2 dessertspoons sugar, dates, 2 eggs, vanilla essence. Beat yolks of eggs and sugar together. Heat milk to boiling point, stir in eggs, and cook until mixture coats the spoon. Leave to cool; flavor with essence. Add gelatine dissolved in hot water, beat whites of eggs until stiff. Whisk into the mixture, have ready a fluted mould lined with dates; pour in mixture when it is thickening. *Strawberry Trifle* (Miss E. A. Colwill).—1 stale sponge cake, 2 eggs, 1 jelly crystal, $1\frac{1}{2}$ pints milk, 3 dessertspoons cornflour, $\frac{1}{2}$ cup sugar, 1lb. strawberries. Layer the sponge cake at the bottom of the dish, pour over it the melted jelly crystal, when cool, then add a layer of strawberries, put custard on top of this, and then repeat another layer, having custard on top. *Custard*.—Boil the milk, add yolks of eggs and cornflour, which must be previously mixed with cold milk, and bring again to a boil. When cold, pour over cake and fruit, beat the whites of eggs to a stiff froth, and place on the top of the trifle. *Apple Snow* (Mrs. H. G. Johnston).—Take the pulp of 2 baked apples, 1 cup of sugar, the whites of 1 egg, and beat well until very light and fluffy. This is nice served with stewed cold apple, and also makes a nice dressing for a cold apple pie when cream is scarce. Line a pie dish with pastry. Partly bake, then pile the snow on to the pastry, put back in oven until snow is a nice light-brown color. *Lemon Pudding* (Mrs. Les. Foale).—Beat yolks of 2 eggs with $\frac{1}{2}$ cup sugar, add piece of lemon, and sift in 2 tablespoons cornflour. Stir in 1 pint of boiling water, stand on stove, stirring until it thickens, then pour into a buttered pie dish. Beat up whites, adding $\frac{1}{2}$ cup sugar, pile on top of pudding, and put in oven to brown. *Duncan Pudding* (Mrs. H. C. Colwill).— $\frac{1}{2}$ cup sugar, $1\frac{1}{2}$ tablespoons cornflour, mixed with the juice of large lemon, 2 cups boiling water, bring to the boil and stir into it the snow made by the whites of 2

eggs. Then make custard with yolks of eggs and pour round when cold. *Peach Blanmange* (Mrs. D. Smitham).—10 peaches, 3 dessertspoons cornflour, 2 cups cream, 1½ cups milk, few almonds. Put 1 cup cream, 1½ cups milk, and 3 tablespoons of juice from peaches on to boil; when boiling, add cornflour, mixed with a little more juice, then pour in wetted mould, put away in cool place. When set, turn out in rather large bowl, put peaches around side down, whip remainder of cream, put a little in each peach, and over blanmange, then put almonds cut small and browned over fruit. *Sago Cream* (Mrs. H. C. Colwill).—Put 2 heaped tablespoons sago into a breakfast cup of milk, and boil for a few minutes. Add the beaten yolks of 2 eggs, 2 tablespoons sugar, and another cup of milk beaten together. Stir over the fire until it thickens. Take off and add the beaten whites of the eggs and a little flavoring. Pour into a wet mould and serve cold. *Lemon Sago Jelly* (Mrs. H. C. Colwill).—1 cup sago, 5 cups water, 2 tablespoons golden syrup, 2 lemons, 1 cup sugar. Boil sago in water until clear, add other ingredients, boil a few minutes, add a few lemons, pour in wet mould, serve cold. *Apple Snow* (Miss Sheila McCormack).—Take 6 large apples and reduce them to a pulp by passing them through a sieve, flavor and sweeten them according to taste. Whisk the whites of 6 eggs and strew upon them 2 tablespoons of sugar. Beat the apples until they are a froth, then mix them with the beaten whites of eggs until they look like stiff snow; now pile them on a glass dish in rough pieces, and garnish with tablespoons of red jelly. Stick a sprig of green on the top. (Secretary, Mrs. R. Welden.)

PINNAROO (Average annual rainfall, 14.57in.).

November 1st.—Attendance, 48.

DIFFERENT WAYS OF USING GELATINE.—Paper read by Mrs. Mattiske:—"Half the fascination of gelatine cookery is the interest it provides in making delightful dishes out of trifles of left-over foods. Left-over salads are usually wasted, but the housewife who knows what gelatine can do takes some salad dressing and adds perhaps scraps of meat to the salads, and has for such a little effort a dish of rare attraction. Gelatine is greatly influenced by temperature. In compiling recipes, the object has been to balance the ingredients, particularly the gelatine, to ensure the dish setting under normal conditions, without an icechest. If the weather is very hot and ice not available, the gelatine content should be slightly increased or less liquid used. Gelatine should never be heated with milk, or added to hot milk, for it causes the milk to 'curdle.' This is not a curdle in the strict sense; merely a division of the curd and whey due to using the milk too hot. This so-called curdling is in no way detrimental; the milk remains perfectly sweet. To avoid this difficulty, first dissolve the gelatine in hot water, then add to the cold milk. *To Garnish Gelatine Dishes.*—Use clear jelly liquid, sweetened and flavored for dessert, &c., and seasoned for meats, salads, and savories. If the mixture for the dish is not clear, make a little by dissolving ½ teaspoon of gelatine in a little hot water, add cold water to make ½ cup, flavour as required. Cover the bottom of the mould with a little of the liquid. When firm, arrange the garnish to make a decorative pattern; then cover with remainder of the clear liquid; when set, arrange the rest of the ingredients and pour in the jelly liquid. *To Remove Gelatine Dish from the Mould.*—Run a pointed knife around the edge of the dish to just loosen, immerse the mould in warm water for a few seconds, dry with a cloth, place a dish or plate on top and turn upside down. Shake the mould gently; if the jelly will not leave the mould, immerse in warm water and repeat the process. A doyley placed over the top of mould will enable the shape to be placed in position on the plate or dish. Gelatine contains a great deal of protein, the most valuable of all food elements. It therefore enriches the food value of every dish of which it is an ingredient, and, because of its colloidal properties, facilitates the digestive process, thus it is of great value in the dietary."

RECIPES.—*Salmon in Jelly* (6 servings).—Ingredients: 2 dessertspoons (½oz.) gelatine, 1 small tin salmon, 1 cup cold water, ½ cup hot water, ½ cup vinegar or lemon juice, 1 hard boiled egg, salt and pepper. Method: Take tin of salmon and open into basin, break up with a fork, finely dissolve gelatine in hot water, adding vinegar or lemon juice, salt and pepper, and cold water. Pour a little into a round mould or cake tin. When firm, arrange slices of hard-boiled egg, pour over a little liquid. When the jelly liquid is thickening, stir in salmon, and pour into prepared mould. Garnish with shredded lettuce, slices of lemon and salads available, vinegar or lemon may be omitted from ingredients, and 1 cup of water used instead of ½ cup. Serve dish with vinegar or slices of lemon. *Asparagus Tip Salad* (6 and 7 servings).—Ingredients: 3 dessertspoons gelatine, 1 tin asparagus tips, white heart of 2 sticks of celery, 1 lemon, water, mayonnaise dressing, lettuce. Method: Drain liquor from asparagus, measure and add water to make 2 cups liquor and water together, add salt, pepper, lemon, and celery cut in small pieces. Bring to boiling point, dissolve gelatine in 1 cup hot water. Add to liquid, line mould with tips, cut up remainder

of tips, mix with celery liquid and pour into mould. When set, serve with lettuce and mayonnaise dressing. *Beetroot Mould* (6 servings).—Ingredients: 2 dessertspoons (1oz.) gelatine, 2 average-sized beets (cooked), $1\frac{1}{2}$ cups hot water, $\frac{1}{2}$ cup vinegar, pepper, salt and sugar to taste. Method: Peel and slice beetroot, line mould with the slices, fill the centre with small pieces of beetroot, dissolve gelatine in hot water, add sugar, salt, pepper and vinegar. Leave to thicken slightly, then pour over beetroot, served garnished with shredded lettuce and sliced tomato. Serve with mayonnaise dressing. If liked, more vinegar and less water in proportion may be used in this recipe. *Christmas Plum Pudding* (9 and 12 servings).—Ingredients: 3 dessertspoons gelatine, 3 cups milk, $1\frac{1}{2}$ squares chocolate or 3 tablespoons cocoa, $\frac{1}{2}$ teaspoon vanilla, $\frac{1}{2}$ lb. chopped nuts and lemon peel, $\frac{1}{2}$ cup raisins, $\frac{1}{2}$ cup dates or figs, $\frac{1}{2}$ cup currants or chopped ginger, $\frac{1}{2}$ cup sugar, pinch salt. Method: Place milk, chocolate or cocoa in saucepan, bring to boiling point, add all ingredients except gelatine and boil for 5 minutes; let cool. Dissolve gelatine in $\frac{1}{2}$ cup hot water, add to mixture, stirring all well together, pour into a wet mould, decorate with holly and serve with cream or custard. *Bananas in Jelly* (6 servings).—Ingredients: 2 dessertspoons gelatine, 1 cup hot water, 1 cup cold water, 2 lemons, 4 dessertspoons sugar, 6 bananas. Method: Dissolve gelatine and sugar in hot water, add lemon juice and finely grated rind of $\frac{1}{2}$ lemon, add cold water, strain. Pour a little of the liquid into the bottom of mould. Arrange bananas cut in fine rings. Cover with more banana and cover with jelly. Continue this way until the ingredients are used. When set, serve with cream or custard. *Pineapple Marshmallow* (6 or 7 servings).—Ingredients: 2 dessertspoons gelatine, 1 tin preserved sliced pineapple, few crystallised cherries, hot water, sugar, cochineal. Method: Dissolve gelatine in hot water, drain syrup from pineapple, add dissolved gelatine to syrup and water to make 2 cups liquid, sugar to taste. Place a little liquid in the bottom of a mould; when firm, arrange a slice of pineapple with a cherry in the centre. Pour over a little more liquid. When firm, coat the sides of the mould with a jelly and place the slices of pineapple and cherries in position. Cut up the remainder of the pineapple and cherries into the jelly, color with a few drops of cochineal, beat thoroughly until thick, then fill the mould. Serve with cream or custard. (Secretary, Mrs. F. Atze.)

RENDELSHAM.

December 6th.—Present: 14 members.

CHRISTMAS COOKING.—Paper read by Mrs. Bignell. Christmas is a time of feasting as well as rejoicing, so in most homes one of the main things is the cooking. Christmas cakes, puddings, and biscuits can be made before Christmas. If there are several children in the family, a plainer cake and pudding is very nice and is enjoyed just as well as a very rich one. Colored icings and scented lollies, also glazed fruits help to decorate. Nuts or nutmeg can be grated, a sprig of holly and rings of silver cachous put on when the pudding is turned out is very effective, or spirits poured over and then lit. *The Turkey or Poultry.*—The turkey must be in good condition and not old. Fill the body with stuffing made out of bread crumbs, parsley, and a white onion and bind with an egg; stuff the craw with mince meat and season with herbs, baste as often as possible, and within $\frac{1}{2}$ an hour or 20 minutes before finished put $1\frac{1}{2}$ lbs. of sausages and rings of bacon around the turkey; pour off fat and make gravy in the usual way. Green peas, cauliflower, apple sauce, baked and boiled potatoes, also if a piece of pork or roast beef is cooked a Yorkshire pudding can be baked in the fat around the meat; rings of lemon can be added if liked. *Christmas Pudding.*—Take $1\frac{1}{2}$ lbs. flour, $\frac{1}{2}$ lb. bread crumbs, $1\frac{1}{2}$ lbs. of suet, $\frac{1}{2}$ lb. sugar, $1\frac{1}{2}$ lb. stoned raisins or muscatels, $\frac{1}{2}$ lb. currants, $1\frac{1}{2}$ lbs. sultanas, $\frac{1}{2}$ lb. of mixed candied peel, $\frac{1}{2}$ lb. ground almonds, $\frac{1}{2}$ lb. of treacle, 5 eggs, $\frac{1}{2}$ pint of milk, 1 teaspoon of ground ginger and cinnamon, the grated rind and juice of 1 large lemon, 3 teaspoons baking powder. Chop the suet very finely and mix with sifted flour, then add bread crumbs and grated almonds. Clean the fruit and cut the muscatels or raisins into small pieces, chop the candied peel finely, and put into the pan with the ginger, cinnamon, and baking powder. Mix ingredients together, beat up the eggs, warm the treacle and mix both together, then put the milk on to boil. Pour the treacle and eggs into the pudding, mix with a wooden spoon, add the milk gradually, taking care not to make the mixture too wet, grease the pudding basins, and dust with sugar, then fill to within an inch from the top. Place a piece of greased paper on top and tie down with a cloth; boil for 6 hours or steam for 7. *Plum Pudding.*—Take 1 cup each plain flour, bread crumbs, currants, raisins, and sultanas mixed, 1 lightly filled cup of chopped suet, or $\frac{1}{2}$ of dripping, with part butter if liked; 1 small cupful sugar, a good $\frac{1}{2}$ cup of water or milk, into which a medium teaspoonful of carb. soda is dissolved. This makes a nice Christmas pudding. If all butter is used, steam in a basin from 2 to 4 hours, longer if preferred. *Jellies.*—Jellies are usually very mild; the

flavor of most jellies can afford to be strengthened, making a lot of difference to the jellies. Cherries, small lollies, or pieces of fruit can be put in the jelly just before it sets. *Trifles.*—*Imitation Trifle.*—Take 3 or 4 stale sponge cakes, cut lengthways, spread with jam, cut in halves, and pile in glass dish. Dissolve one .3d. packet of jelly in hot water and pour over the sponge cake and leave to set. Make 1 pint of custard and pour over it; can be decorated with almonds or any glazed fruits. *Norwegian Trifle.*—Take 1lb. cooking apples, stew and sweeten to taste. Take $\frac{1}{2}$ lb. tea rusks, crush them to a powder, and fry in a little butter. After this, place a layer of apples and a layer of tea rusks in a glass dish alternately, until the amount is used up, and cover with whipped cream. Passion fruit can be used in most trifles. *Lamingtons.*—1 cup butter, $1\frac{1}{2}$ cups sugar, 1 cup milk, 3 cups flour, 1 soda, 2 cream tartar. 4 eggs, vanilla. Beat butter and sugar to a cream, add eggs, well beaten, then milk with soda dissolved in it. Cut into pieces, cover with 1lb. icing sugar, $\frac{1}{2}$ lb. butter, add $1\frac{1}{2}$ tablespoons boiling water, 4 teaspoons cocoa, vanilla to taste; roll in cocoanut. *Ribbon Cake.*— $\frac{1}{2}$ cup each sugar and butter, 1 cup milk, 2 cups self-raising flour, 2 eggs. Beat butter and sugar to a cream, add eggs well beaten, then

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EARLY BOOKING IS ADVISABLE.

Further particulars can be obtained from the Manager, Parafield Poultry Station, Salisbury, or Poultry Expert, Department of Agriculture, Flinders Street, Adelaide.

C. F. ANDERSON, Poultry Expert.

milk and flour. Divide into three—one plain, color one with cocoa, another with cochineal. Cook in sandwich tins, ice when cool. *Almond Icing*.—1lb. sweet almonds pounded or 1lb. almond flour, ½oz. bitter almonds, also pounded, 1lb. icing sugar, juice of ½ lemon, a little rose water, 1 egg. This icing when spread on the cake should be left for 3 days. *Mock Cream*.—2 tablespoons each butter and sugar, well beaten to a cream, then add 1 tablespoon milk, beaten well in, then 1½ tablespoons boiling water, vanilla to flavor. Beat until like whipped cream. If using essence or cochineal, use less water. *Christmas Cake*.—Take 1lb. butter, beat to a cream, then add 1lb. sugar, when well mixed, add ½lb. stoned raisins, ½lb. currants, ½lb. sultanas, 6ozs. lemon peel chopped fine, 6 bitter almonds, 1oz. sweet almonds, juice of lemon and grated rind, a pinch of powdered cloves, 2 pinches of powdered cinnamon, a little nutmeg, 3 cups flour, the yolks of 8 eggs beaten with a wine glassful of brandy. As each article is added, the mixture must be well stirred. Lastly, stir in the whites of eggs, beaten to a froth, and continue beating the mixture rapidly for 20 minutes; then put in a buttered paper mould and bake for 3 hours in a moderate oven. (Secretary, Mrs. E. Andrews.)

TANTANOOLA.

December 6th.—Attendance, 13.

PUDDINGS.—Miss Burchard read the following paper:—"Puddings which contain suet, butter, or dripping are usually boiled in a cloth or steamed in a greased mould, and are both nourishing and wholesome for the cold weather, but for summer a lighter diet should be provided, and those which can be prepared in the morning and served cold for dinner are usually more appetising on a hot day. Baked custard or pudding made chiefly with milk and eggs require a slow cooking, and a basin of cold water placed in the oven prevents the mixtures boiling and therefore curdling. Gelatine is a great help in preparing a small quantity of fruit or in the making of a variety of dishes. Stale cake, or a sponge or a light mixture, with a small quantity of sweet stewed fruit, can be made into a nice trifle by pouring the stewed fruit over the slices of cake, followed by a boiled custard. Sprinkle with desiccated cocoanut and serve with cream. *Cream Sago*.—Put a heaped tablespoon of sago and a breakfast cup of milk into a saucepan and boil for two or three minutes. Add beaten yolks of 2 eggs, 3 small tablespoons of sugar and another cup of milk, beaten together; stir over fire until it thickens, then take off and add the whites of eggs beaten to stiff froth, and a little flavoring. Beat all well, then pour into wetted mould, turn out, and serve cold. *Spanish Cream*.—1 quart milk, 2ozs. gelatine, 1 cup sugar, 4 eggs, essence to taste. Soak the gelatine in milk or water for half-hour; then add to it the rest of the milk (boiling); stir over the fire, boil 1 minute, add the yolks of eggs beaten with the sugar, and stir until boiling again; lastly add the whites beaten well. Pour into a mould when cold, turn out, or set in a glass dish and it is ready to serve when cold." *Fruit Sago Mould*.—Soak 4ozs. washed sago in 1½ pints cold water, simmer gently until thick and transparent. Stew 1lb. sliced fruit with rind and juice of lemon to a pulp, add sugar to taste. Mix apple and sago, pour into a wet mould; when firm, turn out and serve with custard or blanc mange. *Queen Pudding*.—About 2 cups of bread in dish, soak in milk; add sugar to taste and the beaten yolks of 4 eggs. Bake slowly in oven; remove and spread with raspberry jam and pile the well-beaten whites of 4 eggs with a little sugar added over the pudding and brown slowly in cool oven." Miss Burchard tabled samples of the puddings made from her recipes. (Secretary, Mrs. E. Telfer.)

Other Reports Received.

Branch.	Date of Meeting	Attendance.	Subject.	Secretary.
Gladstone	10/1/34	39	Social Afternoon	Mrs. L. J. Sargent
Clare	2/12/33	22	Congress Report	Mrs. McKendrick
Clare	6/12/33	15	Visit to High School	Mrs. McKendrick
McLaren Flat...	7/12/33	56	American Afternoon	Mrs. D. Elliott
Wasleys	7/12/33	—	Congress Reports	Miss J. Braun
Clare	6/1/34	17	Travel Talk—Mrs. Christison	Mrs. McKendrick
Laura Bay	9/1/34	8	Visit to Men's Branch ...	Mrs. D. Merrison

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All communications to be addressed:

“The Editor, Journal of Agriculture, Education Building, Adelaide.”

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A. P. BLESING,
Minister of Agriculture.

AGRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Agricultural Bureau Conferences.

District Conferences will be held as follows:—

South-East (Lower), at Tantanoola, Wednesday, April 11th, H. M. Kennedy (Secretary).

Dairying, at Milang, Wednesday, May 9th, I. E. Yelland (Secretary).

Eyre's Peninsula (West), at Ceduna, Wednesday, July 4th, A. R. Maguire, Mudamuckla (Secretary).

Upper North, at Wilmington, Wednesday, July 18th, Chas. Cole (Secretary).

In each case the Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda.

“Twin Lamb” Disease.

The Chairman of the Governing Council of Roseworthy Agricultural College has received from the Principal (Dr. A. R. Callaghan) a statement setting out the experiments which are being conducted at the College in connection with the disease in sheep known as “twin lamb” disease.

He states that following last year's feeding trials with pregnant ewes a further experiment is planned for February and March, using ensilage and oats as contrasting rations, but supplemented with licks.

Losses of pregnant ewes from “twin lamb” disease are of world-wide occurrence, and the malady has been under investigation in recent years at a number of centres. In 1930 and 1931 experiments to discover its cause were conducted at Roseworthy College by Messrs. A. R. Hickinbotham and W. G. Bennett, and reports were published in the *Journal* of the Department of Agriculture, the conclusion reached being that a deficiency of lime was the cause, or, at least, an important predisposing factor.

By a recent mail a letter has been received from the Chief Chemist of the Rowett Research Institute, Aberdeen, Scotland, describing experiments conducted there to test the importance of lime-deficiency in this disease, and the results fully confirm the results obtained at Roseworthy. Two lots, each of four ewes, were kept over a full year on a ration designed to be satisfactory in every way except that it was deficient in lime. To one group a lime lick was supplied to make good this deficiency. In the lot receiving the lime lick no trouble was experienced, and seven healthy lambs were reared. In the group receiving no lime, two ewes died during pregnancy, and the other two were only brought through lambing by discontinuing the experiment and placing them on corrective food. Two lambs were reared from this group. *Post mortem* examinations of the ewes that died showed the cause was “twin lamb” disease.

Losses from this cause are most common in a dry season such as this promises to be, when no greenfeed is available, and especially when hand-feeding is adopted. As a result of feeding trials carried out by Mr. Whicker at the College last season, there is reason to believe that the feeding of ensilage may be of some value as a corrective, especially if some lime is supplied in the form of licks in addition. A further trial will be conducted this year, and in it ensilage will be contrasted with ensilage plus calcium lick. The results obtained at the College show that cases are very difficult



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to cure, owing to the extensive disorganisation of the system that has taken place before sickness becomes apparent. Such cases sometimes respond to drenches containing lime (1 teaspoonful slaked lime or calcium chloride) or lime and sugar (½ lb.) to supply some food, in half to one pint of water; but generally the death of the lambs *in utero* causes the death of the ewe. In these circumstances preventive measures are important, namely, ensuring an adequacy of lime together with exercise and some green pickings, if possible. By keeping lime in the drinking troughs nearly one-half of the lime requirement will be obtained from the water, and this is probably sufficient in most cases (with exercise) to enable the flock to pull through without trouble. Experiments to devise a satisfactory lick are at present in progress at the College.

Smut in Oats.

“Wynarka” asks how to combat smut in oats, and Mr. R. C. Scott, Supervisor of Experimental Work, says that there is no practicable treatment on farms which would prove entirely effective. For small quantities and with special facilities the grain may be subjected to the hot water treatment, which attacks the spores which may be under the husk, but with ordinary pickles these spores would escape. However, pickling with either a powder or solution will destroy all spores of the disease that happen to be on the outside of the grain, and therefore will prove fairly satisfactory, but not absolutely perfect.

Of the ordinary pickles formalin used at a strength of 1 lb. to 40 galls. of water is the most effective, as it has a more penetrating action than others, but if the grain is to be sown on dry land has the disadvantage of affecting germination in the same way as it does wheat.

Should the oats be sown on damp soil, the use of formalin is recommended; but if seeded dry, pickling with copper carbonate would be less dangerous. On the average, oats will require approximately 2 ozs. of copper carbonate per bushel to be thoroughly coated with the powder.

Californian Cape Barley.

“Maitland” reports that he intends to sow Californian Cape Barley. He asks if it is a soil impoverisher, and is it likely to revert to the old “bluish” Cape. Mr. W. J. Spafford (Deputy Director of Agriculture) says land which is in good heart does not suffer because of Californian Cape Barley being grown on it, provided that it is grown in its proper order. In any rotation in which Californian Cape Barley is one of the crops, it should always be the last crop grown before resting the land as pasture, or preparing it as bare fallow. For instance, if the three cereals—wheat, oats, and barley—are being grown, the order of cropping would be:—

Fallow—Wheat—Oats—Barley—Pasture—Fallow; or

Fallow—Wheat—Oats—Pasture—Barley—Fallow.

If the land is rested after Californian Cape Barley, or worked as bare fallow, no ill-effect will be noticed from the crop, no matter how heavy the yields secured.

Not one of the strains of Californian Cape Barley that has come under the notice of the Department of Agriculture has reverted to the old steely blue Cape Barley, and there is no reason to expect such a change. The samples imported are of a yellowish color, and when they arrive have a clear, bright appearance, which unfortunately they quickly lose when grown on most soils in this State. Although the brightness is lost, and the grains grown here become more or less muddy in appearance, there is no tendency to become blue.

All samples of Californian Cape Barley inspected contain some admixture of different kinds of barley, but the proportion of bluish grains is very low in all strains, and absent altogether from most of them.

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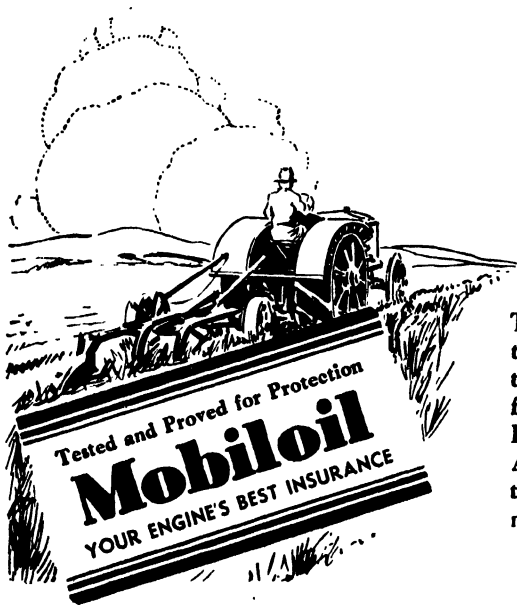
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HORTICULTURAL INQUIRIES.

[Replies supplied by Mr. G. Quinn, Chief Horticultural Instructor.]

Vegetable Growing Queries.

"Lameroo" asks: "*What is the cause of the fruit of trombones failing to set?*"

Reply—Trombones frequently fail to set fruits during the earlier period after flowering begins, and the plants are still very vigorous. These plants are monoecious, that is, they bear two types of flowers on the same plant—male and female. The male flowers are the smaller ones with thin petals, and are borne on a slender stalk. The female flowers have thicker petals which are carried on the top of the ovary—or embryo trombone. In the earlier part of the flowering period nearly all the blooms are male flowers, and consequently no fruits are formed. Often when a few of the female flowers are ready to receive pollen, no male flowers are available with viable pollen, and they soon pass the stage of receptivity. In a home garden artificial conveyance of pollen from the male flowers to the stigmas of the female blooms may be effected by means of a soft brush or rabbit's tail or paw. As the season advances, there would appear to be a more simultaneous opening of male and female blossoms and pollination is effected more readily through insect intervention.

Lettuce Growing.

"Lameroo" asks: "*What is the best variety of lettuce for summer and early autumn?*"

Reply—The Drumhead or Malta type of cabbage lettuce is most favored for general crops. There is no variety of lettuce known to me that will grow and develop a sweet, crisp foliage during the dry hot season in the open country of this State, even if planted under a bush house. If seeds are sown in a box in mid-February, and kept growing in a shaded position so as to have them ready to plant out in early April, as the weather is cooling down, you may develop fair hearts during the winter and spring seasons. Seeds sown in an outdoor bed in June, and planted out as soon as the plants are large enough, should carry on a supply into October or November, but as the weather becomes hot, the leaves invariably develop a bitter taste, and the plants run to seed. Lettuces, like all vegetables grown for their leaves, require ground rich in organic matter. Well-rotted animal manures should be dug in and mixed with the soil preparatory to planting out the crop. Whilst the plants are growing, liquid manure made by steeping fresh cow manure in water or dissolving sulphate of ammonia—1oz to a gallon of water—may be given once or twice a week, or by sprinkling blood manure at intervals of several weeks around the plants on the broken surface and watering it into the land. All of these are nitrogenous and prove great aids to leaf growth. It is questionable whether superphosphate is of any great value in producing a lettuce crop.

Carrots and Parsnips.

"Lameroo" asks: "*Is it advisable to put super in the row when sowing seeds of lettuce, carrots, and parsnips?*"

Reply—These crops should be sown on land which is naturally loose or has been made so by the incorporation of organic matter a year or two previously. In general terms, animal manures should not be applied to land which will be almost immediately sown down to these root crops, and, as a rule, no fertiliser is sown directly with the seeds of carrots and parsnips.

VETERINARY INQUIRIES.

[Replies supplied by Veterinary Officers, Stock and Brands Department.]

Bugle Agricultural Bureau reports death of cow. Symptoms: Off food and drink. jaws stiff, had been chewing bones, and appeared to be more or less paralysed.

Reply—The death of the cow was due to Botulism (dry bible). This disease is due to a poison (toxin) manufactured by a germ in the carcasses of animals which have died and become infected with the germ. The cows get the germ by chewing bones or portions of carcasses. The craving for bones is due to a want of mineral matter in the feed, and the more intense this craving is, the greater is the mineral want. As soon as the feed dries, the mineral matter in it becomes less and less, until during the middle and end of the dry period, the mineral content of the dry pasture feed is at its lowest. The disease can be prevented by:—(1) Better feeding, *e.g.*, good quality chaff and oats. (2) The removal of all carcasses and bones of animals from the paddocks. (3) The provision of a mineral lick. The following is recommended:—Dicalcic phosphate (35-37% P_2O_5), 45 parts; coarse salt, 40 parts; molasses, 5 parts; water, 10 parts. 4-5ozs. of this mixture should be fed daily to each cow. A less effective mixture is as follows:—Superphosphate, 45 parts; lime, 15 parts; coarse salt, 40 parts. The same amount could be fed daily.

Truro reports death of cow. Symptoms: Almost total cessation of milk flow, blood from all teats, and udder very pendulous.

Reply—The cow had an attack of acute gangrenous mastitis (or mammitis), her death being caused through the absorption into her system of toxic (or poisonous) products formed in diseased udder. Treatment of acute mammitis must be commenced promptly and the cow after being isolated in comfortable quarters given a laxative dose of medicine (*e.g.*, Epsom salts, $\frac{1}{2}$ -1lb.; molasses, $\frac{1}{2}$ pint; ground ginger, 2ozs.; warm water, 1 quart) followed by 1oz. doses of saltpetre daily in drinking water for a few days. The udder should be fomented at frequent intervals with hot antiseptic solutions (such as 2 per cent. lysol solution) and a little camphorated oil rubbed in after each fomenting to prevent chill. If the udder is dark and discoloured and gangrene threatens, frequent bathings with a solution of $\frac{1}{2}$ lb. Epsom salts dissolved in 1 quart of hot water will often be found very beneficial. The affected quarters should be gently stripped out as completely as possible at frequent intervals (hourly or two-hourly if possible). If gangrene supervenes (when the udder tissues will become bluish-black in color, swollen and dead in appearance), it is necessary to lance the tissues at several places and bathe frequently with antiseptic solutions. Antiseptic tonics such as tincture of iron, 1 tablespoon, should also be given 3 or 4 times daily in a quart of water.

Carahue Agricultural Bureau reports horse with bad cough.

Reply—Give the horse 1 tablespoon of Fowler's solution of arsenic in a small damped feed night and morning for 14 days. Arrange to give the horse a ration of long hay before each feed. This will check any tendency there may be to bolt his chaff.

Black Springs Agricultural Bureau reports young pigs weak in hind legs.

Reply—Give a dose of 1oz. Epsom salts per pig, well diluted in milk or slop feed. Subsequently provide a liberal allowance of skim milk in the daily ration if available. If not, give up to 5 per cent. of meat meal daily; 1 to 2 teaspoons of cod liver oil per pig should also be given daily in the trough feed. Allow the pigs to run out during the day and keep in warm dry quarters at night.

MALLEE FARM COSTING—FARM No. 1.

(Continued from Page 791.)

[By ARTHUR J. PERKINS, Director of Agriculture.]

PART III. (continued).—STUDY OF MALLEE FARMING COSTS.

C. COSTS AND RETURNS OF A MALLEE FARMER'S FLOCK.

I. Introductory.

Both on the Murray lands and on Eyre's Peninsula the State has adopted a Land Settlement Policy which, from a State viewpoint, followed what appeared at the time to be the line of least financial resistance. Hence, in this connection, State initial outlay has usually been limited to the laying down of railroads, parcelling out timber-clothed land into appropriate holdings, clearing roadways of scrub, and allotting land in virgin condition at low prices and on easy terms of repayment. Nor, unfortunately, has adequate provision for water always been made in advance. It follows, therefore, that the full burden of the reclamation of land from scrub, together with normal costs of settlement in new country, frequently fell upon settlers, the personal means of whom were unequal to the strain of early non-revenue producing years.

Nevertheless, it must be admitted that when the opening seasons of settlement proved unusually favorable, as was indeed the case in the settlement of the original Murray Mallee Hundreds, suitable settlers have been able to consolidate their financial position, notwithstanding apparent inadequacy of initial personal resources; but when the reverse has been the case, and opening seasons have been unfavorable, the majority of settlers have usually had to face one of two alternatives, namely:—

1. To take up an uneconomic burden of debt for an unknown number of years; or else
2. To abandon farms to newcomers, who, if more fortunate, would eventually reap the benefit of the labor of pioneers.

It is, however, too late in the day to speculate as to the probable course of events had a different policy of land settlement been adopted from the outset; and if under this heading I have referred to these matters at all, it is because the complete reclamation of Mallee Farms, and the vitally important association of Livestock operations with Wheat on these farms have been unduly delayed by our methods of Land Settlement in these districts. Recent events have thrown a flood of light upon the folly of limiting Farm Revenues to a single line of activity, notwithstanding its general adaptation to local conditions of climate and soil, and in more normal times to local economic conditions as well. Judicious Farming can perhaps best be described as a business, the main objective of which was to secure at a profit from a given area of land maximum mean pecuniary returns that soil, climatic conditions, available labor, and personal means admitted of; and, apart from exceptional circumstances, wheat growing as an exclusive source of farm revenue, cannot be said to comply satisfactorily with these requirements. For maximum mean returns, and perhaps indeed for mean profitable returns, in no part of the World can Wheat be grown to advantage when sown on the stubbles

of preceding crops; indeed, it is only in exceptional South Australian districts that wheat can be grown at continuous profit, even in alternative years only. Nor in any circumstances can exclusive wheat growing be said to offer continuous occupation to available home labor from one end of the year to the other. If, therefore, from the standpoint of South Australian farming generally, Wheat, to the exclusion of any other form of rural activity, can be said to be inadequate, this inadequacy is all the greater for the kind of farming typical of Mallee districts, which does not admit of the growing of wheat more frequently than once in three or four successive years.

In this connection the inadequacy of wheat alone in the Mallee may be illustrated from costing data of Mallee Farm No. 1.

In districts in which local conditions do not admit of wheat being grown more frequently than once in every three or four years on the same area of land, it is obvious that those farmers who limited their sources of revenue to Wheat alone must in each year have had from two-thirds to three-quarters of their arable land periodically out of crop. And, apart from a proportionate area treated as Bare Fallow over nine months of the year, or thereabouts, the only service this idle land could render to the farmer would be to reduce the amount of Hay and Oats usually consumed by Working Horses. In such circumstances it must be obvious, too, that Wheat grown on one-third or one-quarter of the arable area of the farm must carry the full burden of all Farm Yearly Overhead charges, such as Interest, Depreciation, Rates and Taxes, Value of Owner's Management and Personal Labor, General Expenses, &c. The Mean Value of these charges on Mallee Farm No. 1 has been as follows:—

	£	s.	d.
Interest on Land and Improvements	336	11	11
Interest on Working Capital (excluding Sheep)	137	0	5
Depreciation on Improvements and Plant	400	12	11
Rates and Taxes	29	18	3
Value of Owner's Management and Labor	300	0	0
General Expenses	114	6	1
Total Mean Overhead Yearly Charges	£1,318	9	7

Hence, if Wheat had been the exclusive source of Revenue of Mallee Farm No. 1, total mean overhead charges of £1,318 9s. 7d. would have to be borne by one-third of the total area—552 acres—if the land came under Wheat once in three years; and by one-fourth—414 acres—if the land came under Wheat once in four years. This would represent mean charges of £2 7s. 9d. per acre in the first instance, and of £3 3s. 8d. per acre in the second. On a bushel basis, for a mean crop of 16.92 Bushels, these charges would be respectively as follows:—

- 2s. 10d. per bushel for land under Wheat once in every three years; and
- 3s. 9d. per bushel for land under Wheat once in every four years.

In order to complete the comparison, the costs of Wheat grown every third and fourth year respectively have been calculated for a 16.92 bushel Harvest, and contrasted with the actually recorded costs of the mean of the three seasons under review, which illustrated the association of Wheat and Sheep.

Contrasting Costs of Growing Wheat as Exclusive Source of Revenue, with corresponding Costs of Wheat associated with Sheep: Mean Yield in each case is assumed to be 16.92 Bushels per Acre.

	Calculated Costs per Bushel of Wheat as Exclusive Source of Revenue.		Actual Costs per Bushel of Wheat in Association with Sheep.	
	Every 3rd Year.	Every 4th Year.		
	s. d.	s. d.	s.	d.
Interest on Land and Improvements	0 9	0 11	0	4
Interest on Working Capital	0 3	0 5	0	3
Depreciation on Improvements and Plant . .	0 10	1 2	0	8
Rates and Taxes	0 1	0 1	—	—
Labor and Management	0 8	0 10	0	6
General Expenses	0 3	0 4	0	3
Total Overhead Charges	2 10	3 9	2	0
All other Costs	0 11	0 11	0	11
	3 9	4 8	2	11

It will be noted that a 16.92 bushel crop of Wheat, when associated with a Flock of Sheep and such subsidiary crops as Sheep usually convert into profit, has been raised at a mean cost of 2s. 11d. per Bushel; and that, on the other hand, had Wheat been the exclusive source of revenue, a similar crop could not have been raised at less than 3s. 9d. per Bushel, with Wheat sown on the same land, once in every three years, and at not less than 4s. 8d. per Bushel with Wheat sown on the same land once in every four years. These figures should serve to stress a possibly unsuspected part which Live Stock operations play in the general economy of a Wheat Farm; they not only assist in maintaining the fertility of the land by replenishing dwindling stocks of Organic matter and checking undesirable Weed growth, but in addition offer under our conditions the immense economic advantage of reducing the costs of production of Main Crops, by assuming responsibility for a proportion of normal farm overhead charges, which would otherwise have to be borne in totality by these Main Crops.

Nor should it be forgotten that in skilful hands Live Stock Accounts can be made to close on Profit balances; but when associated with Wheat, or any other Main Crop, actual Net Profits, although desirable, are not absolutely essential to the technical success of Farm Live Stock Operations. Indeed, in such circumstances, Farm Live Stock Operations may be said to have technically succeeded on a Wheat Farm, when Revenue, plus Inventory Balances, do no more than equal inclusive expenditure. It has already been shown that on Mallee Farm No. 1 the association of Sheep with Wheat has had the effect of reducing the costs per Bushel of the latter by 10d. to 1s. 9d. per Bushel, according as Wheat is normally grown once in every three or once in every four years on the same area of land. These facts imply that apart altogether from the soil fertilising and weed destroying influences of the Flock, if the Sheep Account were to do no more than close on an even Balance, the mere presence of the Flock on the Farm would have had the effect of reducing Costs of Production of a Mean Crop of Wheat varying from 7,000 to 9,300 Bushels by £387 10s. to £612 10s. per annum. Finally, it can be added that even if the Sheep Account were to close on Debit Balances of £387 10s. or £612 10s., according to the length of the rotation in which Wheat was being grown, the general finances of the farm would be no worse off than if not a single head of Sheep had been kept on the farm, apart from slight increases in interest and depreciation charges on permanent improvements.

2. CONCERNING THE FARM FLOCK.

On the farm under review advantage has not hitherto been taken of Dairy Cattle, presumably because of the lack of adequate home Labor; and it follows that Live Stock Operations have not yet gone beyond the handling of a Flock of Sheep.

On the 1st April, 1929, when the Department of Agriculture first took over these Accounts, the Farm Flock consisted of 472 Sheep, comprising 2 Merino Rams, 4 Corriedale Rams, 100 Stud Merino Ewes, and 366 Flock Merino Ewes, valued in the aggregate at £822.

Before attempting to criticise on general lines the farm adequacy of a Flock of this type, it is necessary to stress the fact that the national interest in Live Stock operations is quite as great as that of farmers and graziers themselves; and in view of the magnitude of the issues involved, national economy must eventually refuse to admit any difference between these respective interests. The national concern in such matters is that there should be ample home supplies, coupled with a maximum surplus of readily exportable high-grade commodities; that is to say, from the standpoint of Sheep, an abundance of high-class Wool and of Lambs acceptable overseas at highest ruling rates. A Fat Lamb Flock that adequately complied with these national needs can be described as a Specialised Flock, eminently adapted to good average farm conditions, and which, in skilful hands, should eventually yield to the farmer maximum average returns that farm and season admit of. It is perhaps inevitable that over a vast tract of country embracing a wide range of climatic and soil conditions such as South Australia, variations in the character of the Flock or in its management should to some extent arise; nevertheless, these variations can be but slight when type or character of the Flock is concerned. From the latter standpoint a typical Fat Lamb Flock adequate to overseas requirements can be described as a Flock of half-bred Long Wool Ewes, namely:—Merino X Lincolns; Merino X Leicesters; Merino X Border-Leicesters; or Merino X Romney Marsh; but more generally of **large** framed, plain bodied Merino Ewes, mated in either case to Rams of one of the early-maturing Down Breeds, preferably South Downs or Suffolks. Probably of equal value as a Sire for Fat Lambs is the Ryeland, a sturdy, white-faced, short wool, early maturing British Breed, of which there are several Flocks in South Australia at the present time.

Under good management, Flocks of the above type, mated to suitable Rams, will produce Fat Lambs for which the highest rates would be paid on British markets, and upon which New Zealand's lamb Export trade has been successfully built up. Unfortunately, in Australia Fat Lambs have not yet been bred in numbers sufficient to give precedence to the export market, and to enable the latter to impose its standards upon the home market. In present circumstances, the home market usually absorbs not less than two-thirds of the lambs offering, leaving one-third only to the export trade. Moreover, the home Market, which is not too particular in the matter of type or quality, provided that the Lamb be prime enough, is able to outbid the export market at a time of the year when export Lambs would be likely to prove most profitable; hence, the average farmer, who is human, follows the line of least resistance, and with early but coarse Merino X Dorset Horn Lambs, or Merino X Shropshire Lambs, or even Merino X Leicester Lambs, caters for the market that offers quickest and highest returns, much to the detriment of export Supplies that invariably fall short in quality of New Zealand Lambs.

It is from the latter standpoint, namely, export quality in the Fat Lamb produced, that the original Flock of Mallee Farm No. 1 is most open to criticism. The Ewes, we have seen, were pure Merinos; nor, if of suitable type could any

exception be taken to them; but when one notes that 100 of these Ewes were described as Stud Ewes, and that 2 Merino Rams had been kept on the Farm, one realises that after all the Flock was only partly a Fat Lamb Flock. The 34 odd Merino Wether Lambs could no doubt be marketed locally, or even overseas, at 6½ to 7 months old, but at nothing like the profit that would have accrued had their place been taken by a corresponding number of well bred, well nurtured cross-bred lambs. The 44 Merino Ewe Lambs would continue in the Flock as Maiden Ewes for 2 to 3 years, and return slightly improved fleece values only. Hence, at best a small Merino Stud on a Farm can be described as an interesting hobby; but it cannot be recommended to the average farmer.

The balance of the Ewes were mated with Corriedale Rams, which from the Export Lamb standpoint must be described as quite unsuitable. There is no doubt that Corriedale Ewes when mated with Down Rams should drop high-grade Export Lambs, and prove excellent Dams for the purpose; but Corriedale Rams should be avoided as Sires if one has any regard for the national requirements of a uniform type of good quality Export Lamb. The owner of the Flock would appear to have realised the position, since in 1930 we find him introducing a Suffolk Ram to the Flock.

In the 1929-30 Season the number of Ewes sent to the Rams was 466, and the number of Lambs tailed 372, representing a Lambing percentage of 80, which from the standpoint of a small easily supervised Farm Flock, cannot be considered as more than moderately satisfactory.

In the 1930-31 Season the number of Ewes sent to the Rams was 351, of which 44, or 12½ per cent. were Maiden 2-tooth Merinos; the number of Lambs tailed was 301, or a Lambing percentage of over 85, which in the circumstances must be considered quite satisfactory.

In the 1931-32 Season 365 Ewes were sent to the Rams, and the number of Lambs tailed was 332, representing an excellent Lambing percentage of 91 per cent. The fact that Lambs were tailed between the 28th April and 26th November indicates that the Rams were allowed to run with the Ewes over the greater part of the year—an undesirable practice.

On the basis of twelve months' availability, the arable area of the farm was in each season distributed between Harvested Crops and Bare Fallow, on the one hand, and grazing on the other, as follows:—

	Areas on Basis of 12 Months' Availability.			
	1929-30.	1930-31.	1931-32.	1929-32 Means.
	Acres.	Acres.	Acres.	Acres.
Total Arable Area	1,655	1,655	1,655	1,655
Less Area of Harvested Crops and Bare Fallow	816	757	758	777
Area available for grazing	839	898	897	878

The area available for grazing can be subdivided as follows:—

	Areas on Basis of 12 Months' Availability.			
	1929-30.	1930-31.	1931-32.	1929-32 Means.
	Acres.	Acres.	Acres.	Acres.
Grazing Crops (Oats)	519	460	—	326
Cereal Stubbles	149	120	135	135
Land temporarily out of cultivation	171	318	762	417
	839	898	897	878

Although available grazing areas were in the main utilised by Sheep, to a minor extent both Horses and Cattle had access to them. The extent to which Live Stock other than Sheep has had access to these areas is shown in detail for each season in Table X of the Appendix, in which the grazing value of each area has been expressed in terms of equivalent sheep-days.

Table X shows in summary that the mean values of the grazing of various kinds of Live Stock during the three years were as follows:—

	Mean Values of Grazing. No. of Sheep Days. Per Annum.	Percentage. %
Sheep	143,460	85.2
Horses	13,800	8.2
Cattle	11,186	6.6
Totals	168,446	100.0

The mean Live Stock carrying capacity of the available grazing area for the three seasons was equivalent to not much more than one-half of a Sheep per acre per annum. This figure is extremely low, particularly when we take into consideration the fact that 37 per cent. of the available grazing area consisted of a relatively costly crop of Oats. The mean results show that of the three types of grazing available the Cereal Stubbles were the most efficient, namely, the equivalent of 0.70 Sheep per acre per annum; whereas a relatively costly Oat crop—0.53 Sheep per acre—was only slightly better than Natural Pasture—0.47 Sheep per acre. It should, however, be added that the Oat Crop was generally made to do something more than supply grazing for Sheep. In the 1930-31 Season, when the Oat Crop carried 0.49 Sheep per acre only, the 460 acres under Oats yielded as well 70 tons of Hay and 55 bushels of Oats, the feeding value of which would correspond to an additional 40,000 Sheep-days, which, if taken into account, would have raised the Sheep-carrying capacity of the Oat Crop from 0.49 Sheep per acre per annum to 0.73 Sheep per acre per annum. The latter figure is an improvement on the preceding one, but still too low to be worth while.

It should be stressed here, however, that relatively low Live Stock carrying capacity in the early years of Settlement is fairly characteristic of most Mallee areas, and that Mallee Farm No. 1 is by no means singular in this respect. Experience has already shown very definitely that not only in the Mallee, but over the greater proportion of South Australia's arable land, the residual effects of adequate phosphatic dressings applied to Cereal Crops had the effect of gradually building up the fertility of the land, which was always reflected in progressively improving Live Stock carrying capacity, whenever the land was temporarily left out of cultivation. From another point of view the great size of the paddocks that unavoidably characterises early years of settlement offers definite obstacles to effective grazing of what pasturage might be present. On a Farm of this character it is not at all unlikely that the grazing capacity of the land will be more than doubled in the course of the next ten years.

In addition to normal grazing indicated in Table X., Sheep have had occasional access to other portions of the Farm, as follows:—

	Equivalent No. of Sheep Days. 1929-32 Means.
Feeding off Wheat Crops	386.7
Feeding off Oat Crops	950.0
Grazing Early Fallow	7,511.6
Grazing Normal Fallow	23,394.0
Grazing on Neighbor's Farm	2,793.7
Total	35,036.0

Value of Extra grazing expressed as Sheep per acre

Hence, grazing availed of by Sheep over and above that supplied by normal areas may be taken to have been roughly equivalent to the grazing essential to the upkeep of 96 sheep over a twelvemonth.

The occasional grazing by Sheep of fallow land in the course of preparation for the succeeding year's Wheat Crop is not wholly for the benefit of the Sheep; indeed, from the latter point of view only, the value of the practice might well be questioned, since it invariably leads to the soiling of fleeces, and consequent reduction in their values per lb., and calls at times for a good deal of exercise for very little feed, and usually at the expense of the condition of the Sheep. From the standpoint of Wheat Crops, on the other hand, Fallow grazing presents several advantages, and since on a Wheat Farm wheat should normally take precedence of Sheep, the practice cannot be wholly condemned, provided that it be not overdone. The advantages to Wheat crops may be summarised as follows:—Grazing sheep tend to keep in check undue weed development on fallows, and tend to consolidate the loosely broken soil; hence, reduction in tillage costs, and therefore in general costs of Wheat production. Grazing Sheep, too, leave on the fallows new, easily broken down organic matter, coupled with Nitrogen in readily available form, both of which will be of use to future wheat crops. From another viewpoint, fallow grazing permits of the "spelling" of normal grazing areas, which are able to make new growth. Figures given above show that on Mallee Farm No. 1 Fallow grazing was roughly equivalent to one-quarter of a Sheep per acre per annum.

But as is the case on most farms, normal and occasional grazing areas did not suffice for the upkeep of the Flock from one end of the season to the other, and hand-feeding to some extent became necessary. As is usually the case, the need for hand-feeding became urgent when the stubbles had been exhausted, and before the new season's feed was available. This period—when the old season is on the decline, and before the new season has had time to open—is always a critical time for farms that carry Sheep; it coincides with Lambing time, too, when no Flock should be stinted of its food requirements.

In 1929 the Flock was supplied 264 bushels 8lbs. of Barley between the 1st of April and 29th of May, the value of which was £33 0s. 5d. In addition, £5 10s. was paid for grazing rights in a neighbor's property which, although not hand-feeding, is grouped with the latter as representing feeding costs incurred outside the farm. The costs are summarised below, with the aggregate expressed in terms of Ewes present on the farm on April 1st.

	£	s.	d.	
264.16bush. of Barley	33	0	5	
Outside Grazing	5	10	0	
Salt	0	10	0	
	£39	0	5	corresponding to 1s. 8d. per Ewe.

In 1930 hand-feeding took place between 27th of April and 28th of May, and included the following:—

	£	s.	d.	
1 ton Meggitt's Sheep Nuts	17	7	4	
6 tons of Hay	15	0	0	
153bush. Oats	19	2	6	
Salt	0	5	0	
	£51	14	10	corresponding to 2s. 11d. per Ewe.

In 1931 hand-feeding was very restricted, materials costing 7s. 6d. only. Losses from death in the three seasons were as follows:—

Seasons.	Losses from Death.			Total Losses.	Percentage of Flock.
	Size of Flock.	Ewes.	Lambs.		
	Nos.	Nos.	Nos.	Nos.	%
1929-30	472	34	1	35	7.4
1930-31	390	20	Nil	20	5.1
1931-32	422	17	15	32	7.6
Totals	—	71	16	87	—
Means per Season	428	24	5	29	6.8

It will be seen that in summary Mean Losses from death were 6.8 per cent. of the Flock per season; this percentage may be accepted as fairly normal.

3. OPENING AND CLOSING FLOCK INVENTORIES.

Details concerning Opening and Closing Flock Inventories are shown in the Appendix as Table XI. The salient features in these Inventories is the progressive decline in Sheep values per head, which were as follows:—

Mean Per Head Inventory Values of Sheep.

Inventory Dates.	Mean Values.	Progressive Declines per Head.			
		Relatively to Opening Inventory		Relatively to Inventory of Immediately Preceding Season.	
		Value.	Percentage.	Value.	Percentage.
	£ s. d.	s. d.	%	s. d.	%
1/4/29	1 14 10	—	—	—	—
31/3/30	0 17 9	17 1	49.0	—	—
31/3/31	0 12 3	22 7	64.8	5 6	31.0
31/3/32	0 11 7	23 3	66.7	0 8	5.4

Thus it will be seen that the per head value of the Flock had progressively declined between 1st April, 1929, and 31st March, 1932, to the extent of 23s. 3d. per head, or 66.7 per cent. Hence, in that interval of time the Flock lost two-thirds of its value, a fact which adequately accounts for the yearly losses incurred on the Flock. Had World Prices, and consequently Flock values, remained stationary, instead of declining, the Flock of Farm No. 1 would have been worth £600 in 1930, instead of £346, £632 in 1931, instead of £259, and £728 instead of £298 in 1932. From this source alone Flock losses aggregated £1,057 in three years, which should serve to stress the difficulties under which Sheep operations had labored of recent years.

4. FLOCK EXPENDITURE.

Details of Mean Flock Expenditure incurred in 1929-30, 1930-31, and 1931-32 Seasons have been summarised in Table XII. of the Appendix.

The details of the "Costs" given in this Table are in reference to a Mean Flock of 394 Ewes present on the farm at the beginning of the season, *i.e.*, 1st April. It should be added that additional Ewes were not purchased during the currency of the three Seasons. In the eighth column of the Table "Costs" have been reduced to a per-Ewe basis.

Reference to Table XII. will show how costly has been a Grazing Crop of Oats, namely, 8s. per Ewe, or 32.35 per cent. of total expenditure. Actually, however, the Cost per Ewe was greater than the figure shown in the Table, because an Oat crop was availed of in two seasons only, whereas 8s. per Ewe is the average

of three seasons, in one of which Oats were not grazed by Sheep. More correctly, the facts may be set out as follows:—

	s.	d.	
Cost of Grazing Crop of Oats in 1929/30	10	6	per Ewe
Cost of Grazing Crop of Oats in 1930/31	12	11½	per Ewe
No Oats grazed in 1931/32.			
Mean Costs of Grazing Oats in 1929/31	11	6½	per Ewe
Mean Costs of Grazing Oats in 1929/32	8	0	per Ewe

The costliness of the Oat Crop will be made clearer by comparing it with the Costs of Natural Pasture, *i.e.*, of arable land temporarily out of cultivation. In this connection the figures given in Table XII.—4s. 8½d.—cannot be used, because in Natural Pastures have been included both Stubble Grazing and Feeding-off of Crops and of Early Fallow. Mean costs incurred under the several headings during the three seasons may be summarised as follows:—

Cost of—	1929-32 Means.		
	£	s.	d.
Feeding-off Crops	0	15	11
Feeding-off Early Fallow	4	9	5
Grazing Stubbles	23	5	3
Natural Pasture	64	12	7
Totals	£93	3	2

Hence, the "costs" of grazing natural pasture by a Mean Flock of 394 Ewes were £64 12s. 7d., or 3s. 3½d. per Ewe, as against 8s. per Ewe for a grazing Crop of Oats, if we take three seasons into consideration, and 11s. 6½d. per Ewe if we take into consideration the only two seasons in which Oats were grazed. From another viewpoint it can be said that whereas the cost of one day's grazing of Natural Pasture is approximately 0.11d. per Sheep, representing agistment fees of ¼d. per week, the cost of one day's grazing of the Oat Crop was, roughly, 0.38d. per sheep, representing 2.66d. per week. Although the latter figure is clearly excessive, I am not prepared to argue that the farmer who keeps Sheep can afford to discard sown grazing crops altogether and trust to the spontaneous weed growth that may spring up upon land temporarily out of cultivation.

The costliness of the Oat crops we have had under consideration was due entirely to their low Sheep-carrying capacity, namely, not more than ½ Sheep per acre, instead of a minimum of 3 to 4 Sheep to the acre. The reason may have been unfavorable seasonal conditions, or possibly injudicious grazing; but, whatever the cause, Oats cannot be condemned as a grazing crop, even in the Mallee, on the bare results of these two unfortunate seasons.

The detailed expenditure set out in Table XII. has been summarised below in the alternative Statements A, B, and C, in contrast with Turretfield corresponding figures:—

Summarised Statements of Mean Expenditure per Ewe on Mallee Farm No. 1 (1929-32) in Contrast with Corresponding Turretfield Figures (1922-32).

STATEMENT "A."

From the Standpoint of Seasonal Operations.

	Mean Costs per Ewe.		Percentages.	
	Mallee Farm No. 1.	Turretfield.	Mallee Farm No. 1.	Turretfield.
	s. d.	s. d.	%	%
Tending Flock	3 7	4 8	14.6	18.4
Grazing	12 9	11 7	51.5	45.1
Handfeeding	1 10	3 1	7.5	12.0
Water	0 8	0 2	2.6	0.8
Marketing	1 5	0 11	5.7	3.7
Incidental	4 5	5 2	18.1	20.0
Totals	24 8	25 7	100.0	100.0

STATEMENT "B."

From the Standpoint of Main Individual Items.

	Mean Costs per Ewe.		Percentages.	
	Mallee Farm	Turret-	Mallee Farm	Turret-
	No. 1.	field.	No. 1.	field.
	s. d.	s. d.	%	%
Labor (direct and indirect)	4 1	6 5	16.4	25.1
Use of Horses	0 8	0 8	2.8	2.6
Use of Tractor	0 7	—	2.4	—
Use of Implements	1 5	0 6	5.9	2.0
Foodstuffs	1 7	2 7	6.3	10.1
Materials other than Food-				
stuffs	3 9	2 1	15.3	8.1
Freight	1 3	0 8	5.1	2.6
Balance of Expenditure .	11 4	12 8	45.8	49.5
Totals	24 8	25 7	100.0	100.0

STATEMENT "C."

From the Standpoint of Interest and Depreciation Charges.

	Mean Costs		In Terms of		In Terms of Ex-	
	Mallee	Turret-	"A" and "B",	clusive Expenditure.	Mallee	Turret-
	Farm No. 1.	field.	Mallee	Turret-	Farm No. 1.	field.
	s. d.	s. d.	%	%	%	%
Interest on Land and Im-						
provements	7 1	9 2	28.9	35.8	21.4	25.7
Interest on Floating Capital	1 6	1 5	6.0	5.5	4.4	4.0
Interest on Overdraft . . .	0 3	0 2	1.1	0.7	0.8	0.5
Depreciation of Improve-						
ments and Plant	2 9	1 6	11.0	5.9	8.2	4.2
Interest and Depreciation						
Charges	11 7	12 3	47.0	47.9	34.8	34.4
Balance of Expenditure . .	13 1	13 4	53.0	52.1	39.3	37.5
Gross Costs	24 8	25 7	100.0	100.0	74.1	71.9
Add Flock Depreciation . .	8 8	10 0	—	—	25.9	28.1
True Costs	33 4	35 7	—	—	100.0	100.0

These statements show that apart from Flock Depreciation, which will be considered later in conjunction with Flock Revenues, the mean "costs" of the Flock of Mallee Farm No. 1 were at the rate of 24s. 8d. per Ewe per annum. Mean costs at Turretfield were approximately similar, namely, 25s. 7d. per Ewe. In these "costs" grazing was represented by 12s. 9d. per Ewe, or 51.5 per cent. of total costs; hand-feeding by 1s. 10d., or 7.5 per cent., and tending Flock by 3s. 7d., or 14.6 per cent.

On the other hand, Labor was represented by 4s. 1d. per Ewe, or 16.4 per cent. of total costs and purchase of Materials other than Foodstuffs 3s. 9d., or 15.3 per cent.

Finally, Interest and Depreciation charges were represented by 11s. 7d. per Ewe, or 47 per cent. of total costs.

If Flock Depreciation be accepted as a "costing" item—and I see no valid reason why it should not—then the sum of 8s. 8d. per Ewe would have to be added to 24s. 8d., which would raise mean total costs to 33s. 4d. per Ewe. It has already been indicated that this heavy Flock Depreciation was in the main attributable to the unprecedented fall in prices which characterised these three seasons; it cannot therefore be accepted as normal.

5. MEAN FLOCK REVENUES.

Details of Flock Revenues in each of the three seasons, together with general means, are shown below in tabular form:—

Summarising Flock Revenues for 1929-30, 1930-31, and 1931-32 Seasons, together with Means of the Three Seasons.																	
	1929-30.				1930-31.				1931-32.				1929-32 Means.				Percentages.
	Total for 466 Ewes.		Per Ewe.		Total for 351 Ewes.		Per Ewe.		Total for 365 Ewes.		Per Ewe.		Total for 394 Ewes.		Per Ewe.		
	£	s. d.	s.	d.	£	s. d.	s.	d.	£	s. d.	s.	d.	£	s. d.	s.	d.	
Lambs sold.....	246	19 11	10	7-21	147	4 6	8	4-67	107	9 3	5	10-66	167	4 7	8	5-87	45-7
Ewes sold	117	2 2	5	0-31	22	9 6	1	3-36	3	12 10	0	2-40	47	14 10	2	5-08	13-1
Rams sold	1	0 0	0	0-51	1	3 11	0	0-82	1	6 6	0	0-87	1	3 5	0	0-72	0-3
Killed for rations ...	1	7 0	0	0-70	11	10 0	0	7-86	7	10 0	0	4-93	6	15 8	0	4-13	1-9
Wool sold	167	4 7	7	2-13	126	14 9	7	2-66	133	15 5	7	3-96	142	11 7	7	2-85	39-0
Skins sold	0	5 4	0	0-14	—	—	—	—	—	—	—	—	0	1 9	0	0-05	—
Gross Flock Revenue	533	19 0	22	11-00	309	2 8	17	7-37	253	14 0	13	10-82	365	11 10	18	6-70	100-0
+ or - Inventory Differences..	-476	2 6	-20	5-22	-94	12 6	-5	4-70	+31	15 8	+1	8-90	-179	13 1	-9	1-44	—
Net Revenue	57	16 6	2	5-78	214	10 2	12	2-67	285	9 8	15	7-72	185	18 9	9	5-26	—
Less Expenditure ...	592	7 1	25	5-08	572	16 3	32	7-67	294	15 7	16	1-83	486	12 11	24	8-44	—
Net Loss	534	10 7	22	11-30	358	6 1	20	5	9	5 11	0	6-11	300	14 2	15	3-18	—

The above data show that Mean Gross Revenue from the Flock was at the rate of 18s. 7d. per Ewe present on the Farm on the 1st of April. They also show that under the influence of the progressive fall in prices Revenue declined from year to year; they were 22s. 11d. per Ewe in 1929-30, 17s. 7d. in 1930-31, and 13s. 11d. only in 1931-32. If now we set side by side Gross Flock Revenue, Gross Expenditure, and Inventory Differences, we shall realise why on Mallee Farm No. 1 the Sheep Account closed on a Debit Balance in each successive season:—

Items per Ewe.	1929-30.		1930-31.		1931-32.	
	s.	d.	s.	d.	s.	d.
Gross Revenue	22	11.00	17	7.37	13	10.82
Less Gross Expenditure	25	5.08	32	7.67	16	1.83
	<hr/>		<hr/>		<hr/>	
	--	2 6.08	--	15 0.30	--	2 3.01
± Inventory Differences	--	20 5.22	--	5 4.70	+	1 8.90
	<hr/>		<hr/>		<hr/>	
Net Loss	--	22 11.30	--	20 5.00	--	0 6.11

From the above it will be seen that in each season Gross Expenditure, apart altogether from Flock Depreciation, exceeded Flock Revenue very appreciably—by 2s. 6d. per Ewe in 1929-30; by 15s. per Ewe in 1930-31; and by 2s. 3d. per Ewe in 1931-32. Praiseworthy attempts at economy were made in 1931-32, when expenditure per Ewe was reduced by 50 per cent., with the result that although Revenue per Ewe—13s. 11d.—was the lowest in the series, the difference between Revenue and Expenditure—2s. 3d. per Ewe—was also the lowest. The chief item of economy in this direction was omission to sow Oats for grazing purposes, probably because of the costliness of the practice in preceding seasons. Nor was Hand-feeding apparently necessary in 1931-32. The Inventory differences were negative in 1929-30 and 1930-31 because of continued fall in prices in these two seasons; but they were positive in 1931-32, when the position began to improve slightly. With a firm hand on expenditure, the owner should have no difficulty in converting the Losses of the three seasons under review into quite appreciable future profits.

D. TRACTOR FARMING COSTS.

1. *Introductory.*

Until the 1929-30 Season, field motive power had been supplied on Mallee Farm No. 1 partly by a team of 12 Horses and partly by a 12 h.p. Wheel Tractor. During the course of this season the owner decided upon a change of policy, involving the sale of his horses and Wheel tractor and the purchase of a more powerful Caterpillar Tractor. The new Tractor—a 20 h.p. Caterpillar—reached the Farm on November 11th, 1929. Nine of the horses were sold, and left the farm on November 26th, and the Wheel Tractor was discarded on December 2nd. It follows, therefore, that data collected in 1929-30 season were more or less incomplete from the standpoint of a normal season's work, and to that extent costing deductions derived therefrom are not wholly reliable.

2. *Performances of 12/16 h.p. Wheel Tractor.*

This tractor left the Farm on the 2nd of December; hence possibilities of work covered a period of 246 days from April 1st, 1929. Over this period it took part in the following operations:—

- (a) Combine-cultivating (16 tines) 225 acres of Fallow
- (b) Sowing with 16-tine Combine 89 acres of Oats
- (c) Sowing with 16-tine Combine 174 acres of Wheat
- (d) Driving Chaffcutter for 15½ tons of Hay.

Expenditure incurred on behalf of this Tractor over the period as follows:—

	£	s.	d.
Wages (exclusive of Field Labor)	4	12	4
Repairs	0	4	6
Sundries	0	11	5
Kerosene, Petrol, and Oil	32	11	2
Depreciation	34	7	8
Interest	7	18	4

Total Expenditure—April 1st to December 2nd . . £80 5 5

£80 5s. 5d. ÷ 182½ working hours = 8s. 9.56d. per Tractor-hour.

Thus, apart from Field Labor, but inclusive of Interest and Depreciation, the mean cost of one Tractor-Hour was about 8s. 9½d. It would be of interest to be able to determine the number of Horses that could be maintained at the same cost and on the same farm. Unfortunately, we have no data for a corresponding Mallee Farm, and are compelled to fall back upon the incomplete data of Mallee Farm No. 1, or upon the Mean 10-year data of Turretfield.

At Turretfield the mean cost of the Horse-hour (inclusive of Interest and Depreciation) was ascertained to be 4.67d. per hour. Such costs should normally be lower on a Mallee Farm; actually, however, owing to the incompleteness of the data, they were higher on Mallee Farm No. 1, namely, 5.18d. per Horse-hour. By dividing either figure—4.67d. or 5.18d.—into the known cost of the Wheel Tractor-hour—8s. 9½d.—we shall get the number of Horses that could be maintained for the same money, namely, 20.37 horses, if the incomplete data of Mallee Farm No. 1 be used, or 22.60 Horses if the Turretfield data be used.

Costs of the various operations in which this Wheel Tractor participated as Motive Power may be summarised as follows:—

A. Costs of Cultivating 225 Acres of Bare Fallow with 16-tine Combine.

Expenditure on 225 Acres.				Costs Per Acre.			
	Time.	Quantities.	Costs.		Time.	Quantities.	Costs.
	Hours.	Galls.	£ s. d.		Hours.	Galls.	s. d.
Field Wages	68	—	8 1 6		0.30	—	0 8.61
Use of Tractor	68	—	17 15 6		0.30	—	1 6.96
Use of Combine	68	—	4 8 1		0.30	—	0 4.70
Kerosene	—	130	11 4 5		—	0.58	0 11.97
Petrol	—	14	1 11 10		—	0.06	0 1.70
Oils	—	6	1 14 4		—	0.03	0 1.83
Totals			£44 15 8				3 11.77

From the above it will be noted that the costs of cultivating fallow with 16-tine Combine hauled by a 12/16 H.P. Wheel Tractor was a farthing less than 4s. per acre. In this aggregate the costs of the Tractor itself were about 1s. 7d. per acre, those of the Combine 4½d., those of motor spirit and oils 1s. 3½d., and field wages 8½d.

The work was carried out at the rate of 26½ acres per eight-hour day, involving a daily consumption of about 15.26 gallons of Kerosene, 1.65 gallons of petrol, and 0.71 gallons of lubricating oil.

Corresponding work with the same implement, hauled by ten horses, was carried out on 115 acres at the following costs:—

Expenditure on 115 Acres.			Costs per Acre.	
	Time.	Costs.	Time.	Costs.
	Hours.	£ s. d.	Hours.	s. d.
Field Wages	50	5 18 9	0.43	1 0.39
Use of Horses	500	10 15 10	4.35	1 10.52
Use of Combine	50	3 4 10	0.43	0 6.77
		£19 19 5		3 5.68

Hence, the work of hauling a 16-tine Combine Cultivator was done 6d. per acre cheaper when hauled by a ten-horse team than when hauled by a 12/16 Wheel Tractor. When hauled by a ten-horse team the cost of Wages plus the use of Combine—1s. 7.16d.—was greater than corresponding costs with Tractor haulage, namely, 1s. 1.13d. When, however, we compare the costs of the use of Horses—1s. 10.52d. per acre—with costs of the use of the Tractor plus combustion and lubricating oils, namely, 2s. 10.46d. per acre, we can realise the advantage that Horse has over Tractor power.

The 115 acres were cultivated in 50 hours, *i.e.*, in 6½ eight-hour days; hence, the area cultivated per day by the ten-horse team was 18.40 acres, against 26.47 acres by the Wheel Tractor. Speed of work, therefore, which in certain circumstances is of considerable importance, is the main advantage of the Tractor.

(b) *Combined Costs of Sowing with a 16-tine Combine 89 Acres of Oats and 174 Acres of Wheat.*

	Expenditure on 263 Acres.			Costs per Acre.		
	Time.	Quantities.	Costs.	Time.	Quantities.	Costs.
	Hours.	Galls.	£ s. d.	Hours.	Galls.	s. d.
Field Wages	98½	—	11 14 0	0.37	—	0 10.68
Use of Tractor	98½	—	25 15 0	0.37	—	1 11.50
Use of Combine-drill	98½	—	6 6 7	0.37	—	0 5.77
Kerosene	—	152	13 2 3	—	0.58	0 11.96
Petrol	—	17	1 18 9	—	0.06	0 1.77
Oils	—	6	1 14 5	—	0.02	0 1.57
			<u>£60 11 0</u>			<u>4 7.25</u>

Hence, mean costs of sowing Wheat or Oats with a Combine was 4s 7½d. per acre. In this aggregate the costs of Wages were 10½d. per acre, those of the use of the tractor 1s. 11½d., use of Combine 5½d., and fuel and oils 1s. 3½d.

The work was done at the rate of 21.36 acres per eight-hour day, during the course of which the daily consumption of Kerosene was at the mean rate of 12.5 gallons per acre, that of petrol 1.38 gallons, and that of oils 0.49 gallons.

Unfortunately, we have no comparative data of work done by the same implement hauled by Horses. The best comparison that can be offered is that of a ten-horse team hauling a 20-tine cultivator and sowing 58 acres of Oats. The data were as follows:—

	Expenditure on 58 Acres.		Costs per Acre.	
	Time.	Costs.	Time.	Costs.
	Hours.	£ s. d.	Hours.	s. d.
Field Wages	25	1 17 10	0.43	0 7.83
Use of Horses	250	5 7 11	4.31	1 10.33
Use of Combine	25	1 12 5	0.43	0 6.70
		<u>£8 18 2</u>		<u>3 0.86</u>

Hence, a ten-horse team hauling a 20-tine Cultivator sowed Oats at a cost of 3s. 0½d. per acre, whereas a Wheeled Tractor hauling a 16-tine Combine did similar work at a cost of 4s. 7½d. per acre. The Horse team did the work at the rate of 18.56 acres per eight-hour day, and the Tractor at the rate of 21.36 acres per day.

3. PERFORMANCE OF 20 H.P. CATERPILLAR TRACTOR.

This Tractor reached the farm on the 11th November, 1929, and was therefore present on the farm for 141 days of the 1929-30 Season. During this period the Tractor was at work for 399 hours, during the course of which the following expenditure was incurred.

1929-30 Tractor Expenditure for 399 Hours' Work.

	£	s.	d.
Wages (exclusive of Field Labor)	11	10	11
Repairs			
Sundries (Oil for Trial)	0	18	3
Kerosene (144galls.)	12	8	6
Petrol (548galls.)	62	8	6
Oils (42½galls.)	12	3	9
Depreciation	70	8	10
Interest	15	19	7
Total 1929-30 Expenditure	£185	18	4

£185 18s. 4d. for 399 hours = 9s. 3.83d. per Tractor-hour.

Expenditure incurred in 1930-31 for 1,148 hours of Work was as follows:—

	£	s.	d.
Wages (exclusive of Field Labor)	20	17	0
Repairs (Renewal of Parts)	8	8	8
Sundries (Overhaul)	0	17	3
Kerosene (1,683½galls.)	110	9	9
Petrol (711galls.)	76	11	4
Oil (102galls.)	24	18	9
Depreciation	138	18	0
Interest	37	2	8
Total 1930-31 Expenditure	£418	3	5

£418 3s. 5d. for 1,148 Hours = 7s. 3.42d. per Tractor-hour.

Expenditure incurred in 1931-32 for 1,005 hours was as follows:—

	£	s.	d.
Wages (Exclusive of Field Labor)	19	1	3
Repairs (Renewal of Parts)	4	16	3
Insurance	3	14	3
Kerosene (1,879galls.)	134	3	4
Petrol (205galls.)	24	7	8
Oil (79½galls.)	27	1	3
Depreciation	138	13	5
Interest	28	16	0
Total 1931-32 Expenditure	£380	13	5

£380 13s. 5d. for 1,005 Hours = 7s. 6.91d. per Tractor-hour.

Finally, Inclusive Expenditure of the 20 H.P. Caterpillar Tractor since 11th November, 1929, and 31st March, 1932, for 2,552 hours of work was as follows:—

	£	s.	d.
Wages (exclusive of Field Labor)	51	9	2
Repairs (Renewal of Parts)	13	4	11
Sundries	1	15	6
Insurance	3	14	3
Depreciation	348	0	3
Interest	81	18	3

Total Fixed Charges	£500	2	4	= 3s. 11.03d. per Tractor-hour
Kerosene (3,706½galls.)	£257	1	7	
Petrol (1,464galls.)	163	7	6	
Oil (223½galls.)	64	3	9	

Total Fuel and Oil Charges £484 12 10 = 3s. 9.58d. per Tractor-hour

Total cost of 2,552 hours £984 15 2 = 7s. 8.61d. per Tractor-hour

Finally, in Table XIII. of the Appendix a detailed statement has been given of work done by the 20 H.P. Caterpillar Tractor between the 11th November, 1929, and the 31st March, 1932.

The Mean Costs of the various operations are analysed below *seriatim*:—

(a) *Breaking Up 701 Acres with 8-Furrow Plough.*

	Time. Quantities.		Expenditure.		Per Acre.		Costs.	
	Hours.	Galls.	£	s. d.	Hours.	Galls.	s.	d.
Field Wages	502	—	54	0 11	0.72	—	1	6.50
Use of Tractor	402	—	73	13 10	0.57	—	2	1.23
Use of Plough	402	—	17	7 11	0.57	—	0	5.96
Kerosene	—	639	43	14 0	—	0.91	1	2.96
Petrol	—	222	24	1 7	—	0.31	0	8.24
Oils	—	34½	9	2 3	—	0.05	0	3.12
			£222	0 6			6	4.01

For portion of the time there was a man on the plough as well as a driver on the tractor. The work was done at the mean rate of 13.95 acres per 8-hour day, and absorbed 12.72 gallons of Kerosene per day, 4.42 gallons of Petrol, and 0.69 gallons of Oil. The mean cost was 6s. 4d. per acre.

Corresponding work by a team of ten horses on 316 acres was carried out at the following costs:—

	Time. Quantities.		Expenditure.		Per Acre.		Costs.	
	Hours.	Galls.	£	s. d.	Hours.	Galls.	s.	d.
Field Wages	281½	—	29	0 3	0.89	—	1	10.03
Use of Horses	2,815	—	60	15 2	8.91	—	3	10.15
Use of Plough	281½	—	12	13 5	0.89	—	0	9.62
			£102	8 10			6	5.80

The work was done at the rate of 8.98 acres per 8-hour day.

Hence, whilst a 20 H.P. Caterpillar Tractor broke up land with an 8-furrow plough at a cost of 6s. 4.01d. per acre, a ten-horse team did similar work at a cost of 6s. 5.8d. per acre; that is to say, assuming that the conditions under which the work was done were similar, the Tractor did the work at about 1½d. less than the 10-horse team. The Tractor in question is new, and whether it could continue doing the work at the same "costs" throughout its period of usefulness is, of course, another matter.

(b) *Breaking Up 309 Acres of Land with 14-Disc Sundercut Plough.*

	Time. Quantities.		Expenditure.		Per Acre.		Costs.	
	Hours.	Galls.	£	s. d.	Hours.	Galls.	s.	d.
Field Wages	220	—	16	14 2	0.71	—	1	0.98
Use of Tractor	110	—	21	7 0	0.36	—	1	4.58
Use of Plough	110	—	9	7 11	0.36	—	0	7.30
Kerosene	—	266	18	18 4	—	0.86	1	2.69
Petrol	—	22	2	12 4	—	0.07	0	2.03
Oils	—	9	3	1 6	—	0.03	0	2.39
			£72	1 3			4	7.97

The work was done at the mean rate of 22.47 acres per 8-hour day, and absorbed 19.34 gallons of Kerosene, 1.6 gallons of Petrol, and 0.65 gallons of Oil.

Similar work was done by a 10-horse team on 163 acres at the following costs:—

	Time. Quantities.		Expenditure.		Per Acre.		Costs.	
	Hours.	Galls.	£	s. d.	Hours.	Galls.	s.	d.
Field Wages	76	—	5	15 0	0.47	—	0	8.47
Use of Horses	760	—	16	8 1	4.66	—	2	0.15
Use of Plough	76	—	6	13 5	0.47	—	0	9.82
			£28	16 6			3	6.44

In the present instance, assuming work to have been done under similar conditions, the Horse-team work was 1s. 1½d. per acre cheaper than the tractor work, notwithstanding the fact that the tractor work was done at the rate of 22.47 acres per day, and the horse team work at the rate of 17.16 acres only.

(c) *Breaking Up 163 Acres of Grass Land with 16-tine Combine.*

	Time. Quantities. Expenditure.			Per Acre.		
	Hours.	Galls.	£ s. d.	Hours.	Galls.	Costs. s. d.
Field Wages	44½	—	5 5 8	0.27	—	0 7.78
Use of Tractor	44½	—	11 0 7	0.27	—	1 4.24
Use of Combine	44½	—	2 17 8	0.27	—	0 4.24
Kerosene	—	46	3 19 5	—	0.28	0 5.85
Petrol	—	53	6 0 9	—	0.33	0 8.89
Oils	—	4	1 3 0	—	0.02	0 1.69
Totals			£30 7 1			3 8.69

The work was done at the rate of 29.30 acres per 8-hour day.

We have no corresponding horse work data.

(d) *Cultivating 166 Acres of Fallowed Land with 14-Disc Sundercut.*

	Time. Quantities. Expenditure.			Per Acre.		
	Hours.	Galls.	£ s. d.	Hours.	Galls.	Costs. s. d.
Field Wages	52	—	6 13 10	0.31	—	0 9.68
Use of Tractor	52	—	9 6 11	0.31	—	1 1.51
Use of Plough	52	—	5 4 3	0.31	—	0 7.54
Kerosene	—	93	6 5 1	—	0.56	0 9.04
Petrol	—	20	2 3 2	—	9.12	0 3.12
Oils	—	5½	1 7 0	—	0.03	0 1.95
Totals			£31 0 3			3 8.84

The work was done at the rate of 25.54 acres per day, with a mean daily consumption of 14.31 gallons of Kerosene, 3.08 gallons of Petrol, and 0.85 gallons of Oil.

No work of this type was carried out with Horse-teams. It may be pointed out, however, that in the preceding section it was shown that to break up or plough land with a 14-Disc Sundercut hauled by a 10-horse team cost 3s. 6.44d. only; hence it is fairly certain that to cultivate fallowed land with the same implement would cost considerably less.

(e) *Cultivating 2,442 Acres with a 20-tine Combine.*

	Time. Quantities. Expenditure.			Per Acre.		
	Hours.	Galls.	£ s. d.	Hours.	Galls.	Costs. s. d.
Field Wages	575½	—	71 0 8	0.23	—	0 6.98
Use of Tractor	575½	—	109 3 11	0.23	—	0 10.73
Use of Combine	575½	—	25 1 2	0.23	—	0 2.46
Kerosene	—	1,161	78 10 2	—	0.48	0 7.72
Petrol	—	164	22 18 3	—	0.07	0 2.25
Oils	—	58½	16 15 6	—	0.02	0 1.65
			£323 9 8			2 7.79

The work was done at the mean rate of 33.96 acres per eight-hour day, with a mean daily consumption of 16.13 gallons of Kerosene, 2.28 gallons of Petrol, and 0.81 gallons of Oil.

Corresponding work on 372 acres by a ten-horse team hauling a 20-tine Combine was carried out at the following costs:—

	Time. Hours.	Expenditure. £ s. d.	Per Acre.	
			Time. Hours.	Costs. s. d.
Field Wages	118	12 4 9	0.32	0 7.90
Use of Horses	1,180	25 9 4	3.17	1 4.43
Use of Combine	118	7 7 0	0.32	0 4.74
		<hr/> £45 1 1 <hr/>		<hr/> 2 5.07 <hr/>

The work was done at the mean rate of 25.22 acres per eight-hour day, and at 2½d. per acre less than corresponding tractor costs.

(f) *Sowing Grain with 20-tine Combine (975 Acres).*

	Time. Quantities. Expenditure.			Per Acre.		
	Hours.	Galls.	£ s. d.	Hours.	Quantities. Galls.	Costs. s. d.
Field Wages	242	—	30 15 9	0.25	—	0 7.58
Use of Tractor . . .	242	—	45 9 11	0.25	—	0 11.20
Use of Combine . . .	242	—	9 18 9	0.25	—	0 2.45
Kerosene	—	274	19 9 7	—	0.28	0 4.79
Petrol	—	252	27 9 7	—	0.26	0 6.76
Oils	—	20½	6 1 7	—	0.02	0 1.50
			£139 5 2			2 10.28

The work was done at the mean rate of 32.23 acres per 8-hour day, with a mean daily consumption of 9.06 gallons of Kerosene, 8.33 gallons of Petrol, and 0.67 gallons of Oil.

Corresponding costs incurred on 339 acres by a 20-tine Combine hauled by a 10-horse team were as follows:—

	Time. Hours.	Expenditure. £ s. d.	Per Acre.	
			Time. Hours.	Costs. s. d.
Field Wages	139½	10 11 0	0.41	0 7.47
Use of Horses	1,390	30 0 0	4.10	1 9.24
Use of Combine	139	8 14 6	0.41	0 6.18
		<hr/> £49 5 6 <hr/>		<hr/> 2 10.89 <hr/>

The work was done at the mean rate of 22.79 acres per day, and at a cost of 0.61d. per acre more than tractor-work.

(g) *Sowing Grain with 20-Disc Drill (427 Acres).*

	Time. Quantities. Expenditure.			Per Acre.		Costs.
	Hours.	Galls.	£ s. d.	Hours.	Quantities. Galls.	
Field Wages	120½	—	15 5 3	0.28	—	0 8.58
Use of Tractor . . .	120½	—	23 11 4	0.28	—	1 1.25
Use of Drill	120½	—	14 13 10	0.28	—	0 8.26
Kerosene	—	157½	11 8 2	—	0.37	0 6.41
Petrol	—	56	6 1 5	—	0.13	0 3.41
Oils	—	10½	2 13 1	—	0.02	0 1.49
			£73 13 1			3 5.40

The work was carried out at the mean rate of 28.29 acres per 8-hour day, with a daily consumption of 10.43 gallons of Kerosene, 3.71 gallons of Petrol, and 0.70 gallons of Oil.

We have no horse-team data to compare with the above results.

(h) Harrowing 738 Acres of Land.

	Time. Quantities.			Expenditure.			Per Acre.			Costs.	
	Hours.	Galls.		£	s.	d.	Hours.	Galls.		s.	d.
Field Wages	110	—		9	11	0	0.15	—		0	3.11
Use of Tractor	82	—		15	16	0	0.11	—		0	5.14
Use of Harrows	82	—		10	18	8	0.11	—		0	3.55
Kerosene	—	162		11	9	2	—	0.22		0	3.73
Petrol	—	23		2	13	9	—	0.03		0	0.87
Oils	—	7½		2	10	3	—	0.01		0	0.82
				£52	18	10				1	5.22

The work was done at the mean rate of 72 acres per day, with a mean daily consumption of 15.80 gallons of Kerosene, 2.24 gallons of Petrol, and 0.73 gallons of Oil.

In these 738 acres were included 444 acres of land which were being harrowed immediately after ploughing. The work was done at the mean rate of 63.61 acres per day, and at a cost of 1s. 4.94d. per acre. The mean daily consumption of Kerosene was 15.54 gallons, of Petrol 1.85 gallons, and of Oils 0.92 gallons.

There were also included 210 acres of harrowing immediately after seeding. This work was done at the mean rate of 76.36 acres per day, and at a cost of 1s. 1.18d. per acre. The mean daily consumption of Kerosene was 16.36 gallons, of Petrol 2.84 gallons, and of Oils 0.36 gallons.

Costs of Harrowing 1,018 acres with a team of Horses were as follows:—

	Time.			Expenditure.			Per Acre.			Costs.	
	Hours.			£	s.	d.	Hours.			s.	d.
Field Wages	153½			13	16	9	0.15			0	3.26
Use of Horses	1,535			33	2	7	1.51			0	7.81
Use of Harrows	153½			6	6	7	0.15			0	1.49
				£53	5	11				1	0.56

The work was done at the rate of 52.97 acres per day, and at 4½d. less than corresponding Tractor-work.

(i) Reaping 1,343 Acres of Wheat with an 8ft. Header.

	Time. Quantities.			Expenditure.			Per Acre.			Costs.	
	Hours.	Galls.		£	s.	d.	Hours.	Galls.		s.	d.
Field Wages	704½	—		85	18	2	0.53	—		1	3.35
Use of Tractor	704½	—		146	2	6	0.53	—		2	2.11
Use of Header	704½	—		131	0	4	0.53	—		1	11.42
Kerosene	—	699		48	18	5	—	0.52		0	8.74
Petrol	—	490		55	12	11	—	0.36		0	9.95
Oils	—	57		16	16	0	—	0.04		0	3.00
				£484	8	4				7	2.57

The work was done at the mean rate of 15.25 acres per eight-hour day, with a mean daily consumption of 7.97 gallons of Kerosene, 5.56 gallons of Petrol, and 0.65 gallons of Oil. The mean cost per acre was 7s. 2½d., and as the mean yield per acre was 16.56 bushels, the mean cost per bushel was 5½d. The owner draws attention to the fact that these costs would have been lower but for the extremely tangled condition of half the 1930-31 Wheat Crops.

Unfortunately, we have no corresponding data for Horse-work.

(j) Reaping 165 Acres of Oats with an 8ft. Header.

	Time. Quantities. Expenditure.			Per Acre.			Costs.	
	Hours.	Galls.	£ s. d.	Hours.	Galls.	s. d.	s. d.	
Field Wages	89	—	10 17 4	0.54	—	1	3.81	
Use of Tractor	89	—	20 0 3	0.54	—	2	5.11	
Use of Header	89	—	15 13 3	0.54	—	1	10.78	
Kerosene	—	42	2 16 6	—	0.25	0	4.11	
Petrol	—	87	9 17 4	—	0.53	1	2.35	
Oils	—	11½	3 3 10	—	0.07	0	4.64	
Totals			£62 8 6			7	6.80	

The work was done at the mean rate of 14.83 acres per day, with a mean daily consumption of 3.77 gallons of Kerosene, 7.82 gallons of Petrol, and 1.03 gallons of Oils. The mean cost per acre was 7s. 6.80d., and for a 12.23 Bushel Crop the mean cost per Bushel was 7.43d.

Unfortunately, we have no corresponding data for Horse-work.

(k) Cutting and Binding 152 Acres of Cereal Hay with 8ft. Binder.

	Time. Quantities. Expenditure.			Per Acre.			Costs.
	Hours.	Galls.	£ s. d.	Hours.	Galls.	s. d.	
Field Wages	108	—	8 19 3	0.71	—	1	2.15
Use of Tractor	54	—	9 14 0	0.36	—	1	3.32
Use of Binder	54	—	12 12 4	0.36	—	1	7.92
Kerosene	—	85	5 14 4	—	0.56	0	9.03
Petrol	—	13	1 8 0	—	0.09	0	2.21
Oil	—	4	0 19 6	—	0.03	0	1.54
Twine	—	—	6 5 2	—	—	0	9.88
Totals			£45 12 7			6	0.05

Costs per ton (0.46 tons per acre) 13 0.44

The work was carried out at the mean rate of 22.52 acres per eight-hour day, at a cost of 6s. per acre, and 13s. 0½d. per ton for a crop averaging approximately half a ton per acre.

We have no corresponding data for Horse work.

(l) In Table XIV. of the Appendix the results of Tractor work and Horse-team work to the extent that the latter has been available have been summarised comparatively. It will be noted that there are six operations only in which outright comparisons were possible, namely, *one* between a 12/16 H.P. Wheel Tractor and a 10-horse team, and *five* between a 20 H.P. Caterpillar Tractor and a 10-horse team. These six operations and their relative costs are shown below:—

	Mean Costs per Acre.					
	Tractor.			10-horse Team.		
	£	s.	d.	£	s.	d.
1. Ploughing with 8-furrow Plough	0	6	4.01	0	6	5.80
2. Ploughing with 14-disc Sundercut	0	4	7.97	0	3	6.44
3. Cultivating with 16-tine Combine	0	3	11.77	0	3	5.68
4. Cultivating with 20-tine Combine	0	2	7.79	0	2	5.07
5. Harrowing (8 Leaves)	0	1	5.22	0	1	0.56
6. Sowing with 20-tine Combine	0	2	10.28	0	2	10.89
Totals	£1	1	11.04	0	19	10.44

Mean Tractor increased costs per acre 2s. 0.60d. total.
10.32 percentage.

Hence, for these six set of operations Increased Tractor Costs were represented by 2s. 0.60d., or 10.32 per cent. above corresponding Horse-Team Work. This may not seem much, but it must be recalled that Tractor costs given were those of a new tractor, and that they will certainly increase from year to year as the result of normal or accidental wear and tear of the machine.

An estimate based upon the above figures can of course be given as to the relative total costs of Tractor and Team work respectively in growing Wheat. Towards this end we shall adopt the mean Area under Wheat on Mallee Farm No. 1, namely, 422 Acres, for purposes of illustration. In this connection the only comparative costs of field operations that are not available to us are those that concern the reaping of the crop. For Tractor work the latter have already been shown to be at the mean rate of 7s. 2.57d. per acre. Hence, if we adopted the mean percentage increase of other operations, and assumed that Tractor Costs of reaping the crop were 10.32 per cent. higher than would have been corresponding costs of Horse-team work, then we should have 6s. 6.47d. per acre as estimated costs of reaping the Crop by means of Horse Team work. In the comparison, therefore, we shall assume that the fallows would have been broken at the mean rate of 5s. 5.99d. for the Tractor, and of 5s. 0.12d. for the Horse-team; that they would be cultivated three times at the mean rate of 3s. 3.78d. per operation for the tractor, and 2s. 11.3d. for the Horse-team; that they would be harrowed once at the mean rate of 1s. 5.22d. for the tractor, and of 1s. 0.56d. for the team of horses; that the seed would be sown at the mean rate of 2s. 10.28d. for the tractor, and of 2s. 10.89d. for the team of horses; and finally, that the grain would be reaped at the mean rate of 7s. 2.57d. by the tractor, and of 6s. 6.47d. by a team of horses.

In the circumstances, estimated costs of Field Operations in growing 422 acres of Wheat, but exclusive of overhead, costs of seed, etc., may be stated as follows:—

Estimated Costs of Field Operations in Growing 422 Acres of Wheat with Tractors and Horses as Motive Power Respectively.

	Estimated Expenditure.					
	With Tractor.			With 10-Horse Team.		
	£	s.	d.	£	s.	d.
Ploughing (once)	116	0	7	105	14	3
Cultivating (thrice)	209	16	9	186	12	0
Harrowing (once)	30	5	7	22	1	9
Sowing Seed	60	5	6	61	7	0
Reaping Grain	152	4	5	137	19	6
	<hr/>			<hr/>		
Totals	£568	12	10	£513	14	6
Tractor Excess	£54 18 4					

Hence, it is estimated that with a new Tractor in good working order, the costs of Field Operations in growing 422 acres of Wheat would be about £55, or 2s. 7½d. per acre, greater than corresponding costs of a 10-horse team. It is obvious, too, that the difference between Tractor Costs and Horse-team costs would become more pronounced with the progressive ageing of the tractor.

It must be recognised, however, that in the rapidity with which field operations can be carried out tractors present a very solid advantage over horses. The summarised data that follow will serve to make this point clear:—

	Number of 8-Hour Days Required to Complete 422 Acres.	
	Tractor.	10-Horse Team.
	Nos.	Nos.
Ploughing with 8-furrow Plough	30.25	46.99
Ploughing with 14-disc Sundercut	18.78	24.59
Cultivating with 16-tine Combine	15.94	22.93
Cultivating with 20-tine Combine (twice)	24.85	33.47
Harrowing (8 Leaves)	5.86	7.97
Sowing with 20-tine Combine	13.09	18.52
Totals	108.77	154.47

Aggregate saving in favor of Tractor-work . . 45.70 days.

Hence, for the operations indicated above, there would be an aggregate saving of 45½ days in favor of Tractor work; and on the grounds that "time is money" this represents a saving that cannot very well be overlooked. Not only are farm hands, tractors, and implements set free for other work, but in some instances Tractors render possible the carrying out of field operations at the most appropriate moment of the season. Seeding offers a simple illustration of this fact: It is generally recognised that ideal seeding weather is generally limited to a small number of days only in any given season, and it follows that in most instances portion only of the crop is sown at the most appropriate time, with the result that for no other cause crop yields may eventually be uneven, because portion of the crop had been sown too early, and portion of it too late. A saving of 5½ days in the sowing of 422 acres represents a saving of nearly 30 per cent. of the time required by a 10-horse team to do the same work. It should not be forgotten, however, that as the Tractor ages it becomes liable to breakdowns, and consequently to slowing down in the amount of work done in any given time.

Finally, it is claimed—and rightly so, perhaps—that tractors are responsible for reducing the Wages Bill on the farms on which they are used. The last two columns of Table XIV. of the Appendix show that such is the case for field operations of which we have dual records. The general position may be summarised as follows:—

	Mean Number of 8-Hour Labor Days Required for 422 Acres.	
	Tractor. Nos.	10-Horse Team. Nos.
Ploughing with 8-furrow Plough	37.77	47.01
Ploughing with 14-disc Sundercut	37.56	24.60
Cultivating with 16-tine Combine	15.95	22.91
Cultivating with 20-tine Combine (twice)	24.85	33.47
Harrowing (8 Leaves)	7.85	7.98
Sowing with 20-tine Combine	13.08	22.75
Totals	137.06	158.72

Number of Labor Days saved by Tractor 21.66

Hence, it is estimated that in the above operations the use of a Tractor has led to a reduction of Labor Wages in the costs of 422 acres of Wheat to the extent of 21.66 eight-hour days out of the 142 days required by horse-teams for corresponding work, *i.e.*, a reduction of 13.65 per cent. In this connection, however, it is necessary to stress the fact that from the viewpoint of neither the farmer nor the State is mere reduction in Labor Costs necessarily an unmixed blessing. Indeed, in no circumstances can such reduction be regarded as a desirable end in itself, but rather as a possibly unavoidable means to a desirable end, namely, reduction in mean costs of rural production; and in the matter before us there is no other end that can adequately justify the mechanisation of rural production. No other end, indeed, could possibly justify the progressive depopulation of our country-side, which usually accompanies extensive mechanisation. When, however, some special phase in the mechanisation of rural production—the use of Tractors, for instance—does lead to reduction in Labor Costs, but without corresponding decrease in costs of rural production, leads, in fact, to the very opposite effect, it must be obvious that this particular phase in mechanisation is neither in the interest of the farmer nor of the community as a whole. The importation of costly Machines and fuel from foreign parts, the over-capitalisation of our farms, coupled with progressively rising costs of rural production and gradual depopulation of the country-side, are not factors that make for the well-being and prosperity of an essentially rural State. It is on these grounds in the main that I have concluded that Farm Tractors have failed to justify their presence in our midst at a critical stage in our history.

E.—MEAN COSTS OF PREPARATION OF BARE FALLOW.

In the 1929-30 Season both Horses and Tractor participated in the preparation of Bare Fallow sown subsequently to Wheat in 1930-31. On the other hand, the motive power responsible for the 1930-31 and 1931-32 fallows was developed exclusively by a 20 H.P. Caterpillar Tractor. Hence, mean figures given below are confined to these two seasons. Unfortunately, data collected in the last season—which do not go beyond 31st March, 1932—are incomplete, as the fallows would in all probability receive a final cultivation just before seeding, at a cost estimated at £56 4s. 2d. for 464 acres. It follows, therefore, that data given in Table XV. of the Appendix under-estimate these costs to that extent. These data may be summarised as follows in contrast with corresponding data at Turretfield for the same two seasons:—

	Mallee Farm No. 1.			Turretfield.		
	Per	Per-		Per	Per-	
	Acre.	centage.		Acre.	centage.	
	s. d.	%		s. d.	%	
Wages	2 8	19.6		3 4	16.1	
Motive Power (Tractor or Horses)	7 5	53.6		7 0	33.9	
Use of Implements	0 9	5.3		1 10	8.9	
Rates and Taxes	0 3	1.9		0 8	3.2	
Interest on Land (Rent)	2 8	19.6		7 10	37.9	
Totals	13 9	100.0		20 8	100.0	

It will be observed that the discrepancy between the costs of Mallee Farm No. 1 and those of Turretfield is very considerable, namely, 13s. 9d. and 20s. 8d. respectively. An examination of the details, however, will show that the main causes of Turretfield excesses are Interest on Land values and rates and taxes, namely, in the aggregate 2s. 11d. per acre on Mallee Farm No. 1, and 8s. 6d. at Turretfield. If we deduct these two items from their respective totals we shall get 10s. 10d. and 12s. 2d., or a difference of 1s. 4d. per acre in favor of Mallee Farm No. 1, which possesses a soil far more easily tilled than that of Turretfield.

F.—VALUE AND DISTRIBUTION OF LABOR.

The available Arable Area of Mallee Farm No. 1 is 1,655 acres. The mean 1929-32 Area cultivated was 1,350.34 acres, the mean 1929-32 Area under Crop (including 343.67 acres of grazing crops) was 882.01 acres. If we relate Mean Wages paid per annum, namely, £394 17s. 6d. (inclusive of £300 for owner's salary) to mean eight-hour days worked, namely, 567½, we get the following results:—

Time and Cost of Labor per Acre in relation to—	Per Acre.	
	Time. Hours.	Costs. s. d.
Available Farm Area	2.75	4 9½
Mean Area in Cultivation	3.36	5 10½
Mean Area under Crop	5.15	8 11½

Attention is drawn to the fact that Mallee Farm No. 1 is a farm on which there is no available Home Labor, and that the owner, in addition to the burden of Management, is responsible for the greater portion of farm manual operations.

During the three seasons the Owner's working hours numbered 7,710½, i.e., a mean of 2,570 hours per annum, or an equivalent of 321 eight-hour days for payment at the assumed rate of 18s. 8d. per diem (£300 per annum).

Hired laborers, on the other hand, averaged 1,971 hours per annum, i.e., a mean of 246 eight-hour days per annum for payment at the rate of 7s. 8d. per diem, of which 4s. 8d. only represented payment in cash. The mean aggregate sum paid to Laborers per annum was £94 17s. 6d. In addition to the above a mean sum of £49 0s. 3d. per annum was paid for contracts.

Full details concerning the distribution of Wages (inclusive of Owner's Salary) have been given in Table XVI. of the Appendix. These data may be summarised as follows:—

Summarised Distribution of Wages Account (inclusive of Owner's Salary).

	Total.			Per Acre.			Per-centage.
	£	s.	d.	Arable.	Culti-vated.	Cropped.	
Crops (including grazing crops)	103	17	5	1 3	1 6½	2 4½	26.3
Fallows	58	11	6	0 8½	0 10½	1 4	14.8
Sheep	51	7	11	0 7½	0 9	1 2	13.0
Improvements	43	3	5	0 6½	0 7½	0 11½	10.9
Tools and Plant.	40	17	6	0 6	0 7½	0 11	10.4
Various.	96	19	9	1 2	1 5½	2 2½	24.6
Totals	£394	17	6	4 9½	5 10½	8 11½	100.0

Finally, details of Mean Contracts per annum were as follows:—

	£	s.	d.
1. Carting Wheat to Railway Station	23	16	1
2. Carting Superphosphate to Farm	4	2	8
3. Carting and Stacking Hay on Farm	4	1	8
4. Carting Wheat to Farm	1	13	2
5. Carting Kerosene and Petrol to Farm	1	4	6
6. Carting Wool and Lambs to Market	0	13	3
7. Carting Oats to Farm	0	12	6
8. Carting Stores to Farm	0	11	6
9. Carting Barley to Market.	0	8	4
10. Grading and Pickling Wheat	8	6	0
11. Dipping Sheep.	2	7	1
12. Sewing Bags	1	3	6
Mean Total per Annum	£49	0	3

In the above mean list, not all the items enumerated were represented in each year. Hence the following additional information concerning them is necessary:—

Mean of 2 years Contracts: Items Nos. 2, 4, 5, 6, 10 and 11.
 One year Contract only: Items Nos. 3, 7, 8, 9, and 12.
 Mean of 3 years Contracts: Item No. 1 only.

G.—COSTS OF SOME MINOR FARM OPERATIONS.

1. *Stooking Hay.*

An area of 181 acres yielded 100 tons of sheaved Hay, *i.e.*, about 11cwt. per acre. It took 78 hours, or 9½ eight-hour days' Labor. Mean Costs were therefore as follows:—

	Minutes.	Wages.
Costs per Acre	26	5.02d.
Costs per Ton	47	9.09d.

2. *Sewing Bags.*

(a) *Wheat.*—It took 473 hours, or 59 eight-hour days of Labor, to sew 7,333 bags of Wheat, at a cost of £31 13s. 4d. for Wages and £7 9s. 3d. for twine. Mean Costs would therefore be as follows:—

	Time.	Wages.	Twine.	Total Costs.
	Mins.	d.	d.	d.
Costs per Bag	3.87	1.04	0.24	1.28
Costs per Bushel	1.28	0.34	0.08	0.42

(b) *Oats.*—It took 49 hours, or six eight-hour Labor days, to sew 912 Bags of Oats, at a cost of £2 18s. 10d. for Wages and £1 16s. for Twine. Hence, Mean Costs were as follows:—

	Time.	Wages.	Twine.	Total Costs.
	Mins.	d.	d.	d.
Costs per Bag	3.22	0.77	0.47	1.24
Costs per Bushel	1.17	0.28	0.17	0.45

3. COSTS OF CHAFF-CUTTING.

It took 48 hours, or six eight-hour Labor Days, to cut 15½ tons of Hay, with a 12/16 H.P. Wheel Tractor for motive power. Similarly, it took 7½ hours to cut 5 tons of Hay with a 20 H.P. Caterpillar Tractor for motive power. In the latter case 2 tons of Hay were carted from the stack to the Chaff-cutter; in the former the hay was stacked alongside the Chaff-cutter.

Comparative costs are shown below:—

	12-16-h.p. Wheel Tractor (15½ Tons of Hay).			20-h.p. Caterpillar Tractor (5 Tons of Hay).		
	Total.	Per Ton.		Total.	Per Ton.	
	£	s.	d.	£	s.	d.
<i>Chaffcutting—</i>						
Wages	4	6	1	1	3	5
Tractor	3	9	10	1	4	10
Chaffcutter	3	1	9	1	0	0
Petrol	0	18	4	0	7	2
Kerosene	0	6	10	0	4	3
	£12	2	10	3	19	8
		15	8.00		15	11.2
<i>Carting to Cutter—</i>						
Wages				0	9	2
Horses				0	2	7
Trolly				0	3	4
				£4	14	9
					18	11.4

Thus, with a 12/16 H.P. Wheel Tractor providing the motive power, the cost of Chaff-cutting was 15s. 8d. per ton, and with a 20 H.P. Caterpillar tractor 15s. 11d. per ton; whereas inclusive cost of Carting and Cutting was 18s. 11½d. per ton with the Caterpillar Tractor. All these costs are obviously too high, probably because both Tractors were too powerful for the work required of them, and in the end too costly. At Turretfield, Carting and Cutting with a stationary engine providing the motive power to drive the chaffcutter, corresponding costs were 13s. 4.2d. per ton only, compared with 18s. 11.4d.

CONCLUSION.

The Report on three seasons' Farming Operations of Mallee Farm No. 1 has now been brought to a close; and, viewing the position in retrospect, it can be said that the variations in seasonal climatic conditions, and, in our experience, in economic conditions as well, are usually too great to yield convincing means from the results of three brief years of farming operations. If it had been possible to join the data of Mallee Farm No. 1 to those of two other farms situated in the same district the resulting means would, in all probability, have been more satisfactory; and it was because such farms were not available at the time that we sought to induce the Owner to allow us to continue the analysis of his data for an additional two years. Unfortunately, he was unable to agree. We are none the less grateful to him, not only for placing at our disposal all the data of his farm, but for the painstaking and conscientious manner in which all the records required by us were personally kept by him; and for this and for his many kindnesses to Departmental Officers we wish to tender to him our sincere thanks, and to express the hope that our brief association will result in some good to himself, as it will to ourselves.

I must also express my personal indebtedness to the Accountant (Mr. J. W. McDonald) and his Staff for the workmanlike manner in which the numerous data

upon which this Report has been founded have been collected and brought together. I am particularly indebted to Mr. H. S. Soar (Assistant Accountant) who was mainly responsible for the successful handling of these data during three successive years.

Let me say, in conclusion, that although circumstances did not permit of the work being continued on Mallee Farm No. 1, we have other farms in hand concerning which Reports will be published in due course.

APPENDIX.

TABLE X.—*Showing Grazing Value of Available Areas Expressed as Sheep-days.*

	Areas on Basis of 12 Months Availability.	Number of Sheep-days.				Equivalent Number of Sheep per Acre per Annum.
		Sheep.	Horses.	Cattle.	Total.	
	Acres.	Nos.	Nos.	Nos.	Nos.	Nos.
1929-30.						
Grazing Crops (Oats) ..	519	83,197	17,316	5,075	105,588	0.56
Stubbles	149	28,827	2,448	1,715	32,990	0.61
Natural Pasture	171	34,474	—	—	34,474	0.55
Totals	839	146,498	19,764	6,790	173,052	0.57
1930-31.						
Grazing Crops (Oats) ..	460	67,834	6,390	7,980	82,204	0.49
Stubbles	120	23,199	1,836	1,785	26,820	0.61
Natural Pasture	318	48,234	657	777	49,668	0.43
Totals	898	139,267	8,883	10,542	158,692	0.48
1931-32.						
Grazing Crops	Nil	—	—	—	—	—
Stubbles	135	37,264	2,039	4,382	43,685	0.88
Natural Pasture	762	107,351	10,714	11,844	129,909	0.47
Totals	897	144,615	12,753	16,226	173,594	0.53
1929-32 Means.						
Grazing Crops (Oats) ..	326	50,344	7,902	4,352	62,598	0.53
Stubbles	135	29,763	2,108	2,627	34,498	0.70
Natural Pasture	417	63,353	3,790	4,207	71,350	0.47
Totals	878	143,460	13,800	11,186	168,446	0.53

NOTE.—In the above Table one Horse has been assumed to be the grazing equivalent of 9 Sheep, and one head of Cattle of 7 Sheep.

TABLE XI.—*Showing Opening and Closing Flock Inventories, 1929-32.*

	Opening—1/4/1929.		Closing—31/3/1930.		Closing—31/3/1931.		Closing—31/3/1932.	
	Num- bers.	Corres- ponding Value.	Num- bers.	Corres- ponding Value.	Num- bers.	Corres- ponding Value.	Num- bers.	Corres- ponding Value.
Rams	6	£ 47 0 0	5	£ 26 0 0	5	£ 15 13 0	4	£ 15 15 0
Ewes	466	775 0 0	307	280 17 6	320	200 0 0	365	228 2 6
Hoggets	—	—	78	39 0 0	53	26 10 0	143	53 12 6
Lambs	—	—	—	—	44	16 10 0	—	—
Totals	472	822 0 0	390	345 17 6	422	258 13 0	512	297 10 0
Mean Value per Head	—	1 14 10	—	0 17 9	—	0 12 3	—	0 11 7

TABLE XII.—Detailed Analysis of Mean Flock Expenditure (1929-32), Exclusive of Flock Depreciation.

	Con- tracts.	Labor.	Horses.	Tractor.	Imple- ments.	Material.	Miscel- laneous.	Totals for 394 ewes.	Cost per ewe.	Percent- age.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	s. d.	%
A. TENDING FLOCK—										
1. Tailing	—	2 2 0	0 1 2	—	—	—	—	2 3 2	0 1-31	0-44
2. Shearing	—	21 13 1	0 3 3	—	9 14 0	3 9 4	—	34 19 8	1 9-31	7-19
3. Crutching	—	4 19 4	0 0 11	—	2 6 5	—	—	7 6 8	0 4-47	1-51
4. Dipping	2 7 1	0 13 11	0 3 0	—	0 3 9	0 5 9	—	3 13 6	0 2-24	0-75
5. Various	—	17 3 2	2 11 5	—	1 4 2	—	1 17 6	22 16 3	1 1-90	4-69
Totals	2 7 1	46 11 6	2 19 9	—	13 8 4	3 15 1	1 17 6	70 19 3	3 7-23	14-58
B. FEED—										
1. Natural Pasture	—	—	—	—	—	—	93 3 2	93 3 2	4 8-75	19-15
2. Grazing Crops	—	10 16 1	8 10 3	12 9 10	7 8 8	70 12 11	47 11 3	157 9 0	7 11-91	32-35
3. Hand Feeding	—	3 1 6	1 14 2	—	1 6 1	30 7 7	—	36 9 4	1 10-21	7-49
4. Water	—	—	—	—	—	—	12 15 0	12 15 0	0 7-77	2-62
Totals	—	13 17 7	10 4 5	12 9 10	8 14 9	101 0 6	153 9 5	299 16 6	15 2-64	61-61
C. MARKETING—										
1. Wool	0 12 0	0 5 1	0 2 10	—	0 1 10	—	7 0 8	8 2 5	0 4-94	1-67
2. Sheep and Lambs	0 1 3	1 9 11	0 3 7	—	—	—	17 18 6	19 13 3	0 11-98	4-04
Totals	0 13 3	1 15 0	0 6 5	—	0 1 10	—	24 19 2	27 15 8	1 4-92	5-71
D. INCIDENTALS—										
1. Sundry Stores	—	—	—	—	—	0 1 3	—	0 1 3	0 0-04	0-01
2. District Council Rates	—	—	—	—	—	—	6 1 7	6 1 7	0 3-70	1-25
3. Land Tax	—	—	—	—	—	—	6 0 7	6 0 7	0 3-67	1-24
4. Interest on Overdraft	—	—	—	—	—	—	5 4 9	5 4 9	0 3-19	1-08
5. Interest on Floating Capital	—	—	—	—	—	—	29 1 8	29 1 8	1 5-72	5-98
6. General Expenses	—	13 18 5	1 1 6	0 3 3	8 3 7	—	18 5 0	41 11 9	2 1-33	8-54
Totals	—	13 18 5	1 1 6	0 3 3	8 3 7	0 1 3	64 13 7	88 1 7	4 5-65	18-10
Grand Totals	3 0 4	76 2 6	14 12 1	12 13 1	30 8 6	104 16 10	244 19 8	486 13 0	—	—
"Costs" per Ewe	0 1-84	3 10-37	0 8-90	0 7-71	1 6-53	5 3-86	12 5-23	—	s. d. 24 8-44	—
Percentages	0-62	15-64	3-00	2-60	6-25	21-55	50-34	—	% —	100-00

TABLE XIII.—Summarising Work done by 20 H.P. Caterpillar Tractor between November 11th, 1929, and March 31st, 1932.

	Hours.	Fixed Charges.		Fuel and Oil.		Total Expenditure.	
		Per Operation.	Per Hour.	Per Operation.	Per Hour.	Per Operation.	Per Hour.
	Nos.	£ s. d.	s. d.	£ s. d.	s. d.	£ s. d.	s. d.
1. Breaking up 701 acres with 8-furrow plough	402	73 13 10	3 8-0	76 17 10	3 9-9	150 11 8	7 5-9
2. Breaking up 309 acres with 14-disc sundereut	110	21 7 0	3 10-58	24 12 2	4 5-69	45 19 2	8 4-27
3. Cultivating 166 acres with 14-disc sundereut	52	9 6 11	3 7-13	9 15 3	3 9-06	19 2 2	7 4-19
4. Cultivating 2,442 acres with 20-tine combine	575½	109 3 11	3 9-56	118 3 11	4 1-31	227 7 10	7 10-87
5. Sowing 975 acres with 20-tine combine	242	45 9 11	3 9-12	53 0 9	4 4-6	98 10 8	8 1-72
6. Reaping 1,343 acres of wheat with 8ft. header	704½	146 2 6	4 1-78	121 7 4	3 5-34	267 9 10	7 7-12
7. Reaping 165 acres of oats with 8ft. header	89	20 0 3	4 5-97	15 17 8	3 6-83	35 17 11	8 0-80
8. Harrowing 738 acres	82	15 16 0	3 10-24	16 13 2	4 0-76	32 9 2	7 11-00
9. Breaking up 163 acres with 16-tine combine	44½	11 0 7	4 11-48	11 3 2	5 0-18	22 3 9	9 11-66
10. Sowing 427 acres with 20-disc drill	120½	23 11 4	3 10-84	20 2 8	3 4-02	43 14 0	7 2-86
11. Binding 152 acres cereal hay with 8ft. binder	54	9 14 0	3 7-11	8 1 10	2 11-96	17 15 10	6 7-07
12. Various	76	14 16 1	3 0-75	8 17 1	2 3-96	23 13 2	6 2-71
Totals	2,552	500 2 4	3 11-03	484 12 10	3 9-58	984 15 2	7 8-61

NOTE.—2,552 working hours for 2 years and 141 days represents a mean of 133½ (one hundred and thirty-three and two-thirds) eight-hour working days per annum for the tractor, that is to say, not more than 43 per cent. of the available working hours in the year.

TABLE XIV.—Contrasting Tractor and Horse-Team Costs in Field Operations.

	Mean Costs per Acre.		Mean Area Covered Per 8-Hour Day.		Mean Number of 8-Hour Labor Days Per 100 Acres.	
	10-Horse Team.		10-Horse Team.		10-Horse Team.	
	Tractor.		Tractor.	Acs.	Tractor.	Nos.
A. 12/16 H.P. WHEEL TRACTOR—						
1. Cultivating with 16-tine combine	s. d.	3 11-77	s. d.	3 5-68	Nos.	5-43
2. Sowing with 16-tine combine	4 7-25	—	21-36	18-40	4-68	—
B. 20 H.P. CATERPILLAR TRACTOR—						
1. Ploughing with 8-furrow plough	6 4-01	6 5-80	13-95	8-98	8-95	11-14
2. Ploughing with 14-Disc subercut	4 7-97	3 6-44	22-47	17-16	8-90	5-83
3. Breaking grass land with 16-tine combine	3 8-69	—	29-30	—	3-41	—
4. Cultivating with 14-disc subercut	3 8-84	—	25-54	—	3-91	—
5. Cultivating with 20-tine combine	2 7-79	2 5-07	33-96	25-22	2-94	3-97
6. Harrowing (8 leaves)	1 5-22	1 0-56	72-00	52-97	1-86	1-89
7. Sowing with 20-disc drill	3 5-40	—	28-29	—	3-53	—
8. Sowing with 20-tine combine	2 10-28	2 10-89	32-23	22-79	3-10	5-39
9. Reaping oats with 8-foot header	7 6-80	—	14-83	—	6-74	—
10. Reaping wheat with 8-foot header	7 2-57	—	15-25	—	6-56	—
11. Binding hay with 8-foot binder	6 0-05	—	22-52	—	8-88	—

NOTE.—When figures are not given in columns headed "10-Horse Team" comparative data relative to Tractors were not available from Mallee Farm No. 1.

TABLE XV.—*Mean Costs of Preparation of Bare Fallow.*

	Costs of Fallow Prepared in 1930/31.			Costs of Fallow Prepared in 1931/32 up to 31/3/32.			1930/32 Mean Costs of Preparation of Fallows.				Percentage.
	541 Acres.		Per Acre.	464 Acres.		Per Acre.	Quantities.	1,005 Acres.		Per Acre.	
	£	s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	Hours.	£	s. d.	£ s. d.	%
Wages	77	19 7	2 10-59	57	9 4	2 5-72	1,259½	135	8 11	2 8-34	19-61
Horses	1	14 11	0 0-77	—	—	—	—	1	14 11	0 0-42	0-25
Tractor	91	11 8	3 4-63	69	1 9	2 11-74	—	160	13 5	3 2-37	23-26
Kerosene	73	15 3	2 8-72	62	13 1	2 8-41	1,081	136	8 4	2 8-58	6-27
Petrol	32	8 0	1 2-37	10	18 7	0 5-65	298	43	6 7	0 10-35	19-75
Oils	15	3 2	0 6-73	12	13 4	0 6-55	58½	27	16 6	0 6-64	4-03
Tillage Implements	20	10 10	0 9-11	16	6 11	0 8-45	—	36	17 9	0 8-81	5-34
Land Tax	4	4 8	0 1-88	2	15 8	0 1-44	—	7	0 4	0 1-68	0-88
District Council Rates	3	4 10	0 1-44	2	16 8	0 1-47	—	6	1 6	0 1-45	1-02
Interest on Land (Rent)	72	3 4	2 8-02	63	2 11	2 8-66	—	135	6 3	2 8-31	19-59
Totals	392	16 3	14 6-26	297	18 3	12 10-09	—	690	14 6	13 8-95	100-00

NOTE.—It is estimated that to complete preparation of 1931/32 fallows a sum of £56 4s. 2d. would have to be spent; this additional expenditure would raise the total cost of preparing 1,005 acres of bare fallow to £746 18s. 8d., or 14s. 10d. per acre; corresponding costs at Turrethfield, where land values are higher and soil heavier, were 26s. 1d. per acre for the 10-year period ending March 31st, 1932. Costs were, however, very considerably reduced in the last two years of the decade, namely, 20s. 8d. per acre for the preparation of 1930/32 bare fallow.

TABLE XVI.—Mean Distribution of Wages, 1929-32.

	Owner's Salary.	Wages and Allowances of Farm Hands.			Total Wages.	Percentages.
		Cash.	Allowances.	Total.		
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	%
Wheat Account	63 9 1	6 19 11	3 17 3	10 17 2	74 6 3	18.82
General Expenses Account	58 0 8	7 7 8	8 14 3	16 1 11	74 2 7	18.77
Fallow Account	51 19 10	4 4 11	2 6 9	6 11 8	58 11 6	14.83
Sheep Account	31 8 11	14 4 10	5 14 3	19 19 0	51 7 11	13.01
Improvements Account	21 1 6	13 14 8	8 7 3	22 1 11	43 3 5	10.93
Tractors Account	18 3 10	0 6 0	0 4 0	0 10 0	18 13 10	4.73
Tools and Plant	14 19 7	0 15 4	0 13 5	1 8 9	16 8 4	4.16
Oats Account	9 17 11	1 12 6	0 19 10	2 12 4	12 10 3	3.17
Hay Account	8 4 0	1 4 3	1 10 3	2 14 6	10 18 6	2.77
Farm Stores Account	6 3 4	1 4 9	1 1 6	2 6 3	8 9 7	2.15
Cattle Account	3 4 3	1 11 8	2 1 3	3 12 11	6 17 2	1.74
Grazing Crops Account	5 5 9	0 13 5	0 3 3	0 16 8	6 2 5	1.55
Horses Account	3 6 11	1 18 5	0 10 0	2 8 5	5 15 4	1.46
Preparation of Land	3 1 1	0 0 10	0 0 11	0 1 9	3 2 10	0.80
Garden, &c.	1 1 5	0 10 10	0 15 3	1 6 1	2 7 6	0.60
Poultry Account	0 2 5	0 5 7	0 6 9	0 12 4	0 14 9	0.19
Straw Account	0 9 6	0 1 4	0 2 2	0 3 6	0 13 0	0.16
Housekeeping Account	—	0 6 9	0 5 6	0 12 4	0 12 4	0.16
Totals	300 0 0	57 3 8	37 13 10	94 17 6	394 17 6	—
Percentages	75.97	14.48	+9.55	=24.03	—	100.00

THE ESTABLISHMENT AND MANAGEMENT OF IRRIGATED PASTURES.

[By H. C. TRUMBLE, M. Agr. Sc., Waite Agricultural Research Institute.]

Under the conditions of the irrigated Murray swamps it is possible to grow four types of forage:—(a) Summer and winter-crown cereals; (b) temporary pasture for grazing or for cutting and feeding to stock; (c) lucerne for permanent mowing; and (d) permanent seeded pastures. Permanent seeded pastures are particularly desirable owing to their known high productivity under irrigation and their ability to produce feed at low cost when once they are established.

BASIC IMPORTANCE OF NITROGEN AND PHOSPHORUS IN PLANT GROWTH AND ANIMAL PRODUCTION.

On considering the factors that govern the yield and productivity of pastures in general, it is necessary that we should fully understand the importance of the elementary food materials, particularly nitrogen and phosphorus, in determining the yield and nutritive value of pastures and the health and production of livestock.

Nitrogen is a gas which forms four-fifths of the atmosphere we breathe, but as such is useless both to plants and to animals. It can be used by certain soil bacteria, however, which convert it into nitrates and ammonium compounds which in turn can be taken up by plants which convert them into proteins. Proteins are the essential constituents of meat and wool, and are also important constituents of milk. A low protein content of herbage is frequently a cause of poor nutrition and low productivity of stock.

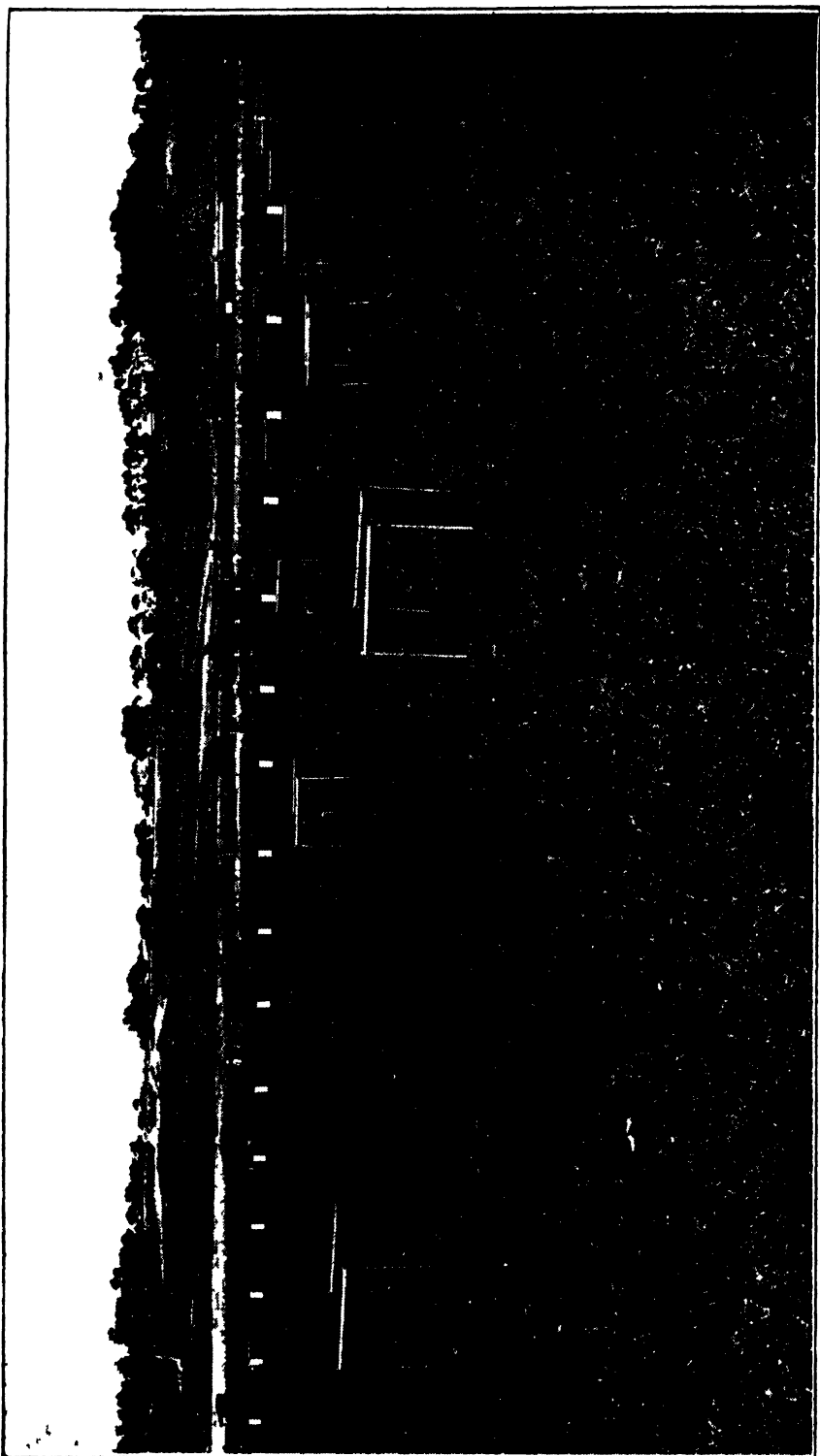
Phosphorus on the other hand is a solid which is found in the soil as phosphate. The soil cannot be enriched in phosphate except by the addition of phosphatic fertilisers such as superphosphate. Phosphates are chiefly found in bony structures, but are also essential constituents of nearly all animal products. The importance of both nitrogen and phosphorus can be gauged from the fact that they are necessary constituents of all plant and animal cells.

REQUIREMENTS OF GRASSES AND CLOVERS FOR NITROGEN AND PHOSPHORUS.

It is important to know that whereas grasses require both nitrogen and phosphorus in fairly liberal quantities for growth, clovers, lucerne, and other leguminous plants are able to obtain all the nitrogen they require from the air by means of bacteria which inhabit small nodules found on the roots of these plants. It is found in practice that grasses respond more readily to nitrogenous manures than clovers, whereas clovers respond actively to soluble phosphates and are actually depressed by nitrogenous fertilisers such as sulphate of ammonia. This is connected with the fact that both grasses and clovers require three to four times as much nitrogen as they do phosphate, whereas the clovers are independent of the soil nitrogen. This characteristic of the clovers is of paramount importance in pastures, for clovers actually enrich the soil in nitrogen and improve the growth of grasses growing in association with them.

AMOUNTS OF NITROGEN AND PHOSPHORUS REQUIRED BY PASTURES.

The amounts of nitrogen and phosphoric acid required by a year's growth of pastures are considerable. Investigations at Wood's Point have shown that 680lbs. of nitrogen and 210lbs. of phosphoric acid equivalent to 30cwts. sulphate



View of experimental area at Wood's Point showing plots grazed rotationally by sheep, with protected quadrats from which the yield of pasture is obtained.

of ammonia and 9cwt. of superphosphate per acre respectively are removed from the soil in a year's growth of herbage. Only about 50 per cent. of these quantities is returned and retained by the soil, so that there is a continual drain on the soil supply of these two nutrients; consequently, an annual application of soluble phosphate is necessary to keep pace with the loss of phosphorus. In the case of nitrogen the loss is greatly compensated by the nitrogen-fixing capacity of the clovers.

WELL-BALANCED MIXTURES OF GRASS AND CLOVER NECESSARY.

It is obvious that neither pure grass swards nor pure clover swards are desirable as pastures. The pure grass sward soon becomes unproductive owing to the using up of the available soil nitrogen without any compensating replacement; whereas the pure clover sward is too rich and unbalanced a food for stock. Moreover, its high nitrogen-fixing propensity leads to a condition of nitrogen excess, which causes the clover to deteriorate and inferior grasses and weeds to take possession of the soil. Lucerne is an exception to this rule when it is mown because most of the nitrogen is removed in the carted forage. When lucerne is grazed it behaves in a similar fashion to the clovers.

It is thus necessary to establish well-balanced mixtures of permanent grasses and clovers in which the clovers act as gatherers of nitrogen and the grasses make use of this nitrogen, yielding it to stock, the grasses and clovers together providing a balanced ration containing protein and phosphoric acid in suitable proportions and amounts for the requirements of grazing livestock.

A large number of grasses, clovers, and mixtures has been tested by the Waite Research Institute on the Wood's Point Estate during the last 3½ years. Relatively few of these have been found sufficiently productive, particularly in winter, and persistent enough under grazing to justify their being recommended for permanent pastures.

SUGGESTED SEEDS MIXTURES.

Certified New Zealand perennial rye grass has proved the outstanding permanent grass and certified New Zealand white clover the outstanding clover. The mixture recommended is 10lbs. certified perennial rye grass, 8lbs. Akaroa cocksfoot, and 2lbs. certified white clover. It is possible that the Montgomery type of red clover may be available in the future, in which case the addition of 2lbs. per acre to the above mixture is recommended.

A grass which has given promising results in many parts of the State, including the swamps, is *Phalaris tuberosa*, a species particularly valuable for its winter growth. Unfortunately, this grass does not grow well in association with perennial rye grass. A suitable mixture containing this species is 4lbs. *Phalaris tuberosa*, 4lbs. Kentucky blue grass, 2lbs. certified white clover, and (when available) 2lbs. Montgomery red clover.

ESTABLISHMENT OF THE PASTURE.

It is always necessary to purchase good seed, and certified lines of perennial rye grass, white clover, and *Phalaris tuberosa* are now available at fairly reasonable prices.

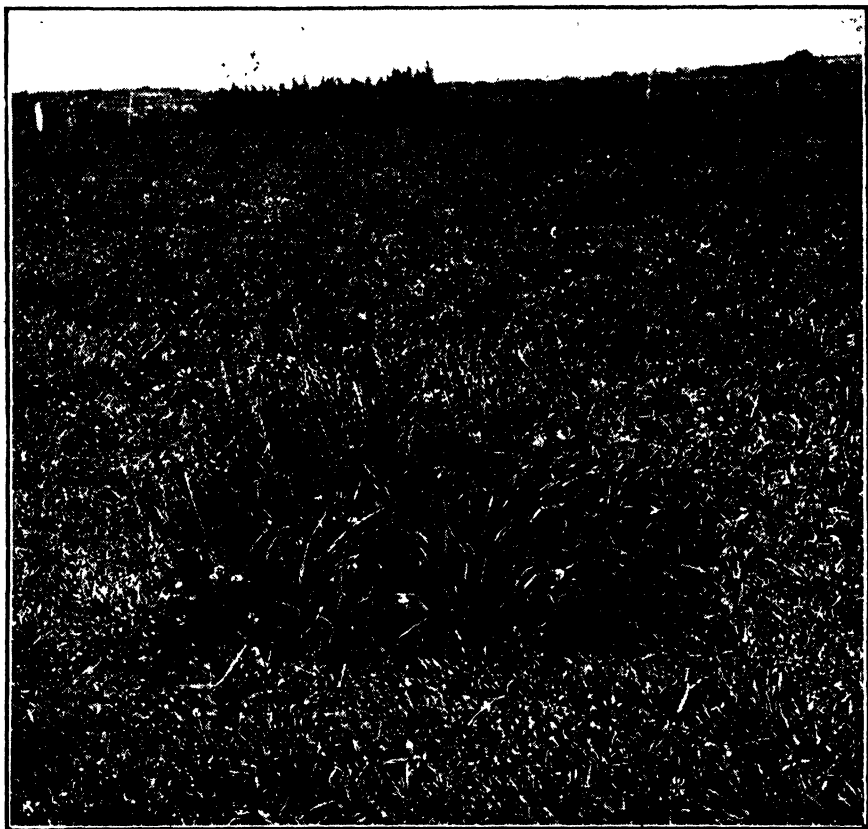
Sowing down after a lucerne stand which has commenced to thin or has been destroyed by flooding gives good results. It is not recommended to plough good lucerne in a state of high productivity unless this cannot be avoided. Good soil preparation is essential.

Seeding in late winter or early spring—August to early September—has given good results, but seeding may be carried out in autumn if winter weeds are not troublesome. In the case of a *Phalaris* mixture autumn seeding is preferable. The seeds are usually sown by mixing thoroughly with superphosphate and allowing to drop on a well tilled surface, then lightly harrowing.

MANAGEMENT.

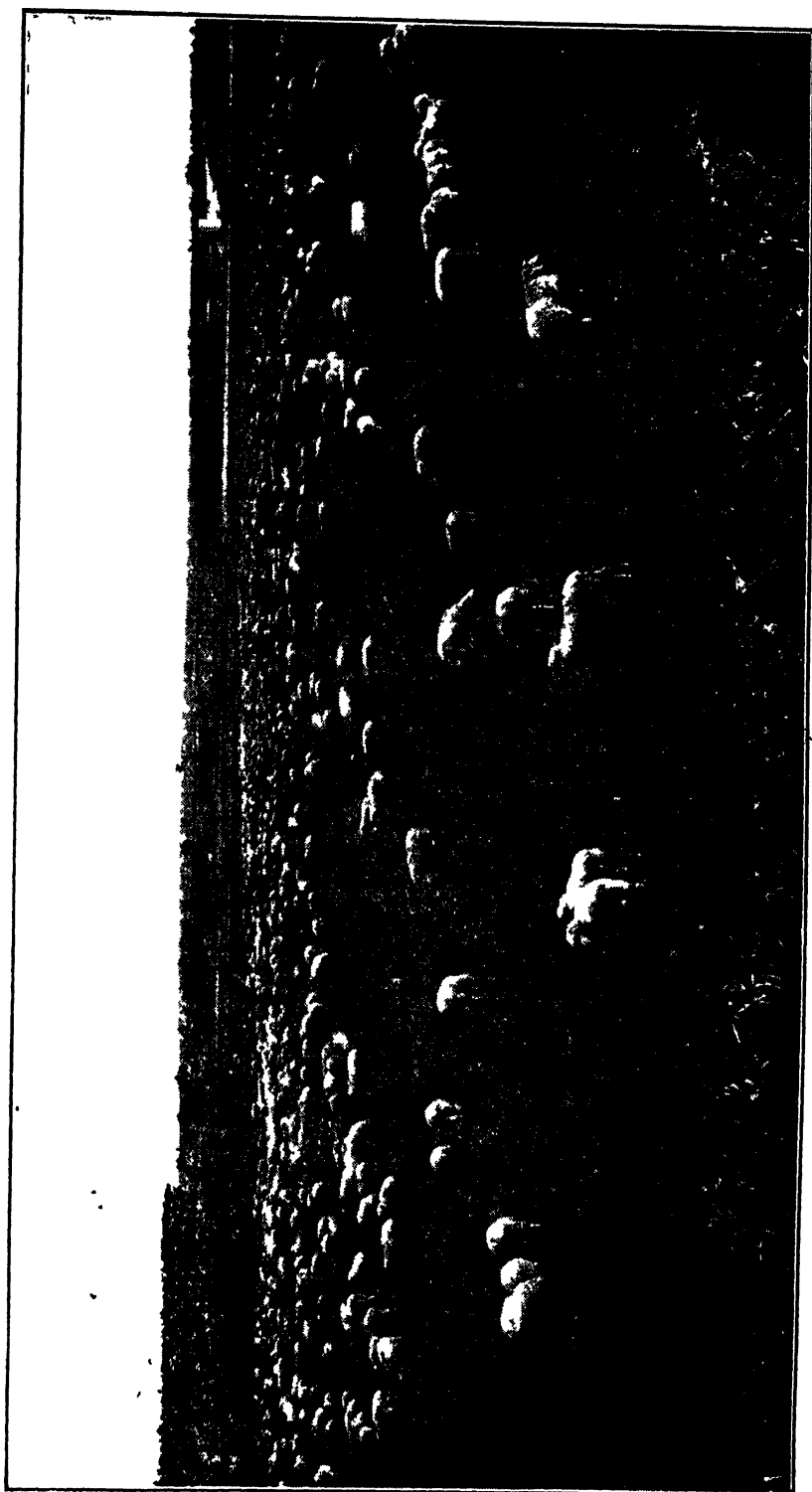
Subdivision of paddocks to sizes of from 5 to 10 acres is desirable, as without this it is extremely difficult to exercise grazing control.

The pasture should be lightly grazed 10 to 12 weeks after seeding, then at intervals of 5 to 6 weeks. It has been found in practice that even and thorough grazing is desirable and can usually only be attained by putting on comparatively



Close view of pasture sown with New Zealand certified perennial rye-grass, cocksfoot, and white clover, with quadrat removed to show growth of pasture.

large numbers of stock for short periods of time, which means fairly frequent rotation. Five or six paddocks with the stock in each paddock for a week at a time would give a satisfactory grazing interval. Ideally, the grazing should not be sufficiently drastic to bare down the pasture and expose a large proportion of bare soil. If possible, a short cover of grass an inch or two in height should be maintained.



View of sheep grazing on 150 acres of New Zealand certified perennial rye grass, cocksfoot, and white clover at Wood's Point.

In Great Britain and in New Zealand the grazing interval recommended has been one of 3½-4 weeks. Wood's Point experience indicates, however, that an interval of 5-6 weeks is more suited to the conditions of the swamps. A system of 8-weekly cutting produced 31 per cent. more herbage over a 12 months' period than 4-weekly cutting, and also provided a more suitable ration for fattening sheep.

IRREGULARITIES OF SEASONAL PRODUCTION.

The production of herbage shows wide fluctuations both in yield and nutritive value according to the period of the year. Approximately 25 per cent. of the total annual production is yielded in the two months, October and November, whereas only 15 per cent. is produced in the four months, June, July, August, and September. On the other hand, the herbage in winter is 40 per cent. richer in phosphorus and 30 per cent. richer in nitrogen than it is in summer. Supplementary feeding in winter should thus take the form of a carbohydrate supplement, such as cereal hay or barley grain.

It is very important that the herbage should not be allowed to get away in spring in the case of irrigated pastures. The reverse is true for non-irrigated sown pastures where spelling in spring is frequently desirable. Under irrigation, however, a heavy yield in October and November followed by close grazing or cutting appears to lead to poor production subsequently. To avoid this, either the grazing interval can be shortened and more stock used to graze the pasture, or, failing this, the pasture should be mown at an early stage of growth.

It is advisable either to graze or to mow, if at all possible, before the grasses actively commence to flower.

MANURING.

An application of superphosphate at the rate of 1½cwts. to 2cwts. per acre is desirable each year. Little response to superphosphate has been obtained at Wood's Point, but this is probably because the land has received liberal dressings of superphosphate in past years.

Sulphate of ammonia is not profitable on irrigated pastures at present prices, but may be used where a rapid stimulation of feed production is required for special purposes.

PASTURE RENOVATION, HARROWING, MOWING, ETC.

Pasture renovation does not appear to be necessary on the Murray swamps with rye grass pastures. Harrowing is, however, advisable in order to distribute cow pats. The use of the mower is beneficial where irregularities, roughness, and thistles appear or where selective grazing has been evident.

A good variety in the feed is very desirable, and it is suggested that more than one pasture mixture should be sown. It might be useful, for instance, to have pastures of both rye grass and of *Phalaris* on a block rather than to sow rye grass mixtures exclusively. For permanent mowing lucerne is unequalled, whereas temporary leys of Italian rye grass, 10lbs. per acre and broad red clover 5lbs. per acre, may be sown for the rapid provision of greenfeed.

In conclusion, fodder conservation in the form of cereal hay and grain, lucerne hay, and stacked silage greatly augments and stabilises production and acts as a safeguard against lean periods.

INVESTIGATION DESIGNED TO IMPROVE CULTURAL PRACTICES IN THE CURRANT-GROWING INDUSTRY IN NON-IRRIGATED DISTRICTS OF SOUTH AUSTRALIA.

[Mr. G. Quinn (Chief Horticultural Instructor) has presented the following report for the information of the Hon. Minister of Agriculture and the Dried Fruits Board. The report covers the first year's operations conducted by the officers of the Horticultural Branch in collaboration with officers of the Council for Scientific and Industrial Research in vineyards in the currant-growing districts around Clare, Barossa, and McLaren Flat.]

The investigation is at present directed towards:—

- (1) Methods of re-organising old debilitated vines in low yielding and unprofitable vineyards.
- (2) Testing the comparative values of various systems of pruning in relation to the productivity of currant vines.
- (3) Testing crop-yielding capacities of normal currant vines preparatory to instituting manurial trials.
- (4) General bud shoot, bunch and berry growth studies on vines under No. (2) treatments.

In each of the above districts three plots of currant vines were selected in vineyards which had been offered by the respective owners for the purposes of the investigation—as stated above and outlined in detail in a previous explanatory report dated September 3rd, 1932.

(1) METHODS OF RE-ORGANISATION OF OLD VINES.

In Mrs. A. Dolan's very old vineyard on the rich Stanley Flat near Clare, two rows consisting of 121 vines were sawn off practically at ground level, but usually at a point where water shoots had started or were giving signs of emergence. The owner had removed the old trellis and erected a new one about 5ft. high on which to train the new growths. To this the available water sprouts were raised or directed by suitably placed stakes and ties, and fixed in position during the pre-bud bursting period in 1932.

It has been planned to raise each alternate vine to the top wire and frame it there, whilst the others will be spread espalier shape on the middle wire. Where no water sprout was available on any stump, the young growths which emerged in spring were led up by a supporting string—around which they were temporarily twisted—to the trellis wires, and there topped to induce subdivisinal growths from which the permanent horizontal arms are being formed.

The number of old vines which responded with healthy shoots was 112, or equivalent to 92.5 per cent. of the total operated upon in the two rows.

With a view to making comparisons, the owner cut off a third row, each alternate vine being severed about 9in. or 10in. above ground level where water shoots have or may emerge.

In all of these amputations the wounds on the stumps were smoothened over and carefully coated with thick white lead paint to prevent the ready entrance of decay-producing organisms.

With a view to arriving at an estimation of the loss of fruit likely to be sustained during the re-organisation period, two of the owners have, on our suggestion, gathered and weighed the currants harvested from an equal number of

rows of the old vines immediately adjacent to those decapitated. This procedure will be followed until the re-organised vines have gradually reached a normal cropping condition. In Mrs. Dolan's the owner reported that three rows comprising 173 old vines planted 10ft. x 11ft. yielded 4,059lbs. of fresh fruit, resulting in 1,424lbs. of dried currants—a drying ratio of 2.85lbs. fresh to 1lb. dried weight. The growths arising from the re-organised vines have been satisfactory, and cropping will no doubt begin on some of the stronger plants during the coming summer if permitted.

In Mr. G. Wishart's 60-year-old vineyard at Angaston three rows consisting of 124 vines planted 8ft. 6in. apart, with vines varying from 8ft. to 16ft. apart in the rows, were cut off and treated in a similar manner to those at Mrs. Dolan's. These vines were of the Shiraz variety for 40 years before being grafted over to currants. The response in growth following our amputations was very remarkable—116 or 93.54 per cent. of the vines produced canes enabling reconstruction to be entered upon during the first summer. A new trellis was also erected by Mr. Wishart to accommodate these growths.

The fresh currants harvested in 1933 from the next adjacent three rows of old vines weighed 1,407½lbs., whilst the few more advanced growths on the reconstructed vines carried 10½lbs. of grapes.

In the 30-year old vineyard of Mr. R. G. Bell of McLaren Flat two rows consisting of 78 vines were cut off in a similar manner to those at Stanley Flat and Angaston, and the resulting growths tied to a new trellis erected to receive them. Of the vines operated upon 76 have grown, equalling 97.43 per cent. of the total.

In this instance, owing to an oversight, no arrangement had been made with the owner to keep a record of the crop gathered from an equal number of old adjacent vines in the same plot.

(2) TESTING THE COMPARATIVE VALUES OF DIFFERENT SYSTEMS OF PRUNING IN RELATION TO THE PRODUCTIVITY OF CURRANT VINES.

In Mr. W. H. Penna's well kept 20-year-old vineyard at Sevenhills, near Clare, 99 vines, comprising two full rows and portion of a third row, were selected for these trials. The outside vine at each end of the rows was omitted. These 99 vines had, at pruning time, been marked off into groups, each containing three consecutive vines as they stood in the rows. These vines, which are planted in rows 10ft. apart with the plants set 11ft. from each other in the rows—396 vines to an acre—are trained as espaliers, each having one pair of arms. The rows run approximately north and south along the gently sloping land. The vines were consecutively numbered from 1 to 99 from north to south along the respective rows.

In each of the groups one vine labelled "S." was spur pruned. The next one marked "S.D." was also spur pruned, but after bud burst all sprouts not arising from the spurs were disbudded, *i.e.*, quite suppressed. The third vine, labelled "R.S.", was rod and spur pruned. This order was repeated along the rows, making 33 groups or replications of each of these treatments.

The fruit was harvested on March 22nd, when the Baume scale recorded from 12.75° in the fruit from the rod and spur pruned vines to 15.50° in that from the spur pruned and disbudded vines.

The harvesting procedure adopted was to first harvest the fruit from the rods on the rod and spur pruned vines and record the weight of its grapes to each particular vine. The remaining grapes from each vine in all of the groups were then harvested, and the bucket or buckets containing same were stood against the stem of the vine from which their contents had been picked. The weighing and recording officers meanwhile followed closely on the heels of the pickers, and collected the data from each vine's yield before the buckets were passed to the

carters for delivery to the drying ground where the fruit gathered from the spur pruned, spur pruned and disbudded, the rods from the rod and spur pruned vines and from the spurs on the rod and spur pruned vines were each spread on separate lots of trays for drying.

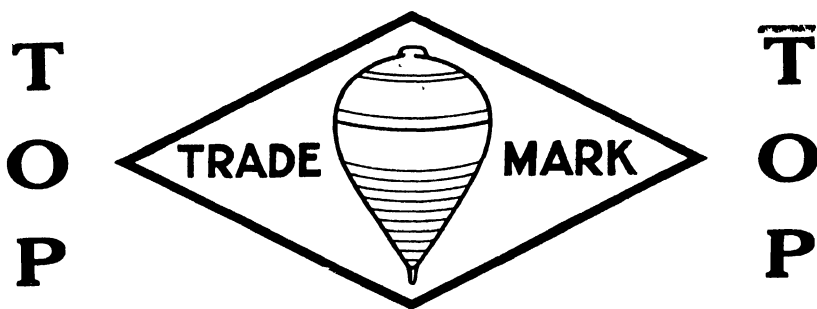
NOTE.—Owing to the grapes from four groups having been mixed on the drying trays, the data has been drawn from 29 groups only.

The production from the variously pruned groups may be summarised as under:—

Method of Pruning.	No. of Vines.	Total Yield.	Average per Vine.	Degrees Baume.	Total Dry Weight.	Drying Ratio.	Total Yield per Acre Rate Fresh Grapes (at 396 Vines per Acre).
S. (spur pruned)	29	lbs. 789½	lbs. 27.22	13.75	lbs. 257¼	3.07 to 1	Tons cwt. 4 16¼
S.D. (spur pruned and disbudded)	29	673	23.20	15.50	220¼	3.05 to 1	4 2
R.S. (rod and spur pruned)							
Rods	29	494½	17.05	12.75	153½	3.22 to 1	} 6 2¼
Spurs		508½	17.53	12.75	156	3.26 to 1	

The fruits when dried were processed and classified into commercial grades at the Clare Dried Fruits Association's Co-operative Shed, which kindly consented to undertake this phase of the investigational work.

TOP SPECIAL SUPER (45%)



“TOP” IT, AND PROFIT.

The Adelaide Chemical & Fertilizer Co., Ltd.

The following figures show the Results of the Final Processing of the Fruit from Mr. Penna's Pruning Trial Plot at Sevenhills.

Method of Pruning.	Bucks.		Waste.		Grades.			M.F. and Distillery	Total Dry.	Yield Dry per Acre.	
	lbs. ozs.	o/100	lbs. ozs.	%	3 Cr. L.	3 Cr.	2 Cr.				
29 Vines.											
S. (spur pruned)	9 8	3.69	15 8	6.02	lbs. ozs. 41 8	lbs. ozs. 175 8	lbs. ozs. 12 0	lbs. ozs. 3 4	lbs. ozs. 257 4	lbs. 3,512	T. C. L. 1 11 40
S.D. (spur pruned and disbudded)	8 8	3.85	2 4	1.01	16.13% 42 0	68.22% 154 0	4.66% 10 0	1.26% 4 0	220 12	3,014	1 6 102
R.S. (rod and spur pruned) —					19.02% 8 8	69.76% 110 0	4.53% 13 8	1.81% 7 0	153 8		
Rods	4 0	2.60	10 8	6.84	5.53% 12 8	71.66% 87 0	8.79% 32 8	4.56% 6 0	156 0	4,226	1 17 82
Spurs	6 8	4.16	11 8	7.37	8.01% 8.01%	55.76% 55.76%	21.02% 21.02%	3.84% 3.84%	309 8		

At Mr. P. B. Boehm's 9-year-old currant vineyard at Light's Pass, near Angaston, a similar number of vines—viz., 99—to those selected at Mr. Penna's, at Sevenhills, have been subjected to the pruning treatments outlined above. These vines are planted in rows 10ft. apart with plants set 12ft. from each other in the rows, making a total of 363 vines per acre planted. They are framed as spaliers, each vine carrying one pair of arms stretched on a low trellis, and the 33 groups occupy five and one-half rows running approximately east and west. The tips of the young shoots were slightly injured by frost in early spring, but apparently the yield was not seriously diminished thereby.

The crop was harvested and the weights recorded on March 14th, when the Baume readings indicated from 13.57° from the juices of fruits on the rods, to 14.76° on the spur pruned, but not disbudded vines. The following is a summary of the yields at Light's Pass:—

Method of Pruning.	No. of Vines.	Total Yield.	Average per Vine.	Degrees Baume.	Total Yield Dried.	Drying Ratio.	Yield per Acre Rate Fresh Grapes.		
		lbs.	lbs.		lbs.	lbs.	T.	C.	L.
S. (spur pruned)	33	563½	17.08	14.76	171	3.29 to 1	2	15	41
S.D. (spur pruned, disbudded)	33	540½	16.38	14.50	163	3.31 to 1	2	13	9
R.S. (rod and spur pruned)	33								
Rods		298	9.29	13.57	85	3.50 to 1	3	9	82
Spurs		412	12.48	13.76	98	4.20 to 1			

These yields have been dried separately, and the drying ratios, grades of commercial quality, bucks, and waste obtained through the kindly co-operation of the Co-operative Packing Association's shed at Angaston.

The following figures indicate in tabular form the results of the final processing and grading of the dried produce:—

Method of Pruning.	Bucks.		Waste.		Grades.		Yield Dry per Acre.
	lbs. ozs.	%	lbs. ozs.	%	1 Crown.	3 Crown.	
33 Vines.							
S. (spur pruned)	19 0	11	11 3	6.54	1 1 62%	139 12	1,881
33 Vines.							
S.D. (spur pruned, disbudded)	18 0	11	6 5	3.87	1 7 88%	137 4	1,793
33 Vines.							
R.S. (rod and spur pruned)—							
Rods	6 0	7	5 9	6.54	1 1 1.25%	72 6	935
Spurs	10 8	10.5	2 13	2.81	0 13 81%	85 14	1,100
						87%	2,035

The pruning test plot on Mr. R. G. Bell's 13-year-old currant vineyard at McLaren Flat consisted of three rows of moderately strong vines trained as simple spaliers on a well set up trellis. The rows, which run down a gentle slope in a northerly aspect, are 10ft. apart, and the vines are placed 10ft. from each other in the rows, or equalling 435 vines on an acre surface.

The vines were pruned in groups of three as in the Sevenhills and Light's Pass tests. Each treatment was thus replicated 42 times on a total of 126 vines. An average of four rods were left on each vine in the R.S.—rod and spur—pruned plants.

The harvesting of the fruit was carried out on March 14th. The fruit was dried by Mr. Bell in a dehydrator on the property. The following is a summary of the yields from the different treatments at McLaren Flat:—

Method of Pruning.	No. of Vines.	Total Yield.	Average per Vine.	Degrees Baume.	Total Dried.	Drying Ratio.	Yield per Acre Rate Fresh Grapes.		
		lbs.	lbs. ozs.		lbs.	lbs.	T.	C.	L.
S. (spur pruned)	42	391	9 5	17	153	2.55 to 1	1	16	17
S.D. (spur pruned, dis-budded)	42	375	8 15	17	149	2.51 to 1	1	14	76
R.S. (rod and spur pruned)	42								
Rods		501	11 15	16	177	2.83 to 1	3	18	98
Spurs		352	8 6	15	108	2.26 to 1			

An analysis of the dried produce is as follows:—

Method of Pruning.	Bucks.		Waste.		Grades.		Yield Dry per Acre.
					3 Crown.	Total Dry.	
42 Vines.	lbs. ozs.	%	lbs. ozs.	%	lbs. ozs.	lbs. ozs.	lbs.
S. (spur pruned)	36 8	23.85	6 0	3.92	117 0	159 8	1,651.9
42 Vines.					76.47%		
S.D. (spur pruned, dis-budded)	35 0	24.47	6 0	4.02	108 0	149 0	1,543
42 Vines.					72.48%		
R.S. (rod and spur pruned) —							
Rods	{ 26 0	9.22	11 4	3.98	245 0	282 4	2,923.3
Spurs					86.88%		

Owing to a misunderstanding the data collected from this processed fruit was not recorded on a similar scale to that of the dried fruit from the Sevenhills and Light's Pass Pruning plots, where it was graded out in detail and classified on the standards adopted by the Australian Dried Fruits Association for currants.

(3) CROP YIELD TESTS.

These tests were carried out in portions of vineyards wherein the vines were said to have displayed normal average growth and fruit production under the soil conditions predominating in the currant vineyards of each respective district during recent years.

In the Clare district this plot is contained in the vineyard of Mr. C. Neate, on Stanley Flat, on the western side of the Main North Road. These vines have been planted about 20 years. They are set in rows 10ft. apart with 11ft. spaces between the vines in the rows which run approximately north and south. These spaces permit 396 vines being planted on an acre surface. The vines are trained as simple two-armed spaliers upon a trellis of medium height above the ground. The vines are all spur pruned. This season a vast number of adventitious shoots have arisen from the arms, and these have cropped freely.

The vines under test are located in a strip consisting of seven parallel rows. Of these the two outside rows and the central one act as barriers dividing the second and third, and fifth and sixth rows into two long plots. These, in turn, are divided into groups of six vines each. This was achieved by omitting the end vines in each row, and thence forward, omitting every fourth vine in the rows. These omissions constitute transverse barrier rows between the groups. In this manner 18 rectangular groups or plots of six vines each are obtained, each group being segregated by barrier rows of vines. Owing to missing vines and muscat vines having been planted in gaps, several of the test groups have not the full complement of currant vine plants. In all, five vines are missing, and the crops unrecorded from four muscat vines.

The fruit was harvested from these groups on March 21st and 22nd, 1933, the yield of each vine in each group being recorded separately by weight. The groups are distinguished by using alphabetical letters.

The following is a summary of the yields from the groups for the season 1933:—

Group.	Vine Numbers.	Total Yield of Group.	Average Yield per Vine.
		lbs.	lbs.
A	1 to 5 6 Muscat	296½	59.25
B	7 to 11 12 —Muscat	292	58.40
C	13 to 15 16—Missing 17, 18—Muscat	159½	53.17
D	19 to 24	279½	46.54
E	25 to 30	232½	38.71
F	32 to 36 31 Missing	306	61.20
G	37 to 42	299½	49.87
H	43 to 48	329	54.83
I	49 to 54	326	54.34
J	55 to 60 57 —Missing	239½	47.85
K	62 to 66 61—Missing	312½	62.45
L	67 to 72	254½	42.45
M	73 to 78 77 Missing	256	51.20
N	79 to 84	244½	40.71
O	85 to 90	331	55.17
P	91 to 96	380	63.34
Q	97 to 102	355	59.17
R	103 to 108	307½	51.21

Summary of Fresh Fruit Yields.

Number of Vines Recorded.	Total Yield.	Average Yield per Group.	Average Yield per Vine.	Average Degrees Baume (16 Tests).	Total Yield per Acre Rate.			
	lbs.	lbs.	lbs.		T.	C.	Q.	L.
99	5,199½	288.89	52.52	12.29	9	5	2	22

Summary of Dried Fruit Yields.

No. of Vines Recorded.	Total Yield Dried.	Drying Ratio.	Average per Group Dried.	Average per Vine Dried.	Rate per Acre Dried.			
	lbs.		lbs.	lbs.	lbs.	T.	C.	Q.
99	1,504	3.46 to 1	83.56	15.19	6,015	2	13	2

It will be noted that the dried currants were not graded into association grades, but as the Baume readings ranged as low as 11° and some of the fruit was poorly colored the sample must have been only fair.

In the Barossa district the crop yield test was conducted on another portion of Mr. P. B. Boehm's 9-year-old currant vineyard, planted 10ft. x 12ft., equalling 363 vines to an acre.

These vines are framed as spaliers with a single pair of arms on a low trellis, and are all spur pruned. The groups of six vines each are segregated by barrier rows as described in the Clare tests, but 25 groups were utilised. This is a very evenly grown plot from which the 150 vines have been chosen. The fruit was harvested from all of the groups on March 15th, 1933, when the Baume readings ranged from 14.5° to 16°, and averaging 15.37°.

The following is a summary of the yields of fresh currants from each of the 25 groups:—

Group.	Vine Numbers.	Total Yield of Group.	Average Yield per Vine.
		lbs.	lbs.
A	1 to 6	178½	29.75
B	7 to 12	126½	21.04
C	13 to 18	71	11.83
D	19 to 24	150¾	25.12
E	25 to 30 27—Missing	77½	15.45
F	31 to 36	128	21.33
G	37 to 42	109½	18.21
H	43 to 48	106¾	17.79
I	49 to 54	108	18.00
J	55 to 60	96½	16.08
K	61 to 66	116	19.33
L	67 to 72	76¾	12.79
M	73 to 78 77—Missing	115½	23.05
N	79 to 84	76	12.67
O	85 to 90	92¾	15.46
P	91 to 96	102	17.00
Q	97 to 102	96	16.00
R	103 to 108	79½	13.21
S	109 to 114 111—No crop	55½	11.10
T	115 to 120	94	15.67
U	121 to 126	108½	18.04
V	127 to 132	74½	12.37
W	133 to 138	65½	10.92
X	139 to 144	82¾	13.79
Y	145 to 150	107½	17.87

Number of Vines Recorded.	Total Yield.	Average Yield per Group.	Average Yield per Vine.	Yield Fresh per Acre Rate.			
	lbs.	lbs.	lbs.	lbs.	T.	C.	Q.
147	2,493¾	99.72	16.96	6.156	2	14	3 24

Unfortunately, the currants from these groups were not dried separately from the general crop, and consequently data relative to the percentages of bucks and currants of various grades are not available for the 1933 crop.

In the McLaren Flat district the crop yield test was conducted in a portion of Mr. A. C. Fraser's 11-year-old vines. These currants are planted 12ft. x 12ft., or equivalent to 302 vines per acre. They are trained on a fairly high trellis

with a cross piece on each post, and framed as spaliers, each with a single pair of arms. The arms run along the central wire, and a parallel wire passes through each of the ends of the cross pieces. The rods are tied down to these side wires. The rows run approximately east and west. The soil is strong, and the vines vigorous. Mr. Fraser states he used a heavy dressing of crude slaughterhouse refuse fertiliser, rich in nitrogen, on the land. These vines are all rod and spur pruned, some carrying as many as 13 good rods on the pair of long extended arms. The 24 groups were plotted out in a similar manner as described for the Stanley Flat and Light's Pass crop yield tests. The crop was harvested and recorded by the District Horticultural Instructor (Mr. C. H. Beaumont) on March 16th, 1933. The average Baume reading was 15.50°. The following is a summary of the respective group and vine average yields in fresh currants:—

Group.	Vine Numbers.	Total Yield of Group.	Average Yield per Vine.
A	1 to 6	138	23.00
B	7 to 12	104	17.34
C	13 to 18	158	26.34
D	19 to 24	178	29.67
E	25 to 30	165	27.50
F	31 to 36	167	27.84
G	37 to 42	132	22.00
H	43 to 48	130	21.67
I	49 to 54	152	25.34
J	55 to 60	161	26.84
K	61 to 66	120	20.00
L	67 to 72	120	20.00
M	73 to 78	70	11.67
N	79 to 84	83½	13.92
O	85 to 90	92	15.34
P	91 to 96	104	17.34
Q	97 to 102	126	21.00
R	103 to 108	112	18.67
S	109 to 114	99	16.50
T	115 to 120	79	13.17
U	121 to 126	111	18.50
V	127 to 132	175	29.17
W	133 to 138	151	25.17
X	139 to 144	131	21.84

In this instance the currants were partly dried on a rack at Mr. Fraser's, and finished off in a dehydrator by Mr. R. G. Bell. The following represents the final results of the crop from the 24 groups:—

Vines Recorded.	Total Yield.	Average Yield per Group.	Average Yield per Vine.	Total Dry Weight.	Drying Ratio Fresh to Dry.	Total Bucks.	per Cent. Bucks.
144	lbs. 3,058½	lbs. 127.41	lbs. 21.24	lbs. 951	lbs. 3.22	lbs. 281	29.5

Fresh currants per acre rate	6.414lbs. =	T. 2	C. 17	L. 30
Dried currants per acre rate	1.994lbs. =	C. 17	Q. 3	L. 6

HORTICULTURAL STUDIES.

In addition to the above described work of a more practical character, at the request of Mr. A. V. Lyon, M.S. Agric., certain viticultural studies were carried out on currant vines, and the data collected and recorded.

These consisted of:—

- (1) Bud studies.
- (2) Berry growths.
- (3) Shoot lengths, together with bunch counts, measurements, and weights of grapes produced on same.
- (4) Juice studies, *i.e.*, Baume readings, sugar and acid determinations.
- (5) Studies in soil moisture content.

Bud Studies were conducted upon all of the rods retained on a selected number of rod and spur pruned vines in each of the vine pruning tests in the three districts.

These observations were made after the bud burst in spring was well advanced, and the behavior of each bud from the base upwards on each rod was clearly indicated. The number of flower bunches arising from each fruiting bud was noted, and the barren and non-starting buds respectively recorded in graphic symbols.

The object of these bud studies was to ascertain if there was any consistency of behavior inherent in the buds arising from the nodes formed in any particular part or parts of the cane or rod.

Berry Growths.—The progressive growths or developments of the berries were recorded on four occasions at fairly regular intervals between the setting and harvesting. The procedure adopted consisted of picking a few berries from the shoulder, middle, and bottom of each of the bunches taken without special selection from vines in each of the groups undergoing different pruning treatments. Their developments were determined by means of water displacement in a cylinder graduated into cubic centimetres, into which 100 berries from each respective part of the bunches were dropped in separate order.

Shoot Lengths, Bunch Counts, Measurements, and Weights of Bunches.—These studies consisted of selecting a number of vines from each of the pruning test groups and measuring the length of each fruit-bearing cane, as well as the sizes of its individual bunches, and then cutting and weighing each of the bunches separately. This work was carried out when the grapes were ripe, and immediately before harvesting commenced. The object of these studies was to procure data from which might be ascertained any correlation which might exist between the growth of the shoots and the sizes and weights of the bunches of currants borne thereon.

JUICE STUDIES.

These consisted of expressing the juice from selected bunchlets of ripe currants taken from vines subject to the different pruning treatments. Readings on Baume and Brix hydrometers and determinations of acidity and sugars were made therefrom.

In the collection of the data having a bearing on the relation between shoot growths and crop yields, and studies of the comparative qualities of the juice contents of the grapes harvested from vines undergoing different pruning treatments, the officers of this Branch had the valuable assistance of Mr. Walters, of the Council for Scientific and Industrial Research Viticultural Research Station staff, at Merbein, Victoria, who made the various determinations and preliminary correlations connected with these operations requiring special skill and knowledge.

The whole of the data accumulated from the above viticultural studies have been passed over to Mr. A. V. Lyon with a view to their being statistically examined and reported upon by a specialist in such statistical work. I understand conclusions arising therefrom will, in due course, be communicated to this Branch and to the South Australian Dried Fruits Board.

SOIL MOISTURE STUDIES.

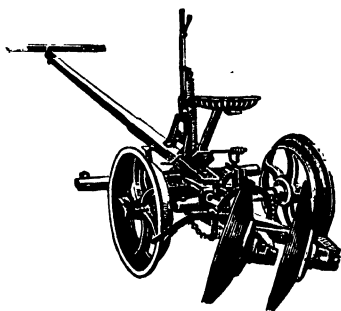
In the spring time, shortly after bud burst, a preliminary series of soil samples were taken at various depths, and their respective moisture contents determined at the Waite Agricultural Research Institute.

It was intended that, as the summer progressed and the grapes on the vines began to approach the harvesting stage, a further series should be drawn from the same positions in the plots in each district. It was considered that possibly an insufficiently sustained supply of moisture in the subsoil—such as is often experienced during an average summer in the non-irrigated currant growing districts—may influence the quality of the currants taken from such vines.

The rainfall during the winter of 1932 being more than usually heavy and the summer of 1932-33 proving to be one of the coolest on record, the supply of soil moisture was well maintained, and the vines did not show any signs of the usual effects of drought. So much was this the case that the juice of the grapes was very late in arriving at a desirable density for drying or wine-making purposes.

The Horticultural officers who have been engaged in this field work have been Messrs. C. H. Beaumont, J. B. Harris, and N. R. Quinn, whilst Mr. F. Supple, Senior Clerk, has checked over the data contained in this report, and prepared the necessary forms on which data has been set out. All of these officers have entered into the work with much intelligence and skill, and given up a good deal of their private as well as official time in assisting to make it as complete as possible.

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FACTORS AFFECTING THE SEVERITY OF TAKE-ALL.

[By S. D. GARRETT, B.A., Assistant Plant Pathologist, Waite Agricultural Research Institute, University of Adelaide.]

(Continued from page 805.)

3. THE CLIMATIC FACTOR.

Although there have been numerous references to the effect of weather on take-all these have been mostly of the nature of casual observations, and many of them have been contradictory. There is, however, a general idea current among farmers in Australia that a dry summer, followed by a wet winter, is most favorable for the appearance of the disease⁽³⁾.

Two workers in America have made a limited study of the effect of weather conditions on the disease. Kirby⁽¹⁾, from a comparison of the incidence of take-all in New York State in the three years 1921-1923, concluded that the most favorable conditions for take-all were an abnormally high temperature and rainfall in early spring, followed by hot dry weather. Russell⁽⁴⁾, working in Canada with records for the seven years 1923-1929, also concluded that take-all was most prevalent in years with a wet spring, and that it was relatively scarce in years with dry spring and summer weather. He considered, however, that moist conditions right up till the time of heading were most favorable for the development of the disease, thus differing on this point from Kirby.

There appears to have been little work done yet on the actual manner in which weather may affect the prevalence of take-all. Considering the economic importance of the disease it is surprising that so little has been accomplished. The explanation is undoubtedly that the disease is influenced by so many factors that it is most difficult to control them, all so that individual ones can be studied. For instance, the life history of the causal fungus, *Ophiobolus graminis*, may be affected directly or indirectly by the weather as regards—(1) dispersal of the fungus over non-infected ground, (2) survival of the mycelium in the soil, (3) rate of spread of the mycelium through the soil, and (4) rapidity of growth of the fungus on infected plants. Moreover, each of these main divisions of the life history may in turn be affected by other factors, such, for example, as soil temperature, soil moisture, the soil microflora, &c. It is not surprising that progress in determining the main factors influencing the development of the disease has been slow and difficult.

In order to obtain as clear a picture as possible of the epidemiology of take-all each of the stages in the life history of the fungus, as enumerated above, will first be discussed. The results of an examination of past records of the disease in South Australia will then be given, and examined in the light of present knowledge.

DISPERSAL OVER NON-INFECTED GROUND.

In spite of the great practical importance of this question there is comparatively little definite information available on it. McAlpine⁽²⁾ considered that dust or wind-blown soil was responsible for much of the distribution of the fungus in parts of Australia. The spores of the take-all fungus are too delicate to withstand blowing about with dust on the hot days of summer and autumn when dust is mainly moving. There remains the possibility that particles of infected plant tissues, such as small pieces of the leaf-sheaths of diseased cereals or grasses, are carried about in the dust and form the main source of infection. This seems the most likely explanation for much of the distribution of take-all in Australia, although it is probable that the larger pieces of infected material, such as the infected barley grass stems figured by Samuel⁽⁵⁾, are chiefly responsible, rather

than minute pieces which would be included in the terms dust or wind-blown soil. (If the smaller pieces were often effective inoculum, take-all would be very much more widely destructive than it is.) Infected grass stems, dislodged by stock in neighboring paddocks during the long, dry summer, often blow over fallows, and provide centres of infection in crops sown after the first autumn rains. Growth of the fungus mycelium through the soil may then give rise to the well-known patch form of take-all.

Such infection of the soil by wind-blown plant material may well explain the appearance of take-all patches in crops sown on clean fallows, but it scarcely seems sufficient to account for the occurrence in similar paddocks of take-all in the whitehead stage as scattered plants, often so thickly interspersed throughout a crop that it becomes worthless to strip it. This form of take-all occurs only in epidemic seasons when the disease is widespread. The discovery of ascospore ejection from perithecia formed on dead plants in "primary patches" of the disease, and their dissemination by wind in rainy weather (⁶), offers a possible explanation for the occurrence of this form of the disease. However, it has not yet been completely proved that take-all can spread in this manner, and the examination of past records of the severity of the disease, together with the spring rainfall, as given below, was undertaken as a necessary step in testing this theory.

The ascospores are exceedingly delicate, and if they were carried down in rain on to a clay-loam soil it is probable that the antagonistic action of soil bacteria would prevent most, if not all of them, from germinating, or, at least, the mycelium from growing far. In agreement with this, the scattered whitehead stage of take-all has not been seen on the heavier soils, although there has only been one season as yet in which particular note could be taken of this. On the other hand, severe losses from this form of the disease are often experienced on sandy soils in seasons when the weather is favorable. On sandy soils the ascospores would more easily be washed down to the roots of plants, and since the bacterial flora of such soils is poor, and the soil temperature at the time of spore discharge is rising, it seems conceivable that ascospore infection might be rapid enough to account for the production of whiteheads in the comparatively short time before harvest. It was hoped to make a practical test of this point during the past season, but unfortunately it was not possible to produce an abundant supply of ascospores for experimental work at the time that they were needed.

This method of distribution of the fungus would be expected to occur only in certain seasons. A coincidence of several favorable conditions would be required, including conditions permitting early maturation of perithecia in the primary patches; wet spring weather suitable for ascospore ejection and infection of roots by spores carried down in the rain; and suitable conditions for rapid growth of the fungus after germination of the spores. The matter is further considered below when past records of the incidence of take-all in South Australia are discussed.

The above remarks on wind dispersal of ascospores and its possible relation to epidemics of take-all have referred to dispersal and infection during the growing period of the crop. Ascospores discharged from perithecia would certainly not last over the summer and cause infections in autumn-sown crops. It has been shown that they lose their power of germination within a few days under dry conditions (⁶). It is possible that they may last over the summer within perithecia on stubble, and be discharged when the autumn rains come. It does not seem likely, however, that they would be responsible for many of the primary infections, for there would be little wheat germinated at this time, and biological antagonism

of the soil bacteria would probably be fairly active owing to the comparatively high soil temperature, but it is certainly a point on which further information is desirable.

For the present, then, it is considered that under Australian conditions the take-all fungus is chiefly dispersed over non-infected ground in two ways—(1) by the blowing about of infected pieces¹ of stubble or grass stems during the dry summer, these pieces providing inoculum for the patch form of take-all which develops gradually in the crop, owing to the slow² growth of the fungus through the soil during the winter; (2) (in certain seasons only) by dispersal of ascospores over the growing crop when conditions have favored early maturation of perithecia, and wet spring weather has permitted wind-dissemination of ascospores and subsequent infection. In the latter case, whitehead plants appear scattered almost at random, and this form of the disease is limited to the lighter soils.

SURVIVAL OF MYCELIUM IN THE SOIL.

In Australia the period which the take-all fungus must tide over without any host to grow upon is the hot dry summer—extending usually from December to April. It has already been stated that free ascospores cannot last over this period, although they may do so within perithecia. Perithecia are often not formed at all under Australian conditions, so it is likely that most of the over-summering material consists of infected roots and stem-bases in the soil, or broken off stem bases blown about in the wind.

The amount of take-all occurring in the patch form, which is probably a measure of the amount of infective material which over-summered, varies from year to year. It would of course depend to some extent upon the amount of disease occurring in previous seasons. Nothing is known yet as to how far the heat of summer may destroy the viability of the fungus in pieces of infected stubble. But from the experimental work in the first two parts of this paper it seems likely that when rain falls during the summer there might be a considerable destruction of inoculum owing to the antagonistic effect of other soil micro-organisms towards the take-all fungus under the combination of high soil temperature and moisture. This is the explanation suggested below for the non-occurrence of a take-all epidemic in South Australia in 1917, a year in which spring rainfall appeared to be eminently suitable for the disease, but one in which there had been exceptional rains in the preceding summer. Conversely, a dry summer should permit the over-summering of more inoculum than usual, and this is in agreement with the farmer's idea of a dry summer, followed by a wet winter, being worst for the disease.

RATE OF SPREAD THROUGH THE SOIL.

Very little is known about conditions governing the rate of spread of the fungus through the soil. It is evident from the experiments described in Part I of this paper that the type of soil is of great importance; growth of the fungus must be most rapid in the light sandy soils where only a slight retarding effect is exercised by the other soil micro-organisms. In such soils, too, growth of the take-all fungus is probably accelerated by rise of temperature, whereas in the heavier soils growth may actually be checked by higher temperatures, owing to the impetus given to biological antagonism.

GROWTH OF THE FUNGUS ON INFECTED PLANTS.

So far efforts to determine whether the internal condition of the plant may influence the rate of progress of the disease have given almost negative results. The fungus was found to attack well-nourished vigorous plants at approximately the same rate as poor plants, other conditions being equal.

From the mode of growth of the take-all fungus along the outside of wheat roots, with penetration following closely behind, it would appear likely that the rate of progress of the disease on wheat plants would depend considerably on soil factors. This has, in fact, been proved experimentally. Thus the external factors, soil temperature, soil moisture, and particularly the soil microflora, acting directly on the fungus, are apparently of primary importance. It is no doubt mainly through its influence on these factors that weather is responsible for variations in time of appearance and severity of disease, rather than through any influence on the resistance of the host plant itself.

Thus the patch form of take-all, attributed to inoculum present in the soil when the crop was sown, may sometimes show up comparatively early (July-August) as a yellowing off of seedlings less than six inches high, or it may not appear until almost harvest time (October). In the latter case it appears as whiteheads, but on account of their being in definite patches there is no possibility of confusing them with the scattered whiteheads apparently due to ascospore infection in seasons favorable to aerial dissemination of the take-all fungus.

But although unfavorable weather conditions do not seem to render the wheat plant necessarily more susceptible to actual infection, they may cause the plant to succumb to the effects of infection much more rapidly. The effect of hot winds in causing the rapid bleaching off to whiteheads is a case in point. Whiteheads certainly appear in great numbers after hot north winds. Very often the take-all fungus may be established on only a few of the roots, and no sign of blackening be present on the stem. It seems likely that some toxic substance, formed as a result of the growth of the fungus on the roots, must be concerned in the rapid bleaching off, for plants in dry soils burnt off by hot winds do not bleach in the same manner. It is not yet known whether take-all infected plants protected from hot winds would bleach as suddenly as do whitehead plants in the field.

PAST RECORDS OF THE PREVALENCE OF TAKE-ALL.

From the above account of the numerous factors influencing the development of take-all it is evident that studies on the effect of weather from past records of the disease, which are usually scanty, could be expected to give only a very general picture of weather influences. Nevertheless it was desired to make an examination of past records in South Australia in order to determine whether there might be anything conflicting with the theory of epidemics being due to ascospore dispersal in seasons with wet springs.

A search was made into all available crop records from the year 1900 onwards. Three main sources of information were employed:—(1) The files of the *Advertiser*, the Adelaide daily newspaper. The entire paper was scanned for every day of the two months October and November (and in some years December was included as well) for any reference to the state of the crops. Except for the period 1918 to 1924, crop reports were sent in with regularity from all the chief country centres, and it was possible to say quite definitely whether take-all was general throughout the State in any particular year or not. (2) The *Journal of Agriculture* of South Australia. A search was made through this journal from 1900 onwards, including the reports from country Agricultural Bureaux, and any references to take-all noted. (3) Records of the Plant Pathology Laboratory, Adelaide University, available only from the year 1921 onwards.

The rainfall at Adelaide Observatory for the three spring months August, September, and October, of the years 1900 to 1933 is set out in Table IV. Years characterised by extensive occurrence of take-all are marked with an asterisk. The relation between total spring rainfall and the occurrence of take-all is also shown graphically in Figure 6.

TABLE IV.—*Rainfall at Adelaide Observatory, for the Three Spring Months of August, September, and October for the period 1900-1933.*

Years.	August.	September.	October.	Total.
1900	4.14	1.18	0.65	5.97
1901	1.12	1.48	1.59	4.19
1902	1.13	1.64	1.77	4.54
1903	2.34	2.85	0.66	5.85
1904	1.98	0.69	2.11	4.78
1905	1.48	1.51	2.90	5.89
1906*	3.97	3.37	1.66	8.93
1907	1.81	1.08	1.70	4.59
1908*	2.35	2.90	3.59	8.84
1909*	5.59	2.19	2.17	9.95
1910*	1.71	2.81	1.80	6.32
1911	0.76	3.80	0.55	5.11
1912	2.12	2.64	0.96	5.72
1913*	2.11	2.67	2.45	7.23
1914	0.35	0.60	0.17	1.12
1915*	2.53	3.57	0.67	6.77
1916	3.99	1.68	1.93	7.60
1917	3.04	3.68	2.09	8.81
1918	2.63	0.66	2.59	5.88
1919	3.07	3.05	0.77	6.89
1920	3.38	1.51	2.91	7.80
1921*	2.20	3.07	1.81	7.08
1922	2.55	1.61	1.70	5.86
1923*	2.26	5.83	2.22	10.31
1924*	2.13	3.48	2.00	7.61
1925	1.66	3.20	0.06	4.92
1926*	4.19	2.42	2.32	8.93
1927	3.79	0.91	0.48	5.18
1928	0.77	1.81	2.43	5.01
1929	1.51	2.13	1.03	4.67
1930*	3.52	2.56	2.80	8.88
1931	2.55	2.79	0.49	5.83
1932*	2.89	2.01	2.32	7.22
1933	3.36	2.89	0.64	6.89

* Years characterised by extensive occurrence of takeall.

It will be seen from Table IV and Figure 6 that there is good general correspondence between high spring rainfall and epidemics of take-all. Whereas the mean spring rainfall for the "take-all years" during the period 1900 to 1933 was 8.17in., that for the remaining years of the same period was only 5.53in., the difference being 2.64 ± 0.49 in.

Taking a rainfall of 6in. as being the approximate dividing line between "take-all years" and "non-take-all years," it is seen that there were no "take-all years" when the rainfall was below this amount, but that there were five years in which the rainfall was above this amount, but in which take-all was apparently not severe, as judged from the absence of records.

In the case of the four years 1916, 1919, 1920, and 1933, it appears as if the explanation may lie in the distribution of the rainfall. In each of these years one of the spring months was particularly dry. The years 1916 and 1920 suffered from dry Septembers, there being only 1.68 and 1.51in. of rain respectively, as against an average of 2.34in. for this month over the period 1900 to 1933. And in the years 1919 and 1933 the month of October was dry; only 0.77 and 0.64in., respectively, were recorded, as against a mean of 1.6in. for the 34-year period. Only in one of the "take-all years" did a similar dry month occur, and that was in 1915, when the October rainfall was only 0.67in., but in this case the September rain had been much above the average.

The other exceptional year was 1917, in which spring rainfall conditions were apparently suitable for the development of severe take-all, but in which no epidemic appears to have occurred. In this case the preceding summer months—January, February, and March—were remarkable for an exceptionally high rainfall of 5.34in., as against a mean of 2.58in. for the years 1900-1933. It seems possible that the combination of high soil moisture with high temperatures may have been responsible for the disappearance of most of the take-all inoculum from the soil, as a result of the antagonistic effect of soil bacteria coming strongly into play. None of the years considered as "take-all years" were preceded by such heavy summer rain as in 1917.

RELATION BETWEEN SPRING RAINFALL
AND PREVALENCE OF TAKE-ALL

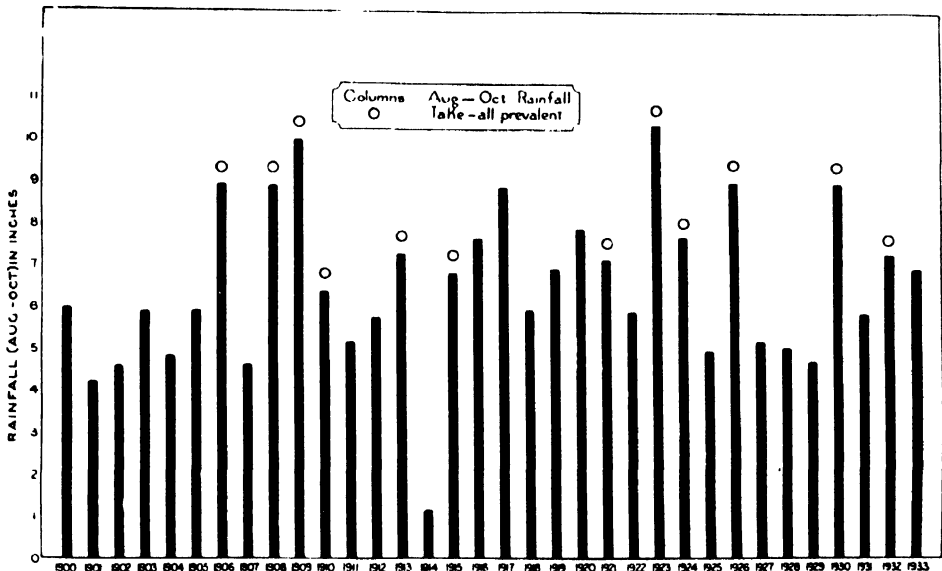


Fig. 6.

Of all the "take-all" years, the year 1910 had the lowest spring rainfall, though still above 6in. This year, however, was immediately preceded by two consecutive epidemic years, 1908 and 1909, and the amount of take-all inoculum present at the beginning of the season must have been greater than usual.

Russell (⁴) reports a similar correlation between the severity of take-all under Canadian conditions and rainfall during the months of June, July, and August (which, with respect to the growing period of the crop, correspond approximately to the months of August, September, and October in South Australia). His observations are of such interest that they are quoted in full, together with his diagram (Fig. 7).

"Take-all has varied considerably in severity during the period of our investigations. This appears to be a common characteristic of the malady the world over, judging by the literature on the subject. There appears to be a marked positive correlation between the amount of rainfall occurring between the first of June and the middle of August and the severity of the disease during the same season. This fact has become apparent to us during our annual field surveys of North-eastern Saskatchewan. Figure 6 shows in the form of a chart the average of the monthly rainfall recorded at four places in North-eastern Saskatchewan during the months of June, July, and August for the years 1923 to 1929. It

can be seen that the rainfall during these months in 1924 and 1926 was very low. In 1923, 1925, and 1927 the reverse was true. In 1923 take-all was first reported in this district, and was probably fairly plentiful. Since then our annual field surveys have shown that take-all was relatively scarce in 1924 and 1926, whereas in 1925 and 1927 it was quite prevalent (see remarks concerning the prevalence of take-all in Saskatchewan in the annual reports of the Dominion Botanist for those years). During the summer of 1928, the North-eastern district of Saskatchewan was drier on the average than many other sections of the province but the precipitation varied considerably in this one district. Around Muenster, where the total rainfall for June and July was 6.22in., conditions were fairly moist and take-all was quite prevalent, whilst around Melfort, where the total precipitation was only 2.72in., the disease was much less prevalent. In 1929 the North-eastern district enjoyed relatively favorable moisture conditions as compared

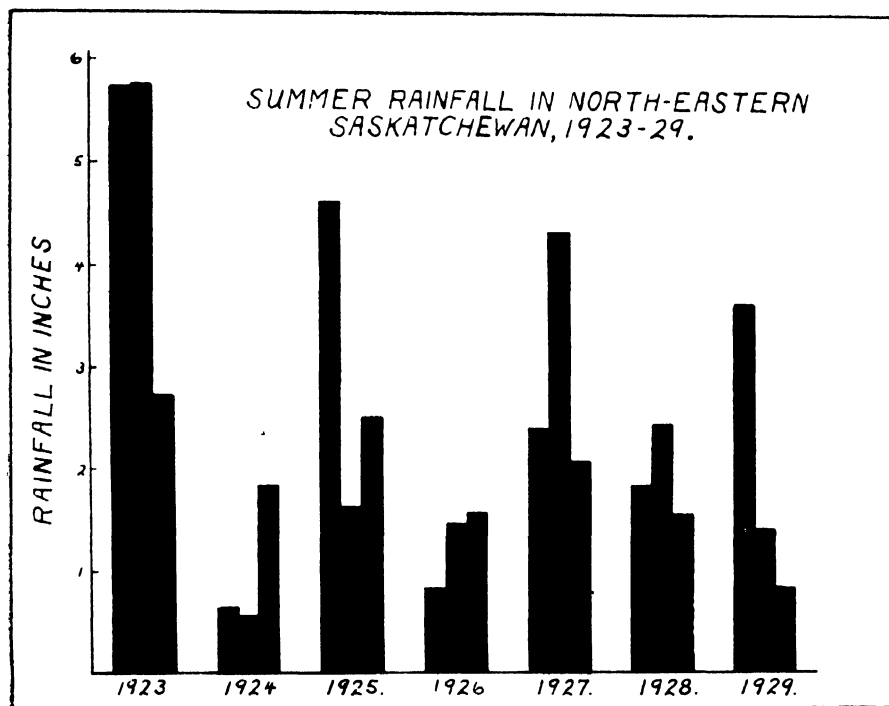


Fig. 7.—Reproduced from R. C. Russell's paper, "Field Studies of Take-all in Saskatchewan."

with many other districts in Saskatchewan. The rainfall for June at all four points where records were taken was over 3in. However, there was a decided falling off in precipitation as the summer advanced, the average for July being 1.42in. and that for August being only 0.84in. Therefore, whilst the conditions were more favorable for the development of the disease than they were in many other parts of the province, yet it was so dry throughout July and the first part of August that comparatively few fields were badly affected, and the signs of the disease were not pronounced on plants which were infected."

Of particular interest is the year 1929 in Canada, which is analagous to the years 1916, 1919, 1920, and 1933 in South Australia, in showing that a well-distributed rainfall appears to be necessary for the general occurrence of the disease.

Although it is clear that there is a marked correlation between high spring rainfall and the occurrence of take-all in epidemic form, this gives only contributory evidence in support of the theory of ascospore dispersal. It is possible that the effect might be due to increased activity of take-all mycelium already present in the soil. But if this were the case it would mean that take-all could be fairly widely distributed and not reveal its presence at all in many crops unless the spring were exceptionally wet. This seems somewhat unlikely. It may be taken, therefore, that this examination of weather factors gives general support to the idea of wind dissemination of take-all in wet springs, but final proof of the theory must still be obtained by field observations on the time of ripening of perithecia, together with tests of the possibility of infecting well grown plants with ascospores under the soil-temperature and moisture conditions obtaining in susceptible localities.

SUMMARY FOR PART III.

The various ways in which weather may affect the prevalence of take-all are discussed under the headings "Dispersal of the fungus over non-infected ground," "Survival of mycelium in the soil," "Growth of mycelium through the soil," and "Infection of the plant."

The results of an investigation into the occurrence of take-all in South Australia during the years 1900 to 1933 show that epidemics occurred only in years characterised by a comparatively high spring rainfall. The possible relation of this to the occurrence of wind-borne ascospore infection on the lighter soils is discussed.

ACKNOWLEDGMENT.

This work was done under the direction of Mr. G. Samuel, to whose experience of the take-all disease this paper owes much, and to whom the writer is indebted not only for frequent suggestions and criticism during the course of the work, but also for much help in the preparation of the manuscript. In particular, he wishes to express his thanks to Mr. Samuel for making the drawings of root infection shown in Figures 1 and 5, and for permission to publish the results of the soil temperature experiment described in Part II. of this paper.

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THE EFFECT OF CROP ROTATION ON THE EELWORM (*HETERODERA SCHACHTII*) DISEASE OF CEREALS.

[By S. D. GARRETT, B.A., Assistant Plant Pathologist, Waite Agricultural Research Institute, University of Adelaide.]

The eelworm disease of cereals in South Australia, caused by the nematode *Heterodera schachtii*, has already been described by Dr. James Davidson ⁽¹⁾.

The disease affects wheat, oats, and barley, and may cause a severe set-back to crops in the early stages of growth. Although in the mallee areas it usually appears in rather small and definite patches, in the better rainfall areas whole crops may be more or less uniformly affected. Usually at the time tillering should be commencing the seedlings begin to appear somewhat weak, spindly and yellowish, and if the roots are examined the presence of the eelworms is immediately evident. The most striking change is produced in wheat (Fig. 1), in which each point of entry of the nematodes eventually becomes a gall or swelling covered with a tuft of freshly formed lateral rootlets. The number of these galls upon the root system of an affected wheat plant thus gives some measure of the severity of attack. Usually as the warmer weather of spring comes on affected crops grow away from the disease and make a moderately good recovery, but instances have been known of almost complete crop failures from this cause.

During September, 1933, it was found that a combined Manurial Treatment and Crop Rotation experiment in progress at the Waite Institute (the results of which will be published elsewhere) was suffering rather severely from eelworm attack. It was therefore decided to conduct a systematic survey of the whole area for eelworm, in the hope that useful information might be obtained on the effect of crop rotation and manurial treatment upon the occurrence of the disease.

METHOD.

The experiment had been laid out in two parallel blocks of 60 plots, making 120 plots in all. Five different rotations had been employed in conjunction with four manurial treatments. Wheat was grown after wheat, barley, oats, peas, and bare fallow, respectively, and the manurial treatments were (1) no manure, (2) superphosphate, 2cwts. to the acre, (3) superphosphate, 2cwts. + ammonium sulphate, 1cwt. to the acre, (4) ammonium sulphate, 1cwt. to the acre.

The history of the experimental area from the year 1928 was as follows:—

1928	Pasture (not cropped for 10 years)
1929	Oats (whole area)
1930	Wheat, barley, oats, peas, fallow.
1931	Wheat (whole area)
1932	Wheat, barley, oats, peas, fallow
1933	Wheat (whole area)

The distribution of the different rotation crops in 1932 was exactly the same as that in 1930, i.e., a plot under wheat in 1930 was sown with wheat again in 1932. So that whilst the wheat, barley, or oat plots were carrying a susceptible crop for the fifth successive year in 1933, in the pea and bare fallow plots a susceptible crop had always been followed by a non-susceptible one (peas) or by a bare fallow.

(1) Davidson, J.: "Eelworms (*Heterodera schachtii* Schm.) Affecting Cereals in South Australia." *Jour. Agric. Sci. Aus.* 34: 378-385. (1931.)

The plots were 80yds. long by 11 drill-rows wide. They were sampled by taking 10 single plants, at intervals of approximately nine paces, from each plot. When sampling had been completed, the plants were taken to the laboratory and the roots washed free from soil. An estimation of the amount of eelworm present in each plot was then made by inspection of the root systems of the 10 sample plants. A rating, varying from 0 to 3, was allotted to each plant according to the degree of eelworm infestation of the root system:—

Very severe infestation	3 units
Severe infestation	2 units
Moderate infestation	1 unit
No infestation	0 units



Fig. 1.—Roots of wheat seedlings severely affected by the nematode (eelworm) *Heterodera schachtii*. Note the numerous small galls with tufts of lateral roots arising from them.

From the sum of the individual ratings for the 10 plants from each plot, a figure expressing percentage eelworm infestation for the whole plot was then obtained as follows:—

$$\frac{\text{Sum of individual ratings}}{10 \times 3} \times 100$$

since the maximum possible infestation would be represented by a rating of three for each of the 10 individual plants, making a total of 30. The percentage figures were only approximate, both because of the method of rating adopted and because it was not possible to take more than 10 samples per plot. In spite of this, however, the results were found to be quite clear cut.

DISCUSSION OF RESULTS

(1) *The effect of rotation.*

The data from 120 plots are summarised in Table I.

TABLE I.

Rotation.	Percentage Eelworm Infestation.						Mean.
	Block A.	Block B.	Block C.	Block D.	Block E.	Block F.	
Wheat after wheat ..	51	50	25	81	52	42	50
Wheat after barley ..	59	58	18	53	50	50	49
Wheat after oats	45	32	30	43	41	36	38
Wheat after peas	9	2	0	16	3	0	5
Wheat after fallow ..	14	13	4	0	3	3	6

In the plots following wheat, oats, and barley, which were carrying a susceptible crop for the fifth successive year, mean infestation ranged from 38 to 50 per cent. In the plots following peas and bare fallow, mean infestations of only 5 and 6 per cent. respectively were recorded. In the latter case a susceptible crop (oats in 1929, wheat in 1931) had been followed in both years by a non-susceptible crop (peas) or by bare fallow.

Since the three cereals are known to be hosts of the nematode these results are in accordance with expectation. Mr. Worsley C. Johnston, Agricultural Instructor, has also found the nematode cysts on the roots of certain grasses in the Lower Northern districts (²), so that leaving land out to pasture is not likely to be of value in ridding it of eelworm. Peas, on the other hand, are not susceptible to *Heterodera schachtii*, and so are as efficient as bare fallow in reducing the pest.

(2) *Effect of Manurial Treatment.*

The data from 120 plots are summarised in Table II. It will be seen that manurial treatment seems to have had no significant effect upon the amount of disease.

TABLE II.

Manurial Treatment.	Percentage Eelworm Infestation.					Mean.
	After Wheat.	After Barley.	After Oats.	After Peas.	After Fallow.	
O = No manure	45	41	28	6	7	25
P = Super 2 cwt.....	62	37	47	3	3	30
P.N. = Super 2 cwt. + Sulph. of						
Amm. 1 cwt.	41	45	44	3	0	27
N = Sulph. of Amm. 1 cwt. ...	40	36	32	8	14	26

CONTROL OF THE DISEASE.

The beneficial effects of bare fallow, and of the non-susceptible crop peas, are undoubtedly due to the "starving-out" effect of a year with no susceptible cereal or grass present. The great majority of the eelworm eggs hatch when the winter brings suitable moisture conditions in the soil, but the young eelworms find no host plant on which they can multiply in bare fallow or peas, and so die of starvation. It is the same principle which is at the basis of rotation of crops for the control of nearly all soil-borne diseases. The pest should never be allowed

(2) Johnston, Worsley C.: "The Occurrence of Eelworms on the Roots of Certain Grasses." *Jour. Agric. Sth. Aus.* 37: 705. (1934.)

to multiply up to large numbers in the soil as a result of growing several susceptible crops in succession; but if it has been allowed to do so, the only practicable treatment is to bare fallow, or to grow a non-susceptible crop such as peas. It is fortunate that in the case of the nematode *Heterodera schachtii* a single year's fallow or peas seems to be sufficient to reduce the disease to such a small amount that it has comparatively little effect on a following cereal crop.

SUMMARY.

In a combined manurial-rotation experiment at the Waite Institute it was found that eelworms (*Heterodera schachtii*) caused considerable injury in plots which had been under cereals for five consecutive years, whereas in plots where peas or bare fallow alternated with cereals the damage was of very small proportions. Manurial treatments of superphosphate or sulphate of ammonia had no appreciable effect on the amount of disease.

SCABBY MOUTH IN LAMBS.

Relying to a question from the Secretary of the Black Springs Branch of the Agricultural Bureau as to the cause and cure for scabby mouth in lambs, Mr. R. H. F. Macindoe, B.V.Sc., M.R.C.V.S., Deputy Chief Inspector of Stock, says this is an infectious disease and is brought about by infection of the skin with a very small organism (ultra-visible group) especially if the skin has been injured. It occurs only in sheep and goats and may occur at any age, but one attack confers an immunity.

It may be seen in the skin around nostrils and eyes, skin of cornet, skin of udder, and the lining membranes of the lips, gums, palate, and tongue. The affection runs a course of from 15 to 23 days from the time the animal becomes infected until recovery takes place. The death rate is small, but animals lose condition owing to



“Scabby Mouth”—Sheep and lambs affected on the muzzles.

interference with their feeding. *Treatment*—Affected animals should be removed from rest of the flock, but this is often impracticable owing to the fact that by the time the disease has been noticed it may have got too great a hold, and the majority of the flock either show the lesions of the disease or will do so a few days later. The local treatment is to apply an oily dressing to affected parts and the earlier it is applied the better. A good dressing to apply is a carbolic ointment, 2 per cent. strength. This is applied and rubbed in after removing any loose scabs with a piece of smooth, flat stick. One dressing is often sufficient, but in severe cases it may be necessary to redress the sheep in a few days' time. The application of Stockholm tar instead of an ointment is also useful.

WHEAT VARIETIES RECOMMENDED FOR VARIOUS DISTRICTS.

[By R. C. SCOTT, Supervisor of Experimental Work.]

The Government Statist records that 244 varieties of wheat were planted in South Australia during the season 1932-1933. This is a large number, and it is certain that many of those listed could with advantage have been replaced by more suitable types.

At the same time, if improved varieties are to be developed, new crossbred or selected wheats recently liberated from plant breeding stations must always be tested under average field conditions before their value can be ascertained. Consequently, such a list must always include those planted for experimental purposes.

However, examination of the return referred to clearly indicates that many wheats whose limitations so far as yield, disease-resistance, &c., are well known are still being fairly extensively planted, and should be discarded with advantage to both the farmer concerned and the State as a whole. It costs no more to plant a suitable than an unsuitable variety, and information regarding the most valuable wheats for the different districts in South Australia is of special interest.

Following upon a resolution passed at the Conference of Upper South-Eastern Branches of the Agricultural Bureau held at Bordertown last year the agricultural instructors were asked to report upon the varieties that had proved the most suitable and highest yielders under the varying soil and climatic conditions obtaining in their respective districts. An outline of these reports is submitted below:—

CENTRAL DISTRICT.

Including Counties Adelaide, Sturt, Hindmarsh, Fergusson, and Carnarvon. (Instructor, Mr. R. Hill.)

Yorke Peninsula.—Ford, Sword, Nabawa, Raneë.

Salisbury to Gawler.—Sultan, Nabawa, Ford.

Palmer to Monarto, Brinkley.—Nabawa, Ford, Raneë.

Strathalbyn and Hartley.—Nugget, Nabawa, Ford, Sultan.

Remarks.—"It was during the dry seasons that Nabawa came into prominence, and this variety is very popular in practically all districts. However, the most consistent yielder has been Ford, whilst at the present time Sword promises to become the outstanding variety both for yield and disease resistance. Raneë has yielded well throughout the district, and will become more popular as the improved selection, Raneë 4H, becomes distributed. On account of its susceptibility to rust, Sultan is losing popularity."

LOWER NORTH.

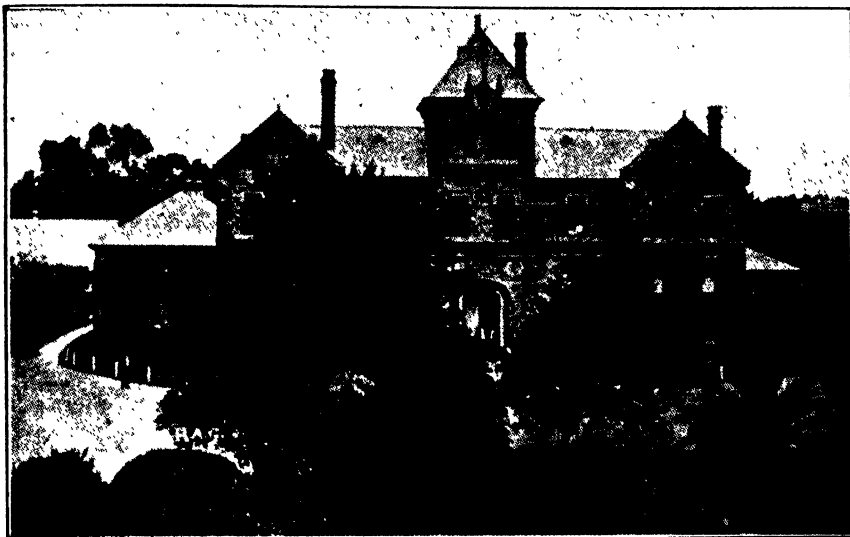
Including Counties Daly, Stanley, Burra, Gawler, Light, Eyre. (Instructor, Mr. W. C. Johnston.)

Low Rainfall Districts (12in. to 14in.).—Gluyas, Waratah, Nabawa, Sword, Ford.

Intermediate Rainfall Districts (14in. to 16in.).—Waratah, Sword, Ford, Nabawa, Raneë.

High Rainfall Districts (over 16in.).—Gallipoli, Raneë, Ghurka.

Remarks.—"Very wide variations of soil and rainfall occur in this district. For the areas of low rainfall Gluyas must be retained, because of its drought-resisting powers, whilst Waratah is also highly suited to such conditions. For the limestone types of soil there does not appear to be any variety better than Ford, whilst this wheat is also recommended for those districts in which there is



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danger of rust. On the best wheatgrowing land and in the districts of regular rainfall Federation was originally the most popular variety, but to-day this wheat has been largely replaced by Gallipoli. Ranee has also gained favor for these conditions, and appears to be very well suited to the red type of soil."

UPPER NORTH.

Including Counties Kimberley, Victoria, Dalhousie, Frome, Granville, Newcastle, Hanson, Blachford, Taunton. (Instructor, Mr. E. L. Orchard.).

Far Northern Districts.—Hawker, Willochra, Quorn, Willowie:—Ranee, Nabawa, Federation, Waratah, Ghurka.

Western Districts.—Baroota, Telowie, Nelshaby, Warnertown, Wandearah, Crystal Brook:—Nabawa, Ford, Quality, Currawa, Gluyas, Sultan.

Eastern foothill country from Melrose through to Laura:—Ford, Sword, Nabawa, Ranee, Caliph, Sultan, Gallipoli.

Centre Northern Districts.—Beetaloo, Gladstone, Jamestown, Belalie:—Gallipoli, Sword, Ford, Nabawa, Ranee, Ghurka, Waratah, Dan.

Mid-Northern.—Bundaleer, Georgetown, Gulnare, Narridy:—Ford, Sword, Nabawa, Ranee, Aussie, Sultan, Gallipoli.

SOUTH-EASTERN.

Including Counties Grey, Robe, McDonnell, Buckingham, Cardwell. (Instructor, Mr. E. S. Alcock.)

Tatiara and Naracoorte District.—Gallipoli, Ranee, Ghurka.

Drained Area.—Gallipoli, Major, Huff's Imperial, Bunyip.

Volcanic Area.—Zealand Blue, Major.

Remarks.—"Very little wheat is grown on the volcanic land. On the wet, black lands in the drainage area the early-maturing wheat, Bunyip, is utilised for late seeding."

MURRAY MALLEE.

Including Counties Chandos, Buccleuch, Russell, Alfred, Albert, Hamley, Young, (Instructor, Mr. R. L. Griffiths.)

The wheat varieties which have proved most suitable and productive in the Murray Mallee Districts are:—

Gallipoli: At present appears to be the most popular variety throughout the better rainfall parts of the district. Has proved very successful when sown sufficiently early.

Ranee: Very popular in Chandos District, now increasing in popularity throughout the whole of the Murray Mallee. New selection Ranee 4H superior to earlier selections, very suitable for mid-season seedings.

Nabawa: Popular throughout the whole district. More suitable for the low rainfall parts than elsewhere. Finished badly this season, and many crops lodged rather badly last season (1932-33).

Sword: Not largely grown yet, but increasing in popularity each season. Appears very suitable throughout whole district.

Waratah: Increasing in popularity throughout whole district. Appears very suitable for late seedings.

Gluyas and Late Gluyas: Replaced during late years largely by other varieties, but still good wheats, especially on new or poorly-prepared land.

Currawa and Joffre: Have been very popular for early and mid-season seedings; more suitable for better rainfall parts than in north of district. Have done very well on sandy soils. Now largely replaced by Gallipoli.

Caliph: Never very popular, but where grown has been quite successful. Discarded by many farmers on account of rust susceptibility.

Sultan: Was for a time the most popular wheat. Proved suitable throughout the district; chief fault, susceptibility to rust. Now replaced largely by Nabawa.

Ford: Became very popular for a time, but was discarded by most farmers although a few appear to grow it successfully. Probably needs more steady ripening conditions than are usual in the Mallee.

LOWER EYRE'S PENINSULA.

Including Counties Flinders, Jervois, Musgrave, York, Buxton. (Instructor, Mr. H. D. M. Adams.)

Higher Rainfall Areas of County Flinders.—Major, Currawa, Gallipoli, Ford, Rancee.

Medium Rainfall Areas.—Nabawa, Waratah, Rancee, Felix.

Light Rainfall Areas.—Gluyas, Waratah, Aussie, Canberra.

Remarks.—"Felix was grown extensively until 1932 when rust played havoc with it, and a much-reduced area was planted last year. During the season just past Waratah was the outstanding wheat in County Jervois, whilst it has also done exceptionally well in County Buxton, where it has displaced Gluyas as the most popular variety. Gallipoli and Ford have recently lost favor as they appear to suffer considerably if unfavorable weather is experienced in October.

"Nabawa is a fairly popular wheat, but is not favored to the same extent as previously, because of the general opinion that it is more susceptible to take-all than other varieties.

"Of the new varieties Sword is most promising, and the small acreage planted last season yielded particularly well."

UPPER EYRE'S PENINSULA.

Including Counties Bosanquet, Le Hunte, Robinson, Dufferin, Way, Kintore, Hopetoun. (Instructor, Mr. W. H. Brownrigg.)

Remarks.—"As the climatic conditions in this district are very similar throughout, and the wheats appear able to adapt themselves to the various soil classes, I find it hard to divide the district, and in general would place the wheat varieties for Upper Eyre's Peninsula in the following order:—Nabawa, Gluyas, Ford, Waratah, Sword, Sultan, Gallipoli, Merriden, Canberra. The outstanding wheat for both yield and weight is Nabawa. During the past four years this wheat has come right to the fore, and appears to yield well under the most adverse conditions. During the rusty year it showed a decided resistance to the disease, and even when apparently badly affected set grain, which although smaller in size, was nevertheless plump.

"Gluyas is still extensively sown in all districts, and under good farming conditions has yielded up to 36bush. per acre this year. Ford, although requiring a little longer to develop, is giving good results, and apparently has the ability to adapt itself to a variety of soils. Sword has only recently been introduced, but is showing great promise, and will be extensively sown from now on."

From the foregoing it is evident that the number of wheat varieties which can be confidently recommended for general planting under the varying agricultural conditions in South Australia is relatively limited.

As an experiment new wheats may be included in the cropping programme, but when this is done the area so planted should be small until such time as their value for that particular locality is clearly demonstrated.

In the same way those men who are still regularly planting wheats which are not included in the above lists should endeavor to test the varieties recommended, since the experience of practical farmers has indicated that they are more suitable and productive than the types previously seeded.

FERTILISERS ACT, 1918—ANALYSES OF FERTILISERS.

Following are results of analyses obtained by the Government Agricultural Analyst from samples procured by Inspectors of Fertilisers during the year ended December 31st, 1933.

NOTE.—Deficiencies greater than permitted under Section 12 of the Act are shown in *bold type*.

Sample No.	Name of Firm and Fertilizer.	Phosphate.										Nitrogen.		Nitrogen as Nitrates.	
		Water Soluble.		Oxalate Soluble.		Acid Soluble.		Total.							
		Vendor's	Result of	Vendor's	Result of	Vendor's	Result of	Vendor's	Result of						
		Guarantee.	Analysis.	Guarantee.	Analysis.	Guarantee.	Analysis.	Guarantee.	Analysis.						
2420	Adelaide Chemical and Fertilizer Co., Ltd.—	%	%	%	%	%	%	%	%	%	%	%	%		
2419	R. H. P. Sulphate of Ammonia	—	—	—	—	—	—	—	—	—	—	20.0	20.85		
1895	Blood Manure	—	—	—	—	—	—	—	—	—	—	13.0	13.4		
2418	Bone and Super.	21.0	25.7	10.0	11.0	12.0	13.9	43.0	50.6	43.0	43.0	1.6	1.8		
1757	Bone and Super.	21.0	23.6	10.0	11.2	12.0	12.5	43.0	47.3	43.0	43.0	1.6	2.09		
2261	Bone and Super.	—	—	—	—	40.0	47.7	40.0	47.7	40.0	40.0	3.25	3.3		
2404	Bone and Super.	—	—	—	—	40.0	42.5	40.0	42.5	40.0	40.0	3.25	3.3		
2408	Bone and Super.	—	—	—	—	40.0	45.1	40.0	45.1	40.0	40.0	3.25	3.4		
2407	Bone and Super.	—	—	—	—	50.0	59.8	50.0	59.8	50.0	4.0	4.0	4.3		
1894	Guano Super.	97.0	30.7	3.0	2.3	3.0	5.4	33.0	38.4	33.0	33.0	2.95	3.4		
1897	Super. and Ammonia, No. 1	38.0	40.2	1.0	2.4	2.0	1.6	41.0	44.2	36.0	39.5	5.15	4.71		
1760	Super. and Ammonia, No. 2	34.0	36.5	1.0	2.0	1.0	1.0	36.0	39.5	36.0	36.0	5.15	4.71		
1898	Top Special Super.	45.0	46.9	—	—	—	—	45.0	46.9	45.0	45.0	—	—		
1893	Top Special Super.	45.0	47.3	—	—	—	—	45.0	47.3	45.0	45.0	—	—		
2414	Top Special Super.	45.0	47.7	—	—	—	—	45.0	47.7	45.0	45.0	—	—		
2415	Top Special Super.	45.0	48.6	—	—	—	—	45.0	48.6	45.0	45.0	—	—		
2417	Top Special Super.	45.0	45.1	—	—	—	—	45.0	45.1	45.0	45.0	—	—		
Cresco Fertilizers, Ltd.—															
1717	45 Super.	45.0	45.6	—	—	—	—	45.0	45.6	45.0	45.0	—	—		
1758	45 Super.	45.0	49.9	—	—	—	—	45.0	49.9	45.0	45.0	—	—		
1896	45 Super.	45.0	46.4	1.0	2.3	3.0	2.8	49.0	51.5	45.0	45.0	—	—		
2272	45 Super.	45.0	45.1	—	—	—	—	45.0	45.1	45.0	45.0	—	—		
2405	45 Super.	45.0	47.9	—	—	—	—	45.0	47.9	45.0	45.0	—	—		
1759	48 Super.	48.0	50.6	—	—	—	—	48.0	50.6	48.0	48.0	—	—		
2278	48 Super.	48.0	48.4	—	—	—	—	48.0	48.4	48.0	48.0	—	—		
2406	48 Super.	48.0	47.2	—	—	—	—	48.0	47.2	48.0	48.0	—	—		
2271	50/50 Phosphate	20.0	20.2	4.0	4.7	38.0	38.6	62.0	63.5	62.0	62.0	5.15	5.5		
2409	Super. and Ammonia, 3 and 1	34.0	36.4	1.0	1.0	1.0	0.8	36.0	38.2	36.0	36.0	—	—		
2410	*Super. and Manganese	45.0	37.5	—	—	—	—	45.0	37.5	45.0	45.0	—	—		

ANALYSIS OF FERTILIZERS—continued.

Sample No.	Name of Firm and Fertilizer.	Potash in Water Soluble Form.		Calcium Oxide, CaO.		Calcium Oxide Expressed as Calcium Sulphate, CaSO ₄ .		Bone Manure, Fine Material.		Agricultural Lime, Fine Material.		Gypsum, Fine Material.		Phosphate Fertiliser, Fine Material.		Moisture.
		Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	
2420	Adelaide Chemical and Fertiliser Co., Ltd.—															0.14
2419	R.H.P. Sulphate of Ammonia															9.06
1895	Blood Manure															1.5
2418	Bone and Super.							60.0	63.0							5.73
1757	Bone and Super.							60.0	63.0							6.9
2261	Bonedust							50.0	52.0							4.4
2261	Bonedust							50.0	51.0							3.8
2404	Bonedust							50.0	64.0					90.0	92.5	6.7
2408	Carb. Bonedust															5.3
2407	Guano Super.															6.9
1894	Super. and Ammonia, No. 1															9.3
1897	Super. and Ammonia, No. 2															5.0
1760	Top Special Super.															0.8
1893	Top Special Super.															7.4
2414	Top Special Super.															7.8
2415	Top Special Super.															5.6
2417	Top Special Super.															3.6
	Cresco Fertilizers, Ltd.—															5.4
1717	45 Super.															7.2
1758	45 Super.															3.1
1896	45 Super.															3.2
2272	45 Super.															8.6
2405	45 Super.															5.4
1759	48 Super.															4.2
2273	48 Super.															
2406	48 Super.															
2271	50/50 Phosphate															
2409	Super. and Ammonia, 3 and 1															
2410	Super. and Manganese													75.0	98.0	

ANALYSES OF FERTILIZERS—continued.

Sample No.	Name of Firm and Fertiliser.	Phosphate.						Nitrogen.		Nitrogen as Nitrates.	
		Water Soluble.		Citrate Soluble.		Acid Soluble.		Total.		Vendor's Guarantee.	Result of Analysis.
		Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.		
2403	Hoffmann, H. W.— Fara Bone Manure	—	—	—	—	—	—	—	—	—	—
1716	Jacobs, Ltd. W.— Bone Manure	—	—	—	—	—	—	—	—	—	—
1718	Bone Manure	—	—	—	—	—	—	—	—	—	—
2263	Mehrtens, H.— Bone Dust	—	—	—	—	—	—	—	—	—	—
2260	Metropolitan Abattoirs Board— MAB Blood Manure	—	—	—	—	—	—	—	—	—	—
2259	MAB No. 1 Bone Manure	—	—	—	—	—	—	—	—	—	—
2402	MAB No. 1 Bone Manure	—	—	—	—	—	—	—	—	—	—
2262	MAB No. 2 Bone Manure	—	—	—	—	—	—	—	—	—	—
2275	Pope Products, Limited— Ferto	—	—	—	—	—	—	—	—	—	—
2276	Shell Fertilizers, Ltd.— Ground Oyster Shell	—	—	—	—	—	—	—	—	—	—
2258	S. A. Gas Co.— Sagasco Sulphate of Ammonia	—	—	—	—	—	—	—	—	—	—
2274	Sagasco Sulphate of Ammonia	—	—	—	—	—	—	—	—	—	—
2401	Wallaroo-Mt. Lyell Fertilizers, Ltd.— Bone Dust	—	—	—	—	—	—	—	—	—	—
2269	W.M.L. Extra High Grade Super.	45.0	47.7	—	—	40.0	40.8	40.0	40.8	—	—
2268	W.M.L. Extra High Grade Super.	45.0	47.9	—	—	—	—	45.0	47.7	—	—
2411	W.M.L. Extra High Grade Super.	45.0	46.9	—	—	—	—	45.0	46.9	—	—
2413	W.M.L. Extra High Grade Super.	45.0	46.5	—	—	—	—	45.0	46.5	—	—
2416	W.M.L. Extra High Grade Super.	45.0	47.7	—	—	—	—	45.0	47.7	—	—
2270	W.M.L. 48% Super.	48.0	51.1	—	—	—	—	48.0	51.1	—	—
2412	W.M.L. 48% Super.	48.0	48.0	—	—	—	—	48.0	48.9	—	—
2267	Wooltana Fertilizers, Ltd.— W.F.L. Fertilizer	1.25	1.2	17.0	7.6	11.0	24.5	29.25	33.3	0.75	1.1
2265	Wooltana Fertilizer	2.3	2.4	22.0	14.4	35.0	37.6	55.5	54.9	1.5	2.3
2264	Wooltana Orchard Fertilizer	2.0	2.3	20.0	12.3	13.0	25.4	35.0	43.0	8.0	6.6
2266	Wooltana Special	1.0	1.4	26.0	14.0	10.0	27.3	51.0	56.7	4.0	4.0

* The bags were guaranteed to contain 159 lbs of 45% Super in a total of 187 lbs.

† Limit of deficiency.

ANALYSES OF FERTILISERS—continued.

Sample No.	Name of Firm and Fertiliser.	Potash in Water Soluble Form.		Calcium Oxide, CaO.		Calcium Oxide Expressed as Calcium Sulphate, CaSO ₄ .		Bone Manure, Fine Material.		Agricultural Lime, Fine Material.		Gypsum, Fine Material.		Phosphate Fertiliser, Fine Material.		Moisture.
		Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	Vendor's Guarantee.	Result of Analysis.	
2403	Hoffmann, H. W.— Para Bone Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7.3
1716	Jacobs, Ltd. W.— Bone Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.7
1718	— Bone Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2263	Mehrtens, H.— Bone Dust	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8.7
2260	Metropolitan Abattoirs Board— MAB Blood Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.9
2259	— MAB No. 1 Bone Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8.2
2402	— MAB No. 1 Bone Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.2
2262	— MAB No. 2 Bone Manure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7.8
2275	Pope Products, Limited— Ferto	15.5	17.4	—	—	—	—	—	—	—	—	—	—	—	—	—
2276	Shell Fertilisers, Ltd.— Ground Oyster Shell	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.0
2274	S. A. Gas Co.— Sagasco Sulphate of Ammonia	—	—	30.0	33.0	—	—	—	—	80.0	82.0	—	—	—	—	0.1
2401	— Sagasco Sulphate of Ammonia	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.1
2269	Wallaroo-Mt. Lyell Fertilisers, Ltd.— Bone Dust	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4.5
1892	— W.M.L. Extra High Grade Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5.4
2266	— W.M.L. Extra High Grade Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7.3
2411	— W.M.L. Extra High Grade Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8.4
2413	— W.M.L. Extra High Grade Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7.7
2416	— W.M.L. Extra High Grade Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7.0
2270	— W.M.L. 48% Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7.1
2412	— W.M.L. 48% Super.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.4
2267	Wooltana Fertilisers, Ltd.— W.F.L. Fertilizer	1.75	1.44	—	—	—	—	—	—	—	—	—	—	—	—	4.0
2265	— Wooltana Fertilizer	3.5	3.05	—	—	—	—	—	—	—	—	—	—	—	—	3.2
2264	— Wooltana Orchard Fertilizer	3.0	2.0	—	—	—	—	—	—	—	—	—	—	—	—	3.4
2266	— Wooltana Special	3.0	3.0	—	—	—	—	—	—	—	—	—	—	—	—	4.3

* The bags were guaranteed to contain 159 lbs of 45% Super in a total of 187 lbs.

† Limit of deficiency.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

CONFERENCE OF RIVER MURRAY SWAMP SETTLERS.

The third Annual Conference of settlers in the Irrigated Swamps of the River Murray was held at Murray Bridge on February 15th, 1934. Messrs. A. J. Cooke and P. J. Bailly (Advisory Board of Agriculture), W. J. Spafford (Deputy Director of Agriculture), H. B. Barlow (Chief Dairy Instructor), C. F. Anderson (Government Poultry Expert) R. L. Griffiths, R. Hill, and P. H. Suter (District Instructors), H. Trumble, M.Sc. (Waite Research Institute), and F. C. Richards (Assistant Secretary, Agricultural Bureau), were present.

Delegates were present from Brinkley, Jervois, Mypolonga, Gumeracha, Monarto South, and Murray Bridge Branches. Mr. A. Wells (Chairman of the Murray Bridge Branch), presided, and the Opening Address was delivered by Mr. P. J. Bailly.

Mr. F. Lehmann (Murray Bridge) read a paper on "Butter Prices." In the discussion that followed it was decided:—"That this Conference requests the Government to instruct the recently appointed Dairy Committee to find out from the factories the reason for the difference between the price paid to the producer for butter-fat and the price paid for butter by the consumer."

Conference discussed the question of the formation of a Veterinary Lodge for the Swamp areas, and it was resolved—"That a local committee be appointed with a view to placing before settlers on the Swamps the advantages of forming a Veterinary Lodge." The following committee was appointed:—Messrs. H. B. Kuchel (Murray Bridge, J. W. Schultz (Jervois), P. H. Pickering (Mypolonga), W. Baldock (Long Flat), C. F. Altmann (Monarto South), H. Mountstephen (Monteith), E. W. Pearson (Brinkley), and F. Burr (Honorary Secretary).

The following addresses were delivered:—"Production of Pigs for Export," Mr. H. B. Barlow; "Poultry as a Sideline on the Swamps," Mr. C. F. Anderson.

It was decided:—"That the 1935 Conference should be held at Murray Bridge, with the arrangements in the hands of the Jervois Branch."

The Evening Session was occupied with an address, illustrated by lantern slides—"The Establishment and Management of Irrigated Pastures," by Mr. H. C. Trumble.

CONFERENCE OF LOWER NORTH BRANCHES.

The Annual Conference of Lower North Branches held at Riverton on February 22nd was opened to an excellent attendance of delegates from the Saddleworth, Riverton, Tarlee, Wasleys, Roseworthy, Blyth, Owen, Dudley, Alma, Kapunda, Farrell's Flat, Greenock, Rhynie, Penwortham, Everard East, Buchanan, Stanley Flat, Watervale, and Wirrilla Branches of the Agricultural Bureau by Mr. F. Coleman (Member of the Advisory Board of Agriculture), who said he wanted to open this Conference with a note of optimism. An optimist sees an opportunity in every difficulty, while a pessimist sees only difficulties in every opportunity. No depression lasts for ever; values will surely stabilise on safer surer lines. Work and prudent economy have killed every depression in the past, and will win out this depression, too. Some people talk of over-production; I do not believe it for a moment; I do not believe it is even in sight. That there is under-consumption is granted, for there are millions in Europe alone to-day who are under-fed and under-nourished. There is need, a crying need, for freer interchange between countries, of foodstuffs and the essentials for healthy life.

In the first place it is necessary to recognise clearly the relative value of the Primary to the Secondary Industries. Situated as Australia is to-day, and especially South Australia, with overseas liabilities, with debts and interest charges, how are

those liabilities to be met honorably except through exports of primary products, for under our industrial conditions there is no possible chance of exporting manufactured goods in any quantity, in competition with the rest of the world.

If, then, the great primary products, such as wool, wheat, dairy produce, fruit, etc., from this State are to continue to be raised, it must not be below the actual cost of production. The producer must be able to live and remain solvent. The Australian protective policy of the past 33 years has added to the cost of production of wheat, etc. The remedy lies in reducing these high tariffs to that of a purely revenue tariff of, say, 10 per cent., which with the long freight charges should be protection enough to hold the local market. If not, then the great primary industries will be crippled, which must of necessity react upon the secondary industries already well established. Without the "new money" obtained from the sale of primary products won from the soil it will not be possible to pay overseas commitments, nor purchase the factory goods turned out by the secondary industries.

If the reduction of the tariff is not practical, then the alternative seems to be the fixing of an artificial price for the home, i.e., the Australian market. This is now being actually considered in regard to butter. The price of butter in New Zealand to-day is, say, 7d., freight to Australia 1d., duty on butter 6d. a lb. To import New Zealand butter, therefore, would cost 1s. 2d. landed here. A Board—termed the Commonwealth Dairy Produce Equilisation Committee—will then fix the price of butter for the whole of Australia at 1s. 2d. a lb. A quota for export will be declared each week, say 50 per cent. of the butter manufactured; that will bring say 7d. a lb. f.o.b., as the balance is used locally at 1s. 2d.; the average price to the dairy farmer will be the mean between 7d. and 1s. 2d. = 10½d. per lb., the price rising or falling as the London prices rises or falls. That is the proposal on which is based the Dried Fruits Acts.

South Australia has until the 1st of March to come into this new scheme, which the Commonwealth, Queensland, New South Wales, Victoria, and Tasmania have agreed upon; these States produce 94 per cent. of the butter made in Australia, while South Australia produces only 4 per cent. and Western Australia 2 per cent. The Paterson Scheme expires on March 1st. Attempts at price fixing and Government control will not tend to lessen the cost of production. The surer way to develop an industry is to reduce the cost of its products.

So far as the dairying industry is concerned, I believe that by care in breeding and feeding it is possible to produce butterfat at 6d. to 8d. a lb. in this district in an average year, and at less cost in good seasons.

Professor Perkins in evidence before the Federal Grants Commission said: "If Port Adelaide were a free port, even wheat at 2s. per bushel would not necessarily be a losing proposition." It is along the lines of lessened cost of production that I look for relief; efforts to bolster up a position by bounties, levies, schemes, or subsidies are wrong.

Overseas markets must be developed. Denmark has a slogan that their produce "*must look better and taste better than any similar product in the world,*" and we need to adopt a similar slogan. We need to watch our Eastern markets for wheat. China and Japan want our wheat, but we must insist on uniform quality in those Eastern countries, just as much as with our butter, lambs, eggs, or fruit in the English market. Our flour has latterly tended to deteriorate in gluten content, and Dr. Callaghan at Roseworthy is alive to this weakness. The New South Wales Department of Agriculture is also working along the lines of improved mill-quality.

If costs of production can be reduced by raising more and better quality per acre, through better farming practice, better soil tillage, better varieties of cereals, better strains of livestock yielding better butterfat returns, better lambs through improved pastures through top-dressing, and cultivated grasses and clovers. If these are

marketed at a uniform standard of quality, South Australians can hold their own in the open markets of the world, if given a fair chance, unhandicapped by high tariff duties.

Bureau officials present were Messrs. A. L. McEwin (Members of the Advisory Board of Agriculture), W. J. Spafford (Deputy Director of Agriculture), C. F. Anderson (Government Poultry Expert), W. C. Johnston, H. J. Apps, and J. B. Harris (District Instructors), C. A. Goddard (Assistant Wool Instructor of the School of Mines), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary Agricultural Bureau).

Mr. D. C. Hannaford, President of the Riverton Branch, occupied the chair, and during the course of the Conference the following papers were read and discussed:—“Power Farming,” E. Travers (Rhynie); “Wool and its Classes,” G. E. Wait (Rhynie); “Pasture Improvement and Grazing,” J. Stephenson (Penwortham); “Crop Rotations,” F. W. Coleman (Saddleworth); and a wide variety of questions was discussed by departmental officers.

Mr. Spafford addressed the Conference on the subject of “Export Lambs.”

Life Membership Certificates of the Agricultural Bureau were presented by Mr. A. L. McEwin to Messrs. E. A. Gray and J. P. Schultz, who have been associated with the Agricultural Bureau for over 20 years. In expressing thanks for the honor that had been conferred upon him, Mr. Gray said the Riverton Branch was formed on December 23rd, 1889, with the following gentlemen as foundation members:—Dr. F. Allwood (Chairman), Messrs. F. Norton (Secretary), F. Gray, J. Cooper, and J. Kelly. The Branch was reformed on October 21st, 1911, and Mr. Gray was elected Honorary Secretary, a position he occupied until 1929. He acknowledged the support of those members who had for so long been associated with the Branch, and trusted that the younger members would push on the work of the Bureau and endeavor to make the Branch worthy of the Riverton district.

Mr. McEwin also handed the trophies to the successful competitors in the Midlands Crop Competition. These were as follows:—First, H. Michael (Hilltown)—Dan, 42bush. to the acre, 92 points; second, O. V. Roberts (Spalding)—Dan, 45bush. to the acre, 91.5 points; third, S. Garrard (Farrell’s Flat)—Gallipoli, 43bush. to the acre, 91 points.

Conference adopted the following resolution:—“It was decided that the 1935 Conference should be held at Blyth.”

Conference concluded by an address, “Modern Methods of Keeping Poultry,” by Mr. C. F. Anderson.

The Committee of the Riverton Branch, and in particular the Honorary Secretary (Mr. O. E. Longbottom) are to be congratulated on the success which attended their efforts of the organisation of the Conference.

CONFERENCE OF YORKE PENINSULA BRANCHES.

Mr. O. H. Heinrich, Chairman of the South Kilkerran Branch, presided over a very good attendance of delegates from the Wauraltee, Kilkerran, Arthurton, Weavers, Brentwood, Boor’s Plains, and South Kilkerran Branches at the Annual Conference of Yorke Peninsula Branches held at Port Victoria on March 7th.

Mr. A. L. McEwin (member of the Advisory Board of Agriculture) delivered the opening address. The Department of Agriculture was represented by Prof. Arthur J. Perkins (Director of Agriculture), W. J. Spafford (Deputy Director of Agriculture), H. B. Barlow (Chief Dairy Instructor), R. C. Scott (Supervisor of Experimental Work), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary Agricultural Bureau).

The following papers were read:—"Woolelassing," R. O. Castine (Wauralte); "Transportation of Sheep," O. H. Heinrich (South Kilkerran); "Bulk Handling of Wheat," M. D. Wright (Boor's Plains); "Pig Feeding," A. P. Robertson (Wauralte); "Sheep *versus* Wheat," M. Newbold (Wauralte). Mr. Scott gave a review of the Barley Experimental Plots being conducted on Yorke Peninsula.

Conference carried the following resolutions:—"That Parliament be asked to alter the time of burning stubble in agricultural districts from 2 p.m. until 8 a.m." "That the Government be asked to appoint a veterinary surgeon to the staff of the Department of Agriculture, whose services should be made available to members of the Agricultural Bureau." "It was decided that the 1935 Conference should be held at Kadina, the arrangements to be in the hands of the Boor's Plains Branch." Delegates were entertained at luncheon by the ladies of the district.

The evening session was occupied with an address illustrated with moving pictures on "The Petroleum Industry" by Mr. B. B. Crewe, of the Vacuum Oil Company.

Mr. M. Newbold ably carried out the secretarial duties of the Conference.



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PAPERS READ AT CONFERENCES.

BUTTER PRICES.

[By F. LEHMANN, Murray Bridge.]

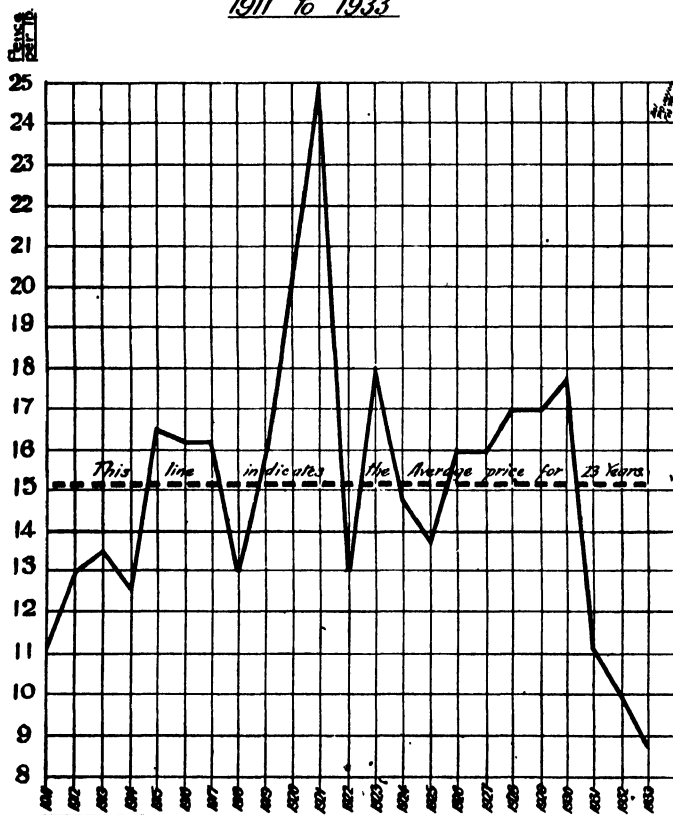
River Murray Swamp Settlers Conference, Murray Bridge, February 15th.

It is by comparing butter price figures, past and present, that a clearer conception of the value of dairy products is obtained. In this paper the figures quoted show the fluctuations of the dairyman's wages.

The average price per lb. of commercial butter sold by me during the last 23 years has been 1s. 3½d. per lb. net on the farm. The highest price was during 1921, when it averaged 2s. 1d. per lb. During the year 1933, ended June 30th, it averaged 8½d. per lb., and for the year December 31st, 1933, 7½d. per lb.—just half the average for 23 years.

PRICES OF COMMERCIAL BUTTER AT CALLINGTON

*Chart showing Rises and Falls for 23 Years
1911 to 1933*

Butter Manufacturer's Charges.

In 1911 all charges for freight, making, and commission were 2d. per lb. In 1923 all charges for freight, making, and commission were 2½d. per lb. In 1925 all charges for freight, making, and commission were 2½d. per lb. In 1928 all charges, including stabilisation levies, were 4½d. per lb. In 1930 all charges, including stabilisation levies,

were 4½d. per lb. February, 1934, 7½d. lb. butterfat, or 6½d. lb. commercial butter (1s. 2d. in prints), 8½d. per lb. 1933, from producer to consumer, total 9d. per lb. In October, 1925, 100lbs. cost £1 0s. 11d. to prepare for market, or 2½d. per lb. The storekeeper paid 1s. 5½d. per lb., the consumer 1s. 8d., the producer got 1s. 2½d. per lb. for commercial butter, the margin being 5½d. per lb.

The following figures show what becomes of the 100lbs. of butterfat the dairyman sells to the butter maker. These are figures for the first week of February, 1934:— 100lbs. of butterfat at 7½d. per lb., £3 4s. 7d., makes 118lbs. commercial butter, sold in prints at 1s. 2d., £6 17s. 8d.; 118lbs. commercial butter sold to consumer at 1s. 4d., £7 17s. 4d. The butter manufacturer obtains £3 13s. 1d. more for the 100lbs. than he gives the producer, or 8½d. per lb. on 100lbs. butterfat to cover costs of making, &c., another 2d. per lb. for the retailer's charges, leaves a total margin of 10½d. per lb.

The above figures compared with the 1925 costs of 5½d. per lb. are rather disturbing.

If this is due to the burden of price disparities because of high tariffs and low export prices, it is the duty of dairymen to get butter or dairy produce values on a parity with goods that others in the community supply us with. The question is: How is this to be done, Producers must organise and unite to gain their aims by moral means; they must realise that conditions are changing; and should not estimate the policy of the future by a summary of the past.

The farmer of the future will have to be respected and his welfare cherished in accordance with his value to the community. It is essential, therefore, that farmers create respect, and as a guarantee of good faith, organise the primary industries in a manner compatible with their value to the Nation. If their efforts are sincere, painstaking, and fearless, the people will respond. They will realise that any real and lasting adjustment of the industrial and economic position must proceed from some redeeming influence, consistent with rural industrial organisation, associated with economic government.

During October, 1925, butter factory charges for making and commission was 2½d. per lb., and 2½d. extra to the consumer, a total of 5½d. against 10½d. as at present. This wide margin leaves ample room for dairymen and small factories to compete and make a good profit, and by giving a little more for cream, get their supplies. This is the national result of present conditions, therefore dairymen should get the best talent available to put the dairying industry on a profitable footing.

CLASSING SMALL CLIPS.

[By S. WAITE, Rhynie.]

Money is lost and disappointment caused in prices obtained for wool, principally through faulty classing. Small growers should give more careful attention to the get-up of their clip no matter how small, and the following information should be helpful:—

When the fleece is shorn off, the belly wool should be kept separate, and it is essential that the fleece be thrown out and spread well on a large table. Heavy skirting is not necessary. Most small growers make the mistake of tearing off wool right around the fleece. This should not be done. Only a light trimming is necessary. The main points to take off are the sweat edge under the arm and the short wool from the fore and hind legs and any stained breech wool. Only one class of pieces should then be made, keeping the stained pieces separate. In classing the fleece of a small Merino clip it is not practical to make a large number of sorts. Over-classing a small clip and cutting it up into "Star" lot parcels is a mistake. Providing the sheep are bred on fairly even lines and have been grazing on the same pasture, the larger number of bales that can be made of a sort the better. That the fleece must not be torn apart is a mistaken idea. The modern method is to strip out the middle of the fleece—commonly known as the backwool—and roll this up as a separate fleece, thereby making

one fleece of the good, long shafty shoulder, side and breech wool, and another fleece of the back wool. By doing this the wool practically classes itself. The best wool brand "AA" and the back wool brand "A." Some growers think that if a back wool is not dusty it should not be taken out. This is a mistake. Very few sheep grow a back wool equal to that on the sides, shoulder, and neck. It is generally weather-affected, shorter in staple, tender, and is inferior to the other portion of the fleece. There can be no effective classing if the back wool is not taken out. To keep the "AA" line even in length and condition, any short, yellow or tender fleece can be put with the "A" class. This leaves the "AA" wool of even and good length, and which is generally known to the buying trade as "Spinners" wool. The "A" class is known to the trade as "topmaking" wool. These wools are used for entirely different purposes in manufacture, and when the fleece is rolled up without taking the back out the grower is offering to the buyer two entirely different wools. The "spinner" buyer cannot operate owing to the presence of the "topmaking" wool. The wool is therefore bought by the topmaking buyer, who eventually sorts it and makes a good deal of money out of the unclassified wools. In the first place the good wool is bought at the topmaking price and there is no doubt that much of the spinners' wool is afterwards resold at good profits. If the back wool is dusty or earthy, it is still more important that it be taken out for the reason that the sand or dust drifts through the whole of the wool when being handled, both in packing and when shown on the show floor. All the clean wool becomes dusty and is unattractive generally to overseas buyers.

It is not necessary to keep hogget, wether, and ewes' wool separate, provided they are bred on the same lines and run on similar pasture. It is far better to mix the sexes and class the wool as suggested.

Estimate the amount of fleece wool the flock will cut in determining the number of packs and weight to be put into same. For instance, if 50 sheep are shorn at an average weight of 10lbs. per head, equalling 500lbs., or, say, two bales, do not make one bale 400lbs. weight and the other 100lbs. weight. Make two bales of 250lbs. each. A 250lb. bale is the minimum weight of a shipping bale. Any bale weighing less than this is sold as a light weight bale and is generally bought by dealers. Do not press the wool into three bales to save the cost of a pack. If possible avoid mixed bales, but if unavoidable advise the broker of any bales that contain mixed wool or enclosures. Do not sew the bales with binder twine. Use a good sewing twine or wire bale fasteners. Brand the bales with a good stencil plate on the front, side, and top of bale. The front side of the long 54in. fixed top pack means the side directly opposite the hinge or fixed side of the cap. Leave the bottom of the bales clean for the buyers' countermark and port mark of destination.

Bulk-classing or pooling for the small grower is now an established practice with all wool brokers. This method of marketing is proving most successful. All mixed bales, packets, and bags are not now sold without bulk-classing. Bulking promotes competition and enhances values, but it is very difficult for the broker to successfully re-class fleece wool, in which the grower has left the back wool.

Inter-lotting is another modern method which has proved a great advantage to the grower. It means grouping various brands together of similar types of wool to make large lines that come in for competition from overseas buyers in the big selling room.

Small growers also make the mistake of not classing lambs' wool. A sheet should be placed over the rolling table and all lambs fleeces put over the table. By using the two hands lightly and picking up the lightest and longest stapled wool, the shorter lambs' wool is left on the table. Two sorts should always be made.

It is not necessary for the farmer to have a scientific knowledge of wool in order to put up his clip in an attractive manner. Wool-classing is only matching, and if the wool grower will match all the long stapled wool together and the short stapled wool together—provided the wool is bred on fairly even lines—it is all that is necessary and is only a common sense job.

Growers should always advise their brokers when consigning their wool as to the manner in which the clip has been put together, and give specifications regarding the number of bales of each description of wool.

POWER FARMING.

[By E. TRAVERS, Rhynie.]

About 30 years ago the internal combustion engine made its appearance in the motor car on Australian roads, and by the year 1916 began seriously to challenge the light horse.

The improvements in the internal combustion engine and the improved methods of manufacture, and repairs of same, since that date, have developed the farm tractor to such an extent that the draught horse has now to take second place to the tractor, as a more economical and more efficient method of farming. For the last 22 years I have put under crop from 400 to 500 acres each year. When farming with horses I sowed 400 acres of fallow each year and kept from 20 to 22 draught horses to do the work.

The general practice adopted by me since using the tractor is as follows:—Fallowing in winter; cultivating twice in spring; harrowing after rain during summer; working the fallow twice again with the combine at seeding, and at harvesting: seven times in all.

I maintain that it requires five working horses per 100 acres. A tractor with a draw-bar pull which will displace from 12 to 14 horses is taken for purposes of comparison. Such a tractor will work comfortably 500 acres each year, and to work 500 acres—seven times over the land—requires 25 good horses.

The tractor has an advantage over horses at busy periods when the land is in the most suitable condition for working. One tractor can do more work in a day with two men driving it than two horse teams, which is an advantage, for wheat sown under the best conditions gives the best results. One tractor and a 10ft. header can harvest as much wheat in a day as two 8ft. headers and four teams each of six horses. And a £330 motor truck can deliver more wheat to the railway siding than the horse teams can per day. Although this reference has been made to the motor truck, it is more profitable for the power farmer to "let" his heavy carting, and have a light truck, converted old car, or trailer, to keep his tractor going on the farm.

Another advantage in favor of the tractor is that the land can be kept cleaner, because horses have a tendency to spread weeds. There is less drudgery with power farming; when the farmer leaves his tractor his day's work is done—there are no horses to be fed after tea and on Sunday. If thorough overhauls and repairs are made, once in the slack time of each year, and then before each season's work, the tractor will be found very reliable. I have had but three stops for repairs over a working period of 11 years; two of the breakdowns took two days each to repair, and one a week.

The figures given below show the costs of both methods of farming, each plant being regarded as new. The tractor, &c., can be bought in the second-hand market as well as the goods for the horse plant. A tractor is not like a motor car, it will go on working so long as spare parts are put into it when required, and such a tractor need not be put aside until it is replaced by the diesel type of engine, which has made its successful appearance in our district. With the horse farmer, the money is not actually paid out, but the hay cut displaces wheat, and the grass grazed displaces cattle and sheep.

Wheat has been valued at 3s. 4d. per bushel at the railway siding 75 miles from port, for wheat cannot be produced profitably in Australia by either method under that price.

The above working of the land in good heavy country should give an average of seven bags of wheat and two tons of hay per acre over a period of years.

TRACTOR v. HORSES ON THE FARM.

	£	s.	d.		£	s.	d.
Tractor	575	0	0	25 horses at £27 each	675	0	0
Tractor attachments	30	0	0	Harness, swings, chains, &c., at £3 each	75	0	0
Kero., and petrol drums, pump, &c.	7	10	0	Six h.p. engine No. 4 chaff- cutter, &c.	120	0	0
Motor truck	340	0	0	Binder and horse trolly	170	0	0
	£952	10	0		£1,040	0	0

PURCHASE OF FARMING PLANTS, SHEDS, YARDS, &c.

	£	s.	d.		£	s.	d.
One 8-furrow plough	73	0	0	Two 6-furrow ploughs	120	0	0
One stiff 19-tine, stump jump cultivator	62	10	0	One stiff 17-tine stump jump cultivator	59	10	0
One 20-hoe combine	83	10	0	Two 16-hoe combines	150	0	0
Combine harrows for 20 hoe . .	4	0	0	Two combine harrows for 16 hoe	6	10	0
Set of harrows (10 leaves) . .	26	5	0	Set of harrows (10 leaves) . .	26	5	0
One 10ft. header	188	0	0	Two 8ft. headers	311	0	0
The following are an asset to farm:—				The following are an asset to farm:—			
Fitting shop, tools, &c. . . .	80	0	0	Horse stables, chaff shed, harness room, yards, and water supply	250	0	0
Implement shed	70	0	0	Fitting shop and tools	45	0	0
	£587	5	0	Implement shed	75	0	0
+ £952 10 0					£1,043	5	0
£1,539 15 0					+ £1,040	0	0
					£2,083	5	0

WORKING EXPENSES.

	£	s.	d.		£	s.	d.
2,000galls. kerosene at 1s. 1d. gallon	108	6	0	Hay, bran, oats, and grass for 25 horses at 30lbs. feed per day	230	0	0
550galls. petrol at 1s. 4d. gallon	36	13	0	Shoeing and other expenses for horses	7	10	0
120galls. cylinder oil at 5s. 6d. gallon	33	0	0	Repairs and upkeep of har- ness (above depreciation) . .	5	0	0
Gear oil and grease	3	0	0	Fuel and oil for engine	3	0	0
Motor truck, tyres, tax, and licence	13	10	0	Wages for permanent man at £3	156	0	0
Repairs to tractor and truck (twice the amount it has cost me per year for 11 years)	54	0	0	Wages for extra man, 20 weeks at £3	60	0	0
Wages for farm labor (20 weeks) at £3 per week	60	0	0	Interest on above plant at 5 per cent.	104	2	0
Depreciation on above plant at 9 per cent. (11 years) . . .	138	10	0	Depreciation on above plant at 6 per cent.	125	0	0
Interest on above plant at 5 per cent.	77	0	0				
£523 19 0					£690	12	0

Balance in favor of the tractor, £166 13s.

From the foregoing figures it will be seen that with wheat at 3s. 4d. a bushel, the tractor is the more profitable. Depreciation has been allowed for at the rate of 6 per cent. (16 years 8 months) to renew the horses as well as the rest of the plant,

and depreciation on the tractor at 9 per cent. (11 years 1 month) which would allow the tractor to be renewed at any time over 8 years. Direct taxes have not been deducted from the tractor, for it is most unfair to ask power farmers to pay over 7d. a gallon on petrol, 9d. a gallon on oil, primage and sales tax added, and primage on kerosene solely for the purpose of working their land.

The advantage of the power farmer of the future will be much greater than that of the horse farmer, for the tractor and the motor truck will be very much improved as time goes on, whereas the draught horse of to-day can do very little more work than the horse of 30 years ago, and little or no more work can be expected from the horse of the future. No tractor was a success until the high-speed engine was introduced. The Diesel engine with its low grade fuel has completely shifted the steam engines from the railways of Denmark and Holland and is slowly challenging the steam trains of England, France, and Germany. The Diesel tractor is doing the work of 16 horses at 1½ galls. of crude oil per hour at 5½d. per gallon, and each hour of its work it is doing one-third more work in the hour than my tractor, which uses 17 to 18 pints of fuel per hour, from which I have taken my calculations and figures above.

CROP ROTATIONS.

[By F. WATSON COLEMAN, Saddleworth.]

With the continual low prices of wheat and other cereals, and the improvement in the prices for wool, it would seem that we should go in for wool instead of wheat. This probably will be done on some of the larger holdings, but on average sized farms it is not possible to keep sufficient sheep to make a living on them alone.

Such changes also involve considerable expenditure, and it is not certain that wool prices will maintain for very long. In a year or two the position may be reversed.

However, I believe we can keep more sheep with profit without seriously affecting the acreage put into cereals, by more efficient rotations of crops than has been practised in the past.

Most producers in the Lower North District have a fairly efficient plant for the production of wheat, and this district is one of the best for wheat production. We should be able to grow wheat as cheaply as anywhere in Australia. Consequently it would be folly to scrap our plant at this time.

The question is: "How can we still lower costs of production to make ends meet?" There are two ways in which this can be still further reduced, and these are—

- (1) by increasing the yield per acre, and
- (2) by lowering the interest charges per acre.

The first can be raised by more efficient cultivation, improved varieties, and most important, by changing the rotation and bringing other crops into the rotation with wheat.

Interest charges—interest on working capital, land, and improvements—can only be reduced on the "per acre" basis by a longer crop rotation to eliminate a larger proportion of the bare fallow, portion of the farm which puts double rental or interest charges on to the wheat crop.

A study of the costs of wheat production as worked out at the Turretfield Demonstration Farm shows the following items in the cost of growing 19bush. on bare fallow for seasons 1929-32.

	Per Bushel.	
	s.	d.
Interest charges	1	2
Labor	1	0
Use of horses	0	8
Seed, super, and bags	0	10
Incidentals	0	3
Implements	0	2
Total	4	1

Professor Perkins works out the costs for various yields as follows:—30bush at 2s. 9d., 25bush. at 3s. 3d., 20bush. at 4s., 15bush. at 5s. 2d.

From this it will be seen that the effects of increasing the yield on the cost of production will require about 36 to 40bush. to meet all charges with wheat at its present price. It will be noticed that interest charges (or rent) is the highest charge, 1s. 2d. of which, with a 30bush. crop, means that all other costs come to only 1s. 7d. It is contended, therefore, that to reduce this high interest charge it is necessary to grow a greater variety of crops to absorb it. The following table shows returns at Booborowie and in the Wimmera over a number of years:—

Rotations.	Wheat Yield.		Oat or Barley Yield.	
	bush.	lbs.	bush.	lbs.
<i>Booborowie</i> —				
Fallow-wheat-oats	32	33	30	14
Fallow-wheat-pasture	32	33	—	—
Fallow-wheat-barley	30	35	17	45
Fallow-wheat	28	2	—	—
<i>Wimmera</i> —				
Fallow-wheat-oats	38	0	—	—
Fallow-wheat	34	0	—	—

These figures show that where a variety of crops is grown, higher yields are obtained, as well as reducing the acreage under fallow. With the fallow-wheat rotation, one-half of the farm only is in full production, whereas there are two-thirds in the others, so that the rent can be more evenly divided.

Improvements can be made to the pasture section of the rotation by sowing with oats or barley and grazing throughout the year. Part can be sown with barley or an early variety of oat, and the balance with a later variety so that early feed will be available, and the food of the other will last well into the summer with periodical grazing.

Annual grasses such as Wimmera Rye can also be sown alone or in a mixture and increase the feed value of the pasture, allowing more stock to be kept.

Where oats are sown in rotation they may be grazed as suggested, cut for hay or ensilage or harvested as grain. In districts of good rainfall, where the third crop in the rotation has been heavily fed off, a large proportion of the nitrogen taken out of the soil by the growing crop is returned and it is possible to make a 4-course rotation of it by following with another wheat crop before bare fallowing again. This can also be done when a good mixture of burr clover has grown with the oats, or if the oat crop is replaced by a pea crop.

When wheat is to follow pasture or another crop, there will be a limitation to the moisture and plant food available, so that it will be necessary to use wheats which will make rapid growth after sowing, and withstand droughty conditions.

Gluyas and Waratah are highly recommended for this purpose, while Nabawa and Sword have also done well in this way at Saddleworth. Last year a paddock was sown with oats and grazed until late September, the stock were then removed and a good crop of oats harvested for grain. There was a good stand of burr clover with the oats. The stubble was burnt and sown with Waratah wheat. A few half-acre plots of other varieties were tested in the same paddock and yielded as follows:—Waratah, 23½bush.; Nabawa, 23½bush.; Sword, 23bush.; Ghurka, 22½bush.; S.H.J., 20bush. S.H.J. is a West Australian variety—a cross between Florence and Early Jonathan, so should be a good milling wheat. This variety gained Champion Prize at the Adelaide Show last year. A farmer at Saddleworth grew a 9 bag crop of Florence on non-fallow this year, so it may be possible to obtain a payable return from good milling wheats when grown on stubble ground. Many of the good milling wheats are early maturing and command an extra 3d. per bushel.

The cost of growing wheat on stubble or ley ground is much cheaper than growing on bare fallow on the per acre basis as can be shown by again referring to Turretfield Farm Costing in the following table:—

Wheat.	On 1926-30.		Decrease Cost.
	Pea Stubbles (16bush.)	Fallow (19bush.)	
Per acre . . .	£3 7 7	£4 18 6	£1 10 11
Per bushel . .	0 4 3	0 5 2	0 0 11
Hay.	1923-31.		1922-32.
	Stubble Hay.	Fallow Hay.	
Per acre . . .	£3 12 3	£5 6 10	£1 14 7

This shows a saving of 30s. per acre, so that if a crop can be grown that will yield anything within 15bush. at 2s. per bush., it will give as good a net return as the fallow grown crop. These costs may seem a trifle high at the present time and my estimation is that a fallow crop can be grown at £3 10s. per acre and a stubble crop for £2 10s., so that with wheat at 2s. 6d., 28bush. on bare fallow and 20bush. on stubble should be grown to pay expenses. Two crop rotations which will help to reduce costs of production, enable the fertility of the soil to be maintained, and the stock carrying capacity increased are:—

1. Bare fallow-wheat-oats (sown with 2lbs. Wimmera Rye seed)-pasture.

The advantages of this 4-course rotation are to increase the pasture in quality and quantity, increase wheat and oat yields and keep down crop diseases. By leaving out for a year as a rye pasture, barley grass and silver grass would be kept in check, and as those grasses carry the take-all fungus, this would be kept in check. This rotation is similar to Rotation No. 10 as laid down at the Waite Research Institute which consists of bare fallow-wheat-oats-pasture. The pasture there is a Wimmera Rye grass stand sown the same year. This rotation gives the highest yields of wheat 41.2bush., the highest oats 66.6bush., and the highest in pasture taken as 41.2cwt. per acre of dry hay, of all the different rotations laid down at the Institute. Results are over the period 1926-32.

This rotation would be suitable for fairly large holdings, for only one-quarter of the farm would be under wheat. The Wimmera Rye grass—if sown with the oats—would not affect the crop to any extent, and sufficient seed would fall to give a good stand of grass for the next year.

The second rotation which would be more suitable for smaller farms of good soil and climatic conditions is as follows:—

2. Bare fallow-wheat-oats (hay)-peas-wheat-oats (grazed)-wheat.

With this rotation a maximum acreage is sown to wheat, 3/7ths of the area; and a minimum to bare fallow, 1/7th only; each paddock would be fallowed once in 7 years. With a farm of, say, 350 acres, if this was divided into 7 paddocks, the cropping would be as follows:—Wheat, 150 acres; oats for hay and grain, 50 acres; grazing crop (oats, barley, or grass mixture), 50 acres; peas, 50 acres; bare fallow, 50 acres. A rotation similar to this is now in operation on portion of our farm, and results of wheat yields on fallow and stubble are as follows:—Fallow, 32bush. at 2s. = 64s.—cost 70s., loss, 6s.; stubble, 25bush. at 2s. = 50s.—cost 50s. The peas part in the rotation could be replaced by bare fallow without changing the area under wheat and oats. Peas in rotation at the Waite Research Institute have yielded an average of 25bush. A good crop of wheat is fairly certain after a crop of peas, and similar returns can be obtained when sown after a heavily grazed crop, or a crop in which a large amount of burr clover has been present. If the roots have made such good growth and food is abundant so that the grazing crop can be harvested as hay or grain, it may be necessary to use a manure containing nitrogen if the rotation is to be followed through, otherwise a lack of this plant food will be felt. There is further need for experiment in this direction, for it is possible to show increased yields with sulphate of ammonia, but not sufficient to pay for the application.

Varieties of oats suitable for the rotations are *Calcutta Cape* and *Belar* (Sunrise × Algerian). These are mid-season, and can be fed off and recover well, lasting into the summer. They also make excellent hay.

Gidgee (White Ligowo × Algerian), the same cross as Lachlan and Guyra, is a good early hay and feed oat with a plump heavy grain. Bags averaged 150lbs. off the winnower this year.

Peas: Australia produces 800,000 out of the world's production of 30,000,000bush. Spain produces 7,000,000bush. or nine times that of Australia. White Brunswick have yielded up to 62bush. at the Waite Institute; they escape a lot of the grubs and command a higher price than Dunns.

Wimmera Rye grass grows well in a 15-20in. rainfall, seed is not expensive and a good stand can be established for 2s. per acre.

PASTURE IMPROVEMENT AND ROTATIONAL GRAZING.

[By J. B. STEPHENSON, Penwortham.]

This paper deals with the higher rainfall areas, and is my experience with grasses during the last five years on my property near Sevenhills. Where I have been using the common Subterranean Clover in the earlier districts the early type would apply equally as well.

It might be of interest to mention that the first man to realise the value of Subterranean Clover was Mr. A. W. Howard, of Blakiston.

Subterranean Clover is an annual which, on account of its characteristic of re-seeding by forcing the lower shoots into the ground, is quite permanent when once established. From this habit the clover derives its name. The plants grow very close together, the runners overlapping and crossing to a depth of several inches, forming a dense mat. The seeds germinate with the first good rains and die down about the end of November—to the middle of December in this district.

Subterranean Clover is a nitrogenous plant, and in the green state provides a succulent fodder of which all stock are very fond. If there are a few scattered patches in a paddock, it is always obvious which grass the stock prefer, as the clover will be nipped off short and the other grasses left. On account of its remarkable seed production it spreads with great rapidity, and with reasonable care and management of the paddocks, becomes firmly established and will last for years.

The ideal climate for Subterranean Clover is a temperate to cold one, providing there is an average rainfall of 20in. or over and that there is a reasonably wet spring. Given these conditions it will grow on practically any class of soil, and will grow where land is too cold and sour for other grasses to grow at all. It does well on poor ground, but makes wonderful growth on good land. The clover will grow without fertiliser and will spread, but only slowly. The fertiliser to which Subterranean Clover most readily responds is superphosphate, and the wonderful effect of this manure will more than repay the initial outlay involved in its use. Superphosphate may be sown with the seed, and then used to topdress the pasture.

The seed may be sown at any time from the first autumn rains until the end of July. The earlier seasonal conditions permit the seed being sown the better, as it gives the plants a better chance of establishing themselves before the seed is formed. As the plant is an annual, it is obvious that a good deposit of seed is essential the first season to ensure the continued spread of the plant. Often one hears the remark, "Yes, the clover did well the first year but died out," and the fault is generally not due to the plant, but to over-stocking before it has time to develop the seed supply. Also the complaint is sometimes made that it is very backward in the winter. That, again, is more often than not due to the fact that the stock prefer it to other grasses and give the natural grasses an unfair advantage.

There is one other point that should be of vital interest to producers. It has been proved in Victoria that Subterranean Clover will choke out St. John's Wort.

The first clover I sowed at Penwortham was half a paddock of 120 acres which had been cropped the year before. About the only foliage was stinkwort, which was doing remarkably well. I mixed the seed with 45 per cent. superphosphate and sowed at the rate of 4.5lbs. of second grade seed (equal to about 3lbs. of first grade) with 1cwt. superphosphate per acre. I used a disc drill with the hoes outside the discs, and the discs let into the ground. This was sown in the middle of June and soon showed a promising take. The sheep were taken off this paddock as soon as the flowers showed and kept off until the seed was formed and the plant had started to wilt. By that time enough had been buried underground to ensure a good germination next year. When sheep were turned into that paddock they nipped the clover off as close as any sheep can bite, and to anyone who was unused to the peculiar properties of the plant, it looked a failure. The next year it was topdressed with another 1cwt. of superphosphate and the growth was thick and was so well established that it did not need a spell for nearly so long a period as the first year. The next year it was not topdressed, and I now intend to topdress the paddocks in alternate years with 90lbs. of 45 per cent. superphosphate per acre. This, of course, wonderfully increases the carrying capacity of the land, and so ensures a lot more animal droppings, and it has been proved that sheep especially return nearly as much to the soil as they take out of improved pastures.

After a few years there is a tendency for worms to develop in sheep, and this must be guarded against. A good medicinal salt lick helps. About every two or three years harrow heavily or cultivate the paddocks to spread the manure and aerate the soil. This also applies to cattle grazing, as the growth of any grass is always strongest and more rank on or around animal droppings and is always the last eaten by the stock. Even distribution of manure ensures an even growth and sweeter pastures. A method I have found successful both for the spreading of cattle and sheep manure is to turn a set of harrows upside down and drag them over the ground. A better way is to use a good set of ordinary harrows with a heavy drag chain or four or five-plough chains fastened on each rear corner of the harrows to break the manure which the harrows allow to pass through untouched.

ESTABLISHING THE CROP.

The year the pasture is harrowed or cultivated it does not seem necessary to topdress. The sowing of pasture seeds with a cover crop is an excellent way of establishing a pasture, and I have had good results with clover and Wimmera Rye grass, by sowing with both wheat and oats and also to a lesser extent barley, but either wheat or oats are better for this purpose than barley. The land was ploughed, harrowed, and the wheat sown at the rate of 1½bush. per acre, 3lbs. clover, and 2lbs. of rye grass per acre were mixed with the super, which was put on at the rate of 1½cwt. of 45 per cent. per acre. Always leave the mixing of the grass seeds with the super until ready to be sown—some do the mixing in the drill box.

Do not plant the seed too deeply, and harrow the top after drilling to cover the wheat. The Subterranean Clover throws out exceptionally long heads when planted with a cover crop and seeds fairly well enough to give a good start for next year. The rye grass is very prolific. It was planted at the rate of 2lbs. per acre, and enough was blown over the tail of the harvester to seed the land thickly for the next year, and 20bush. were cleaned which collected in the screening box. That was off an 80 acre paddock. Of course, this crop cannot be cut with the binder, as it prevents the rye grass from seeding. The rye grass grew nearly as high as the wheat. Cutting the crop does not interfere with the clover plants.

Wimmera Rye grass is an annual, but is a very prolific seed plant. From one seed, 10 to 12 stems will grow with 20 to 40 seeds per stem. The seed is very light, and when it drops to the ground soon works underneath the straw and germinates with the first good rains. It is not advisable to burn the stubble, this destroys most of the rye grass seeds.

Perennial Rye grass is a coarser plant than the Wimmera. It grows best along the banks of creeks and where land is flooded in winter. It is rather rank for sheep but they readily eat the heads and flag. On the other hand, cattle do well and seem to relish this plant. Perennial rye grass makes excellent meadow hay, and mixed with any of the clovers makes an ideal grass hay for dairy cattle or winter feeding of ewes. The grass is easily established by discing the seed on to the land in autumn with about 1cwt. of super., and when once established is quite permanent, and has the additional advantage of sending out green shoots after rains in the drier periods of the year. The feed value of the perennial is not so high as that of Wimmera, and stock, if allowed to choose, show in no uncertain way which they prefer.

A pasture of pure clover has a tendency after a few years to become thinner and then after a year or so thicken up again. It will be noticed that as the clover thins out the other grasses increase and they in turn are choked out as the clover increases again. Any clover is a great producer of nitrogen and in time produces too much nitrogen and to a certain extent the ground is "clover sick." The other and poorer grasses which grow absorb the surplus nitrogen and allow the clover to spread again. The rye grasses are all nitrogen-absorbing plants and by experimenting it has been proved that clover and rye grass planted together keep a proper pasture balance, neither the rye nor the clover will predominate. Wimmera rye is best suited for sowing with clover for the drier parts of the property and Perennial for the flats and where water lies.

"PHALARIS TUBEROSA."

This is a perennial and is the best winter grass. It has an extensive root system, and once established is permanent. The surest way to start this grass is from roots, planting them about 3ft. apart the plant soon spreads on something the same principle as Couch grass.

Planting by Seed.—Be sure and obtain seed from guaranteed stock, as there are other types which are very inferior to the true plant. The Department of Agriculture will always advise where seed or roots can be obtained. The seed is planted at the rate of 3lbs. per acre on well prepared land with a liberal dressing of super. and as the seed is very fine, it is best sown on top of the ground and then lightly harrowed.

This grass is very susceptible to competition from other grasses in the first year of its growth, especially the rye grasses, but after it is well established, clover or rye may be sown with it. It also responds well to cultivating in the early winter, which seems to stimulate the growth.

Phalaris when properly established, produces an abundance of green fodder; the worst winter frost does not seem to affect it, and if allowed to grow, will make a good hay, which can be easily cut with the binder or loose mower. Stock seem to have to acquire a taste for this grass, but when once used to it seem to relish the fodder.

Subdivision.—Pasture improvement can have little permanent benefit unless subdivision of paddocks, topdressing with fertilisers, systematic harrowing, distribution of animal droppings and rotational grazing are adopted. The usual plan of having one or two large paddocks does not permit of any part of the farm being "rested" from time to time, but results in too much feed at one time and a shortage at another. This subdivision of the property permits parts of the holding to be rested from time

to time and so encourage the best features of the pasture. With smaller paddocks, the stock can be changed from one to another and short, fresh greenfeed ensured for a large part of the year. Grasses are highest in food value when about 3 to 4 in. high; long and rank grass is unpalatable to stock, besides lacking the feed value of the shorter grass. Another advantage of subdivision is that it lessens the waste caused by unnecessary tramping.

Another consideration in subdivision is the opportunity it affords for the control of the growth of the grasses, and an introduction of variety into the feed of stock. Variety of feed ensures a balanced ration, and the animal uses the maximum quantity of feed to the greatest advantage. It is also possible to devote different paddocks to different grass mixtures.

Subdivision and rotational grazing make it possible to considerably increase the carrying capacity of the farm, the small paddocks which are heavily stocked and rested in turn, do not grow much grass to waste. The amount of waste that occurs on a farm with few fences can only be measured by comparison with a similar area that is subdivided, and if regular topdressing is practised in conjunction with rotational grazing, the carrying capacity of the pastures may be doubled as compared with the farm with the few large paddocks.

To achieve this there is, of course, an original outlay and then periodical purchases of super., but when a pasture is well established, alternate autumn topdressings of 90lbs. to 1 cwt. of 45 per cent. super., and heavily harrowing or cultivating the land every third or fourth year, will give an ample reward for the time and money spent.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held at the Blackwood Experimental Orchard on February 28th, there being present Messrs. R. H. Martin (Vice Chairman), F. Coleman, P. J. Baily, S. Shepherd, A. L. McEwin, H. N. Wicks, G. Quinn (Chief Horticultural Instructor), R. Fowler (Manager Blackwood Orchard), and H. C. Pritchard (Secretary).

Apologies were received from Messrs. A. J. Cooke, J. W. Sandford, Professor A. J. Perkins, and Dr. A. E. V. Richardson.

New Branch.—Conditional approval was given to the formation of a Women's Branch at Wirrabara.

Life Members.—Messrs. E. H. and L. G. Huxtable, G. L. Bonython, H. S. Green, J. Waters, and V. V. Brown of the Borrika Branch were approved as Life Members of the Agricultural Bureau.

New Members.—The following names were added to the rolls of existing Branches:—Milang—G. Yelland; Belvidere—G. R. and A. K. Donaldson, R. H. Westley; Buchanan—E. O. and R. M. Pfitzner; Kelly—F. W. Russack, L. S. Beinke; Mount Gambier—A. L. Warren; Kybybolite Women's—Mrs. G. McInnes, Misses M. and K. Carracher, Mrs. G. Davidge; Wilkawatt Women's—Mrs. P. Thompson; Kybybolite—C. G., and John Boddington, R. Newlyn, D. Chapple; Owen—Arthur Pretty; Dudley—D. I. Telfer; Lameroo—Mr. Edwards, J. Hamilton, R. Morcom; Roseworthy—R. Freer, C. Forman; Quorn—L. Eckert; Block E.—W. B. Anderson, F. B. Gitsham; Mount Barker—C. Pope.

Present No. of members, 7,999; present No. of Branches, 336.

Several items were discussed in Committee.

EXPORT PIG COMPETITIONS.

“THE CHRONICLE” PRIZES, G. A. COOPER CUP, MONTHLY, AND SPECIAL PRIZES.

COMMITTEE DRAWS UP CONDITIONS.

[After the decision reached at a meeting of representatives of various interests in the pig industry on February 9, to hold monthly export pig competitions in connection with the Cooper Cup, “The Chronicle” prizes, and other monthly and special prizes, the Committee appointed by the Minister of Agriculture (Mr. Blesing,) consisting of the President, Stud Pig Breeders Society (Mr. H. J. Candy), the agricultural editor of “The Chronicle” (Mr. C. P. Butler), and the Chairman of the Meat Export Board (Mr. G. A. W. Pope), met and framed these conditions, which have been approved by the Minister. The competitions will begin on May 10, and will be held monthly for 12 months until April 30, 1935.]

Each entry shall comprise not less than five, and not more than eight pigs. In judging, the best five carcasses will be chosen by the judge. There will be no limit to the number of entries made by any one person.

Each pig shall weigh not less than 60lbs. or more than 160lbs. dressed frozen weight, and, for the purpose of judging, carcasses weighing between 60lbs. and 120lbs. shall be declared porkers, and from 121lbs. upwards baconers.

Entry forms may be obtained from the Government Produce Department, Light Square, Adelaide, the Department of Agriculture, Flinders Street, Adelaide, the Stud Pig Breeders’ Society, 23, Waymouth Street, Adelaide, any of the stock and station agents, and the Manager of the Port Lincoln Freezing Works.

GENERAL CONDITIONS.

Entries must be lodged with the General Manager of the Government Produce Department or the Manager of the Port Lincoln Freezing Works on or before the 10th day of the month in which the entrant desires to compete. It is provided, however, that entries for the May competition may be made from now on, and the pigs so entered may be slaughtered at any time between the date of entering and May 31.

After May 31 the pigs must be slaughtered in the month in which the entry is made. Slaughtering dates must be arranged by the entrants with the Produce Department, and the pigs must be delivered alive and free of charge at the department’s works, Port Adelaide, or Port Lincoln.

In the event of five carcasses in any entry not being suitable through rejection of all or part of the carcasses through any cause, the entry will not be permitted to take any part in the competition.

Exporters, breeders, fatteners, bacon curers, and producers generally, including those on Eyre’s Peninsula, may enter pigs for the G. A. Cooper Cup, and the Meat Export Board’s monthly prizes, also the special prizes presented by Messrs. Michie, White, and J. M. Wilson Pty., Ltd.

Pigs entered for the prizes to be presented by the proprietors of *The Chronicle* and the Stud Pig Breeders’ Society must be the product of boars of registered stock, and the breeding and age must be stated on the entry form. These pigs will be eligible for competition for all the prizes, including the Cooper Cup.

COOPER CUP.

The G. A. Cooper Cup competition will be confined to entrants competing in three or more of the 12 monthly competitions. The cup will be presented to the competitor gaining the best average of points over three monthly entries. Should any entrant compete in more than three monthly competitions, that person's best three entries will be accepted as the entries qualifying for the Cup competition.

The committee reserves the right to withhold the cup should the number of entries over the whole period be, in its opinion, insufficient to achieve the objective of the donor, which is to improve the quality and increase the quantity of the pigs exported from South Australia.

The pigs will be judged in Adelaide by an officer of the Government Produce Department for proportion of dead to live weight, for which a maximum of 20 points will be allowed, and for uniformity in weight for which a maximum of 10 points will be allowed.

The total judging points in Adelaide and London will be:—Proportion dead to live weight, 20; evenness of weight, 10; conformation, 15; suitability for trade, 35; shape of hams, 10; condition, 10; total, 100.

Should any dispute arise, the committee's decision shall be accepted as final.

The pigs will be sold and the proceeds, after deducting the usual charges, will be paid to the owners, and, when desired, the department will make advances on the pigs up to 75 per cent. of the estimated value.

There will be no entry fees.

METROPOLITAN AND EXPORT ABATTOIRS, ADELAIDE

MANUFACTURERS OF

Meat Meal for Pigs

Read Report of Trials made by PROF. PERKINS,
Journal of Agriculture, January and July, 1921.

Meat Meal for Poultry

For full information on above write to

The GENERAL MANAGER, Metropolitan and Export Abattoirs
Board, Box 578E, G.P.O., Adelaide.

ALSO MANUFACTURED—

Blood Manure

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SCHEDULE OF PRIZES.

The prizes will consist of:—

1. The G. A. Cooper Cup, valued at 30 guineas.

2. The Meat Export Board's prizes for each of the 12 months in which the competitions are held, consisting of:—(a) A rebate of 12s. a pig from the charges for treating, shipping, and selling the five first prize pigs (value £3 a month). (b) A rebate of 8s. a pig from the charges for treating, shipping, and selling the five second prize pigs (value £2 a month). Total value, £60.

3. Special Prizes:—

- (a) The Australian Stud Pig Breeders' Society prizes of £2 for first prize a month and £1 for second prize a month, for the months of May, June, and July, for pigs, the product of boars of registered stock.
- (b) The Michie White prize of £5 5s. for the best five baconers entered during the competitions and slaughtered at Port Adelaide.
- (c) The J. M. Wilson prize of £5 5s. for the best five porkers entered during the competitions and slaughtered at Port Adelaide.
- (d) The Wickham & Candy prize of a pedigreed Berkshire (Canadian) type boar for the best five porkers other than all white pigs.
- (e) The proprietors of *The Chronicle* prizes:—First £8, second £5, third £2, fourth £1 10s.; for the best pen of five porkers taken from a maximum entry of eight pigs.
- (f) The proprietors of *The Chronicle* prizes:—First £8, second £5, third £2, fourth £1 10s.; for the best pen of five baconers taken from a maximum entry of eight pigs.

Pigs competing for these two prizes, presented by *The Chronicle*, will be shown alive at the Royal Adelaide Show, subject to the concurrence of the Royal Agricultural and Horticultural Society, in accordance with the conditions laid down in the society's catalogue, including entry fees, and will be slaughtered in September.

- (g) The proprietors of *The Chronicle* prizes for pigs bred on Eyre's Peninsula:—First £5, second £2, third £1 10s.; for the best five porkers taken from a maximum of eight pigs.

The proprietors of *The Chronicle* prizes for pigs bred on Eyre's Peninsula:—First £5, second £2, third £1 10s.; for the best five baconers taken from a maximum of eight pigs.

The pigs for these special prizes are to be slaughtered in September and October at the Port Lincoln Freezing Works.

- (h) In addition, Mr. E. A. Wilcox will present a pedigree Large White boar to the winner of the porker class in the Eyre's Peninsula competition, and Mr. W. J. Aldridge will make a like presentation to the winner of the bacon class.

Should fuller particulars be desired inquiries must be addressed to either—

The Secretary, Stud Pig Breeders' Society, 23, Waymouth Street, Adelaide.

The Government Produce Department, Light Square, Adelaide.

The Department of Agriculture, Flinders Street, Adelaide.

The Agricultural Editor, *The Chronicle*, Waymouth Street, Adelaide.

IMPORTANT WEEDS OF SOUTH AUSTRALIA.

[By G. H. CLARKE, B.Sc., Botanist at the Roseworthy Agricultural College.]

No. 4.—THE APPLE OF SODOM.

Solanum sodomaceum, L., var. *Hermannii*, Dunal.

In the writings of the ancient historians, Tacitus and Josephus, and of Strabo, mention is made of certain fruits, beautiful to the sight but turning to bitter ashes when eaten, which were to be found growing near the ancient cities of Sodom and Gomorrah on the shores of the Dead Sea. These "fruits"—in reality the galls formed on dwarf oak trees by a species of gall-forming insect—have given rise to the name "Sodom Apple" or "Dead Sea Apple" as a metaphorical expression to represent what excites high hopes or expectations, but ultimately produces bitter disappointment. The plant known botanically as *Solanum sodomaceum*, L., is called the Apple of Sodom because it bears an abundance of juicy yellow berries, an inch or more in diameter, which, so far from being edible, are intensely bitter and poisonous.

The plant in question is a native of Africa and the Mediterranean region. It is a common weed on vacant land in and around the suburbs of Adelaide, and occurs here and there along the roadsides throughout a good many parts of the State. It is a proclaimed weed both here and in Victoria, where it is very widely spread. It occurs also in Queensland, and to a less extent in New South Wales. In the last-named State it is to be found growing in greatest abundance actually in sand along the sea coast, and does not appear to penetrate inland, at least, not to such an extent as to justify its being regarded as a serious weed, being proclaimed only in the coastal municipalities of Botany and Stockton.

The Apple of Sodom is an irregularly branched, semi-shrubby perennial, bearing a mass of dark green sinuately lobed leaves, both stems and leaves being covered with prickles. The flowers, which are purple or purplish-white in color, resemble those of a potato plant, and develop later into the berries, which are at first green and white, but turn pale yellow when ripe. Well fed stock refuse to touch the plants, the prickles evidently serving, in this case, the very useful purpose of deterring animals from eating the leaves and fruits.

Botanical Name.—*Solanum* was the Latin name for the Black Nightshade, *S. nigrum*, L., and was derived, probably, from the word *solari* to solace or comfort, in allusion to the reputed sedative properties of that species. The species name *sodomaceum*, as already explained, is on account of the disappointing qualities of the attractive-looking fruits. The local form belongs to the variety *Hermannii*, which occurs in Africa and in southern Italy. It differs from most Mediterranean forms in having the branches and both surfaces of the leaves sprinkled with minute star-shaped hairs.

The Family Solanaceae.—In common with other species of *Solanum*, the Apple of Sodom belongs to the *Solanaceae* or Nightshade family, which comprises some 1,500-1,800 species of plants native to tropical and temperate regions. Among these are such economically important members as the potato (*Solanum tuberosum*, L.), the egg-plant (*S. Melongena*, L.), the tomato (*Lycopersicum esculentum*, Mill.), tobacco (*Nicotiana Tabacum*, L.), red or Cayenne pepper and chillies (*Capsicum annuum*, L.), and the Cape Gooseberry (*Physalis peruviana*, L.). Many plants belonging to the family contain poisonous alkaloids, and of these the Deadly Nightshade (*Atropa Belladonna*, L.), the Thorn Apple (*Datura Stramonium*, L.), and Black Henbane (*Hyoscyamus niger*, L.), are used in medicine and yield the drugs Belladonna, Stramonium, and Hyoscyamus, respectively. In addition to species of *Solanum*, certain solanaceous plants are more or less common in this



Photograph of plant of Apple of Sodom, showing general habit. See colored plate opposite.



APPLE OF SODOM

State as naturalised weeds, e.g., Tobacco Tree (*Nicotiana glauca*, Grah.), African Box-thorn (*Lycium ferocissimum*, Miers.), Thorn Apple or Mad Apple (*Datura Stramonium*, L., *D. tatula*, L., *D. Metel*, L., and possibly also *D. ferox*, L.). The same family includes such garden favorites as *Cestrum*, *Petunia*, *Salpiglossis*, and *Schizanthus*.

In addition to the frequent presence of poisonous alkaloids, such as atropine, nicotine, solanine, daturine, etc., members of the family have certain structural characters in common. The flowers are more or less radially symmetrical; there is a persistent five-lobed calyx, a corolla of five petals joined to form a tube of varying length, five stamens arising from the corolla, and a superior pistil, situated upon a hypogynous disc and composed of two united and obliquely placed carpels, with an ovary containing usually numerous ovules attached to axile placentas. The ovary subsequently develops into a fruit which may be dry and capsular, or succulent and berry-like. The seeds are usually small and numerous, and contain endosperm.

Many *Solanaceae* show peculiarities in the position and arrangement of leaves and flowering branches, due to adnation or coalescence between the primordia of neighboring parts. The prevailing leaf arrangement is alternate, and this is usually found in the vegetative parts; but, on the flowering branches, the leaves sometimes arise in pairs, due to the failure of certain of the leaf rudiments to separate from the parent stems, except at levels considerably above their true points of origin.

Another and very general character of the family is the presence, in the stems, of internal food-conducting paths. The stem of a plant, being an intermediary zone between roots and leaves, is concerned with the conduction, not only of water and minerals to the leaves, but also of elaborated foods from the leaves to the roots, which, being living, necessarily require to be supplied with these materials. This conduction takes place through the inner part of the bark, just outside the wood, and is confined in most plants to this region of the stem. The method of ring-barking aims at killing a tree indirectly by depriving the roots of their food supply, and is usually effective so long as suckers are not allowed to develop below the level of the ring. But ring-barking would not kill a solanaceous plant, because the roots would continue to receive a supply of sugars and proteins via the internal conducting paths, which are situated on the inner side of the wood.

The Genus Solanum.—More than half the total number of solanaceous plants belong to the genus *Solanum*, which comprises upwards of 900 species of varying habit, and is represented in most parts of the world. About 50 species are present in Australia. The most important economically is the potato (*S. tuberosum*, L.), a native of Chile and Peru, and introduced by the Spaniards into Europe between 1560 and 1570. It was brought to England in 1584 by Raleigh from Virginia, where it had probably been introduced by the Spaniards from South America. Another important economic species, the Egg-plant (*S. Melongena*, L.), is probably a native of tropical Asia. Of the 19 species in South Australia, *S. sodomacum*, L., and *S. rostratum*, Dun., are introduced weeds, the latter—called Buffalo Burr—being a native of Mexico and western U.S.A. Of the remaining species, all of which are native, the commonest is the Black Nightshade (*S. nigrum*, L.), an almost cosmopolitan weed in this State, often wrongly called Deadly Nightshade, a name which really belongs to a much more poisonous plant *Atropa Belladonna*, L., which does not grow in South Australia except, perhaps, in a few private gardens. *S. nigrum* is a herbaceous annual or biennial, without prickles, and with small white flowers and globular berries of a black or dark-purple color. It is somewhat poisonous. Another native *Solanum* is the Kangaroo Apple (*S. aviculare*, Forst.f.), which is sometimes confused with the

Apple of Sodom, but differs in its leaf form, as well as in being devoid of spines or prickles. The orange-colored berries of this species are smaller than those of *S. sodomaeum*, and are said to be edible.

Botanically the *Solanums* are characterised by their symmetrical flowers with rotate corolla, the cone-like arrangement of the five stamens, which are placed close together and surround the slender protruding style, and which shed their pollen through terminal pores and not by the lengthwise splitting of the anthers; also by the berry type of fruit with usually numerous small flattened albuminous seeds, each with a curved embryo inside.

Description of S. sodomaeum, var. Hermannii.—A semi-shrubby plant of more or less spreading habit, from 18 in. to several feet in height. Branches covered with stellate hairs, and armed with scattered, straight, awl-shaped, pungent spines $\frac{1}{4}$ to $\frac{1}{2}$ in. long. Leaves petiolate, mostly about $3\frac{1}{2}$ in. long and $2\frac{1}{2}$ in. wide, deeply and sinuately lobed, with scattered hairs on both surfaces, the petioles and nerves spiny, the lobes rounded. Flowers solitary or few in short cymes; calyx bell-shaped, densely (or sometimes sparingly) spiny outside, stellate-hairy, the lobes linear-lanceolate and acute, slightly scarious on the margins, closing over the young fruit, becoming reflexed when the fruit is mature; corolla violet, plicate, 1 in. in diameter, the lobes broadly ovate, cuspidate, stellate-pubescent outside; stamens shorter than the corolla, the anthers oblong with two small apical pores; ovary globose, glabrous, with a nearly straight style thickened at the base and terminating in an almost hemispherical stigma. Fruit depressed-globular, $1\frac{1}{2}$ in. in diameter, at first green variegated with white, finally pale yellow.

Period of flowering: October to April.

Means of Spreading.—The Apple of Sodom is spread by seed. Probably wind and rain are the chief agents of dispersal, for, unlike its near relative the African Boxthorn, the berries of which are eagerly sought after by birds, this plant is left severely alone by most animals. The berries are left to rot on the parent bushes, any full grown specimen of which will show numbers of the dried and shrivelled remains of the fruits of the previous year. These eventually become detached, and are then doubtless carried by rain or wind, the contained seeds germinating at some distance from the parent plants.

Properties.—The poisonous nature of the berries, which are stated to have caused the death of children, is due to the contained alkaloid, *solanine*, present in varying amounts in many species of the genus *Solanum*. This substance is abundantly present in the potato plant, not so much in the tubers, but in the green parts, especially in the young sprouts, and fatal poisoning has been known to follow the ingestion of potato shoots. The normal potato tuber contains very little of this alkaloid, about 0.04 gram per kilogram of unpeeled tuber; but some young potatoes have been found to contain 0.23 gram, and some newly budded from seed as much as 0.58 gram. Epidemics of solanine poisoning have occurred in military barrack-rooms as a result of eating potatoes with an abnormally high solanine content, and similar outbreaks have been known to take place among civil populations. In Glasgow in 1917, 61 persons were poisoned as a result of eating potatoes which were subsequently found, on analysis, to contain five or six times the amount of solanine of normal potatoes. The same alkaloid has been responsible for cases of poisoning due to eating the berries of *S. nigrum* and *S. dulcamara*. Solanine is a glucosidal alkaloid, that is, it is readily hydrolysed to form a sugar and another alkaloid *solanidine*, which retains the poisonous properties of the parent substance. Taken internally it acts as an irritant, causing acute gastro-enteritis, and producing such symptoms as headache, severe colic, hot skin, fever, rapid pulse, vomiting in some cases, in others nausea only, diarrhoea, great weakness, and depression. It also acts upon the general nervous system, though somewhat irregularly, causing giddiness, dilatation of the pupils, and, in severe cases, paralysis of respiration, coma, and death. The latter effects may be due to the presence of small amounts of other substances, such as atropine and other tropines. Further—

more, there appear to be slight differences in the physical and chemical properties of solanine obtained from different sources. Thus Willimott found that the solanine—distinguished as *solanine-S*—isolated from *S. sodomacum* had a bitter taste and an irritating action on the throat, not observed in other samples; also that it gave somewhat different color reactions.

Eradication.—The Apple of Sodom is a perennial plant, but is not difficult to get rid of, once its eradication is conscientiously undertaken. It does not spread as rapidly as Boxthorn, nor does it form impenetrable thickets, the individual plants being usually well spaced out on the ground occupied. Repeated cutting will soon exhaust it, but it is better, if such is at all practicable, to dig out or pull up the plants with the roots, and to burn them in heaps as soon as they are sufficiently dry. On arable land it is easily kept under by cultivation.

(The writer desires to express thanks to Dr. R. S. Rogers for allowing him to consult his private library.)

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STATE OF SOUTH AUSTRALIA.

EXPORTS OF EGGS AND EGG PULP, JULY-DECEMBER, 1933 AND 1932.

By W. L. JOHNSTON (Government Statist).

Compiled by the Government Statist from returns collected direct from Merchants.

GRAND TOTAL EXPORTS.

Quantity.—Eggs in shell and in pulp in terms of eggs in shell—July-December, 1933, 5,600,000 dozen; 1932, 5,000,000 dozen.

Value.—July-December, 1933, £263,819; 1932, £245,228, increase £18,591. The interstate trade increased from £33,971 to £52,474, and the trade with oversea countries was just slightly ahead of the 1932 level, £211,345 (£211,257).

The following are the details of exports, July-December, 1933 and 1932 :—

State.	Eggs in Shell.		Egg Pulp.		Total Value.
	Doz.	£	Lbs.	£	£
New South Wales (Ex. B.H.).....	215,579	7,817	658,297	19,033	26,850
Broken Hill	93,714	3,076	9,376	256	3,332
Victoria	84,322	2,320	676,925	17,051	19,371
Other States	17,123	784	71,250	2,137	2,921
Total Interstate, 1933.....	410,738	13,997	1,415,848	38,477	52,474
1932.....	303,496	12,746	757,842	21,225	33,971
Oversea (Direct), 1933.....	3,944,216	207,324	148,000	4,021	211,345
1932.....	3,724,080	192,982	475,000	18,275	211,257
Grand Total 1933.....	4,354,954	221,321	1,563,848	42,498	263,819
1932.....	4,027,576	205,728	1,232,842	39,500	245,228

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., EXAMINED DURING THE MONTHS OF DECEMBER, 1933, AND JANUARY, 1934.

IMPORTS.

Interstate.

December.		January.		December.		January.	
Apples (bushels)	116	3		Potatoes (bags)	3,408	225	
Apricots (bushels)	3	—		Bulbs (packages)	23	35	
Bananas (bushels)	10,716½	11,123		Plants (packages)	32	33	
Citrus—				Seeds (packages)	30	51	
Grape Fruit (bushels)	2	21		Trees, Fruit (package)	1	—	
Lemons (bushels)	1	9		Wine Casks (No.)	2,664	2,857	
Oranges (bushels)	8	220					
Mangoes (bushel)	1	—		<i>Fumigated—</i>			
Passion Fruit (bushels)	110	151		Citrus—Oranges (bush.)	—	80	
Paw Paws (bushels)	2	—		Wine Casks (No.)	7	50	
Peaches (bushels)	3	31					
Pineapples (bushels)	564	278		<i>Rejected—</i>			
Plums (bushels)	1	2		Apples (bushels)	—	3	
Currants, Black (bushels)	2	4		Bananas (bushels)	55½	32	
Peanuts (bags)	255	100		Pineapples (bushels)	4	—	
Peanut Kernels (bags)	55	6		Second-hand cases (No.)	1	11	
Cucumbers (bushels)	5	—					

OVERSEAS.

State Law.

Wine Casks (No.)	679	1,507
<i>Fumigated.</i> —Wine Casks (No.)	77	—

Federal Quarantine Act.

	December.		January.	
	Packages.	Lbs.	Packages.	Lbs.
Seeds, &c.	8,247	752,000	1,561	293,814
Canes	45	—	119	—
Cocanut Chests	415	—	105	—
Tea Chests	2,304	—	4,193	—
Plants	—	—	1	50 (No.)
		Super Ft.		Super. Ft.
Timber	180,989	1,836,389	145,405	1,600,248

EXPORTS.

Federal Commerce Act.

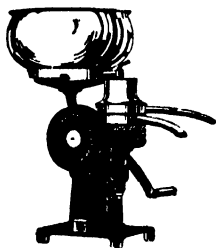
		Packages.	Packages.			Packages.	Packages.
Colombo	Apples	—	163	Straits Settle-	Apricots	—	4
	Pears	—	10	ments	Cherries	5	—
Netherlands,	Citrus—Oranges	58	—		Citrus—Lemons	2	2
East Indies	Peaches	—	12		Oranges	2	—
New Zealand	Citrus—Oranges	3,913	—		Gooseberries	5	—
Singapore	Apples	—	2		Peaches	—	6
	Apricots	—	2		Plums	—	20
	Citrus—Lemons	2	—		Potatoes	—	15
	Peaches	—	13		Other Vegetables	2	2
	Plums	95	159				
	Other Vegetables	33	29				

NARRUNG HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR JANUARY 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during January.	Per Cow during January.	Per Cow October to January.	Per Herd during January.	Per Cow during January.	Per Cow October to January.	
			lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
5/C ..	33	23.55	11,217½	339.92	2,320.60	538.75	16.33	117.63	4.80
5/D ..	33-74	27.87	15,245	451.84	2,265.88	779.94	23.12	121.66	5.12
5/E ..	37	26.42	13,031	352.19	1,942.02	672.02	18.16	101.90	5.16
5/F ..	35-19	28.48	20,764½	590.07	2,765.13	942.87	26.79	130.66	4.54
5/R ..	61	56.39	18,985	311.23	1,875.00	837.52	13.73	78.25	4.41
5/S ..	13	7.68	4,258½	327.57	2,208.94	222.22	17.09	108.33	5.22
5/EE ..	17	16.29	10,225	601.47	2,761.73	489.24	28.78	133.91	4.78
5/GG ..	18-87	15.90	7,991½	423.50	1,705.61	363.42	19.26	81.37	4.55
5/KK ..	20	16.29	11,161½	558.08	2,337.85	523.50	26.17	107.92	4.60
5/NN ..	15-61	13.19	5,573½	357.04	2,302.95	276.33	17.70	113.14	4.96
5/QQ ..	15-74	10.74	5,753½	365.53	1,888.02	282.58	17.95	93.73	4.91
5/RR ..	21	10.19	4,390½	209.07	1,403.54	218.32	10.40	77.10	4.97
5/SS ..	17	13.87	6,800	401.70	1,998.61	344.80	20.37	95.11	5.11
5/TT ..	12	9.19	6,604½	550.37	2,841.24	316.08	26.34	138.55	4.79
5/VV ..	14	10.94	2,351½	167.96	1,911.46	122.78	8.77	88.02	5.22
5/WW ..	23	12.90	6,296	273.74	1,764.69	288.23	12.53	82.87	4.58
5/XX ..	17-77	17.77	7,372½	414.88	2,208.68	365.72	20.58	108.44	4.06
5/YY ..	14	11.26	5,156½	368.32	1,704.82	246.73	17.58	84.81	4.77
					Nov.-Jan			Nov.-Jan.	
5/Z ..	30	20.52	18,367½	612.25	1,893.18	707.98	23.58	69.80	3.85
5/AAA ..	19	18	10,989½	578.39	1,642.54	550.87	28.99	81.00	5.01
5/BBB ..	17	17	6,107	359.23	1,347.70	317.01	18.65	67.03	5.19
5/CCC ..	13	12	2,604	200.31	—	135.83	10.45	—	5.22
Mears	22-63	18.43	9,147.55	404.17	2,115.48	433.73	19.16	101.28	4.74

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Skimming
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Special Discount for Cash or Easy
Terms Arranged.

A. W. SANDFORD & Co., Ltd.
75, Grenfell Street, Adelaide.

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RABBITS

is with the

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provided you use



RABBIT POISON

Which is also
unequalled for



CROWS.

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skins alongside the trail.

It can also be spread by hand.

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110, North Terrace, Adelaide,

and from Principal Storekeepers and all
Stock and Station Agents.

THE HILLS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR JANUARY, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during January.	Per Cow during January.	Per Cow July to January.	Per Herd during January.	Per Cow during January.	Per Cow July to January.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
7/E ..	28 42	22 74	13,348½	469 68	3,601 40	505 78	17 80	141 75	3 79
7/H ..	7	6 87	4,295½	613 64	4,080 87	194 97	27 85	193 11	4 54
7/K ..	12 10	10 48	6,512½	538 22	4,869 84	283 73	23 45	190 94	4 36
7/L ..	35 81	34 74	18,985½	530 17	3,912 29	800 64	22 36	181 83	4 22
7/P ..	25	24 03	11,706½	468 26	4,899 73	577 69	23 11	229 00	4 03
7/T ..	17	15 68	7,143½	420 21	3,029 01	304 78	17 93	131 40	4 27
7/Y ..	27	24	9,949	368 48	3,909 01	441 78	16 36	171 60	4 44
7/AA ..	14	12 90	6,183½	441 68	3,747 82	288 72	20 62	166 68	4 67
7/KK ..	22 77	20 03	16,519½	725 49	5,477 17	602 34	30 41	224 49	4 19
7/MM ..	40	33 48	15,374½	384 36	4,796 80	586 91	14 67	180 90	3 82
7/PP ..	21	17 48	11,096½	528 40	4,169 50	489 36	23 30	212 32	4 41
7/TT ..	17	13	7,052½	414 85	4,295 20	286 63	16 86	179 41	4 06
7/UU ..	21	18	9,563½	455 40	3,115 55	428 61	20 41	142 40	4 48
7/VV ..	16 13	15 48	9,194	569 98	5,351 53	407 06	25 24	243 44	4 43
7/XX ..	19	17 32	11,409½	600 50	4,802 06	589 69	31 04	249 73	5 17
7/YY ..	24 97	19 35	7,354½	294 53	2,505 27	314 05	12 58	109 67	4 27
7/BBB ..	71 42	58 65	28,488½	399 33	3,848 36	1,331 23	18 66	174 75	4 65
7/CCC ..	21 06	18 55	7,843	372 41	4,056 90	348 66	16 56	183 19	4 45
7/DDD ..	13	11	5,137½	395 19	4,134 01	242 92	18 69	192 89	4 73
7/EEE ..	11 74	9 97	5,386½	458 81	3,285 95	250 03	21 30	157 92	4 64
					Oct.-Jan.			Oct.-Jan.	
7/FFF ..	21	17 65	7,597½	361 78	2,208 40	336 07	16 00	98 31	4 42
					Nov.-Jan.			Nov.-Jan.	
7/GGG ..	16 94	13 48	5,976½	352 80	1,314 52	290 33	17 14	62 46	4 86
Means	22 88	19 77	10,278 11	449 22	4,068 62	454 18	19 85	180 18	4 42

LAKE ALBERT HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR JANUARY, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during January.	Per Cow during January.	Per Cow December to January.	Per Herd during January.	Per Cow during January.	Per Cow December to January.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
6B ..	18	17	9,486	527 00	1,178 86	478 62	26 59	57 57	5 05
6/C ..	20 45	16 90	11,494½	663 51	1,373 95	479 26	27 64	57 13	4 18
6/H ..	22 48	20 42	15,454½	513 59	1,131 47	591 80	26 33	59 21	5 13
6/Y ..	14	13	7,843	560 21	1,190 68	355 80	25 41	51 25	4 54
6/II ..	25	23 48	21,633½	865 34	1,625 26	954 70	38 19	70 95	4 41
6/LL ..	24	21 26	16,838	701 58	1,389 69	657 51	27 40	53 12	3 90
6/OO ..	20	18	14,058½	702 93	1,646 11	650 73	32 54	77 18	4 63
6/PP ..	15	13 13	9,643½	642 90	1,406 58	456 95	30 46	69 12	4 74
6/RR ..	29	27 16	27,194	959 08	1,810 41	1,102 83	38 89	77 31	4 04
6/TT ..	17 42	16 45	13,696	786 22	1,610 09	615 84	35 35	71 76	4 50
6/XX ..	26 03	24 10	22,553	866 42	1,701 22	992 39	38 12	73 13	4 40
6/ZZ ..	28	24 42	19,882½	710 09	1,438 55	808 71	32 45	67 48	4 57
6/BBB ..	26 52	21 68	18,768½	707 71	1,497 44	808 53	30 49	64 85	4 31
6/CCC ..	21 45	17 42	12,741	593 98	1,224 13	597 08	27 00	54 74	4 54
6/DDD ..	19 03	16 39	14,705	772 72	1,583 59	632 77	33 25	65 08	4 30
6/EEE ..	24 68	21 61	20,963	850 20	1,717 07	815 49	33 04	67 89	3 89
6/FFF ..	22	20 29	18,912	859 63	1,758 26	814 96	37 04	73 74	4 31
6/GGG ..	26 39	20 52	19,601½	742 76	1,539 40	820 87	31 11	63 04	4 19
6/HHH ..	17	17	12,121	713 00	1,335 62	548 08	32 24	61 61	4 52
6/III ..	21 32	20 29	20,993	984 66	1,808 54	845 41	39 65	73 96	4 03
6/JJJ ..	25 65	23 39	17,280½	673 70	1,329 37	824 82	32 16	62 77	4 77
6/KKK ..	39	36 13	33,201	851 31	1,827 16	1,321 20	33 88	72 07	3 98
6/LLL ..	22	17 16	12,101½	550 07	1,108 07	560 99	25 50	49 60	4 63
Means	22 80	20 31	16,838 09	738 48	1,515 60	731 19	32 07	65 42	4 34

EXPERIMENTAL FEEDING TESTS CONDUCTED AT PARAFIELD POULTRY STATION.

[By C. F. ANDERSON, Poultry Expert.]

A series of feeding tests are being conducted at Parafield Poultry Station with a view to ascertaining if suitable foods which are obtainable on the majority of our farms can be satisfactorily fed to poultry. The tests are each of 50 White Leghorn pullets, and commenced on April 1st, 1933.

The feeding is as follows:—

No. 1 Test.—Morning—Wet mash composed of 1 part crushed barley, 3 parts wholemeal (by weight), $\frac{1}{2}$ lb. meat meal, 50 per cent. chaffed greenfeed.

Midday—1oz. wheat per bird.

Night—1oz. wheat per bird.

No. 2 Test.—Dry mash composed of same proportions as No. 1 Test.

Midday—Greenfeed.

Evening—Wheat.

No. 3 Test.—Morning—Wet mash composed of 1 part bran, 2 parts pollard (by weight), $\frac{1}{2}$ lb. meat meal, 50 per cent. chaffed greenfeed.

Midday—1oz. wheat per bird.

Night—1oz. wheat per bird.

No. 4 Test.—Morning—Wet mash composed of 1 part bran, 2 parts wholemeal (by weight), $\frac{1}{2}$ lb. meat meal, 50 per cent. chaffed greenfeed.

Midday—1oz. wheat per bird.

Night—1oz. wheat per bird.

No. 5 Test.—Morning—1 $\frac{1}{2}$ ozs. wheat per bird.

Evening—1 $\frac{1}{2}$ ozs. wheat per bird.

Greenfeed in season.

The following are the numbers of eggs laid by each pen from April 1st, 1933, to February 28th, 1934.

Definite conclusions, however, cannot be given at this juncture with regard to the various methods of feeding. It is necessary for the tests to complete the 12 months before any satisfactory opinions can be formed.

No. of Test.	No. Eggs Laid April 1st to January 31st.	No. Eggs Laid Month February.	Total Eggs Laid April 1st to February 28th.
No. 1	6,318	610	6,928
No. 2	5,957	575	6,532
No. 3	5,408	565	5,973
No. 4	6,304	840	7,144
No. 5	2,857	295	3,152

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TELEPHONE: CENTRAL 4855 and 4856.

RED COMB EGG ASSOCIATION.

OFFICIAL SINGLE TEST.

EGG-LAYING COMPETITION, 1933-34.

SECTION 1.—WHITE LEGHORNS.

Competitor.	Address.	Score to Month ending February 20th, 1934.			
		Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Totals
E. F. Ashmeade	398, Magill Road, Ken- sington Park	(1) 138	(2) 66	(3) 160	364
L. R. Badcock	77, Findon Rd., Woodville	(4) 130	(5) 148	(6) 122	400
C. J. C. Burton	Mallala	(7) 103	(8) 135	(9) 71	309
C. J. C. Burton	Mallala	(10) 101	(11) 67	(12) 154	322
W. A. Carter	2, Grosvenor St., Glandore	(13) 130	(14) 153	(15) 108	391
W. A. Carter	2, Grosvenor St., Glandore	(16) 143	(17) 156	(18) 109	408
B. Cooke	Kanmantoo	(19) 155	(20) 149	(21) 125	429
H. F. Cox	Samson Road, Glanville Blocks	(22) 83	(23) *	(24) 26	109
H. F. Cox	Samson Road, Glanville Blocks	(25) 118	(26) 95	(27) 158	371
L. H. Crawford	Military Road, Grange ..	(28) 68	(29) 149	(30) 138	355
L. H. Crawford	Military Road, Grange ..	(31) 77	(32) 14	(33) 86	177
R. C. Crittenden	William Street, Kilkenny North	(34) 122	(35) 148	(36) 82	352
Chas. H. Day	Box 28, Salisbury	(37) 157	(38) 110	(39) 125	392
J. H. Dowling	Glossop	(40) 122	(41) 127	(42) 113	362
T. Duhring	Mallala	(43) 138	(44) 127	(45) 144	409
T. Duhring	Mallala	(46) 137	(47) 84	(48) 110	331
H. Fidge	313, Cross Roads, Clarence Park	(49) 123	(50) 75	(51) 104	302
V. F. Gameau	Findon Road, Woodville .	(52) 93	(53) 131	(54) 133	357
W. Chas. Slape	Magill Road, Magill	(55) 150	(56) 153	(57) 164	467
G. C. Gavin	Salisbury	(58) 125	(59) 97	(60) 155	377
G. C. Gavin	Salisbury	(61) 140	(62) 97	(63) 127	364
H. H. Hefford	McHenry St., Murray Bdge.	(64) 77	(65) 78	(66) 13	168
H. H. Hefford	McHenry Street, Murray Bridge	(67) 162	(68) 112	(69) 70	344
W. H. A. Hodgson ..	Commercial Rd., Salisbury	(70) 121	(71) 147	(72) 102	370
W. H. A. Hodgson ..	Commercial Rd., Salisbury	(73) 112	(74) 106	(75) 100	318
E. A. Lamerton	Cross Roads, Edwardstown	(76) 117	(77) 42	(78) 152	311
C. H. Lines, jun.	Box 75, Gladstone	(79) 125	(80) 144	(81) 45	314
C. H. Lines, jun.	Box 75, Gladstone	(82) 137	(83) 135	(84) 127	399
V. F. Gameau	Findon Road, Woodville .	(85) 122	(86) 88	(87) 67	277
L. A. G. Pitt	24, John Street, Payneham	(88) 160	(89) 117	(90) 116	393
L. A. G. Pitt	24, John Street, Payneham	(91) 125	(92) 165	(93) 134	424
H. A. Rasmussen	Swan Terrace, Ethelton .	(94) 38	(95) 148	(96) 108	294
H. A. Rasmussen	Swan Terrace, Ethelton .	(97) 137	(98) *	(99) 50	187
S. E. Reedman	51, Gilbert Street, Gilberton	(100) 85	(101) 133	(102) 79	297
Bruce Rowe	"St. Kevern," Two Wells	(103) 114	(104) 128	(105) 165	407
Bruce Rowe	"St. Kevern," Two Wells	(106) 140	(107) 108	(108) 118	366
H. J. Stacey	Uraidla	(109) 99	(110) 129	(111) 142	370
H. J. Stacey	Uraidla	(112) 144	(113) 129	(114) 44	317
Thomas & Elson ...	53, Clifton Street, Hawthorn	(115) 24	(116) 52	(117) 135	211
Thomas & Elson ...	53, Clifton Street, Hawthorn	(118) 118	(119) 139	(120) 133	390
H. L. Twartz	Gawler	(121) 78	(122) 160	(123) 147	385
H. L. Twartz	Gawler	(124) 110	(125) 76	(126) 136	322
F. F. Welford	1, Ludgate Circus, Colonel Light Gardens	(127) 127	(128) 133	(129) 75	335
F. F. Welford	1, Ludgate Circus, Colonel Light Gardens	(130) 163	(131) 156	(132) 41	360

EGG-LAYING COMPETITION—SECTION 1—WHITE LEGHORNS—*continued.*

Competitor.	Address.	Score to Month ending February 28th, 1934.			
		Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Totals
A. P. Urlwin	Box 80, Balaklava	(133) 94	(134) 161	(135) 163	418
A. W. Dawes	230, Portrush Road, Glenunga Gardens	(136) 167	(137) 132	(138) 134	433
Total—Section 1					15,758
SECTION 2—ANY OTHER LIGHT BREEDS.					
V. F. Gameau	Findon Road, Woodville (Minorcas)	(139) 141	(140) 87	(141) 84	312
M. O. and C. A. Roberts	Torrens Road, Kilkenny (Minorcas)	(142) 59	(143) 105	(144) 77	241
Total—Section 2					553
SECTION 3—BLACK ORPINGTONS.					
Arthur Cook ..	187, Goodwood Road, Colonel Light Gardens	(145) 148	(146) 173	(147) *	321
B. Cooke	Kanmantoo	(148) 35	(149) 11	(150) 63	109
L. H. Crawford	Military Road, Grange ..	(151) 102	(152) 101	(153) 150	353
L. H. Crawford	Military Road, Grange ..	(154) 160	(155) 165	(156) *	325
Les. Darcy	Mypolonga	(157) 161	(158) 118	(159) *	279
Les. Darcy	Mypolonga	(160) 77	(161) 118	(162) 60	255
J. H. Dowling	Glossop	(163) 92	(164) 56	(165) 23	171
H. Fidge	313, Cross Rds., Clarence Pk.	(166) 146	(167) 70	(168) 76	292
H. H. Hefford	McHenry Street, Murray Bridge	(169) 94	(170) *	(171) 189	283
F. J. Hudson	54, Willcox Av., Prospect	(172) 82	(173) 140	(174) 38	260
A. G. Dawes	230, Portrush Road, Glenunga Gardens	(175) *	(176) 204	(177) 77	281
C. H. Lines, jun.	Box 75, Gladstone	(178) 106	(179) *	(180) 127	233
C. H. Lines, jun.	Box 75, Gladstone	(181) 109	(182) 77	(183) 137	323
H. J. Mills	Edward St., Edwardstown	(184) 152	(185) 180	(186) 147	479
H. J. Mills	Edward St., Edwardstown	(187) 164	(188) 153	(189) 162	479
J. Rawe	Honeyton St., Seaton Pk.	(190) 160	(191) 81	(192) *	241
S. E. Reedman	51, Gilbert St., Gilberton.	(193) 118	(194) 82	(195) 125	325
S. E. Reedman	51, Gilbert St., Gilberton.	(196) 67	(197) 147	(198) 132	346
H. L. Twartz	Gawler	(199) 47	(200) 116	(201) 121	284
A. G. Dawes	230, Portrush Road, Glenunga Gardens	(202) 178	(203) 139	(204) *	317
N. F. Richardson ...	60, Beaufort St., Wood- ville Park, Kilkenny	(205) 200	(206) 159	(207) 151	510
W. H. L. Wittenberg	3, Rushton St., Goodwood	(208) 126	(209) 41	(210) 62	229
W. H. L. Wittenberg	3, Rushton St., Goodwood	(211) 76	(212) 135	(213) 158	369
W. Woodley	Tailem Bend	(214) 24	(215) *	(216) 109	133
W. Woodley	Tailem Bend	(217) 147	(218) 139	(219) *	286
Total—Section 3					7,483
SECTION 4—ANY OTHER HEAVY BREEDS.					
H. Fidge	313, Cross Roads, Clarence Park (Rhode Is. Reds)	(220) 50	(221) 62	(222) 54	166
V. F. Gameau	Findon Road, Woodville (Rhode Island Reds)	(223) 127	(224) 102	(225) 109	338
V. F. Gameau	Findon Road, Woodville (Rhode Island Reds)	(226) 95	(227) 83	(228) 143	321
H. J. Mills	Edward St., Edwardstown (Rhode Island Reds)	(229) 153	(230) 129	(231) 83	365
W. R. Williams	28, Avenue Rd., Frewville (Rhode Island Reds)	(232) 84	(233) 108	(234) 93	285
W. R. Williams	28, Avenue Rd., Frewville (Rhode Island Reds)	(235) 98	(236) 42	(237) 134	274
Bruce Rowe	"St. Kevern," Two Wells (Barnevelders)	(238) 145	(239) 117	(240) *	262
Bruce Rowe	"St. Kevern," Two Wells (Welsumers)	(241) 37	(242) 131	(243) 1	169
Total—Section 4					2,180

RED COMB EGG ASSOCIATION.

OFFICIAL EGG-LAYING COMPETITION, 1933-34.

Conducted at the Parafield Poultry Station under the supervision of the Department of Agriculture.

LEADING SCORES TO WEEK ENDED MARCH 2nd, 1934.—FIRST GRADE EGGS ONLY.

WHITE LEGHORNS.		Eggs Laid.	Bird No.
<i>Singles—</i>			
A. G. Dawes.....		167	136
B. Rowe		165	105
L. A. G. Pitt		165	92
<i>Trios—</i>			
W. C. Slape		467	55-57
A. G. Dawes.....		433	136-138
B. Cooke		429	19-21
<i>Teams—</i>			
L. A. G. Pitt		817	88-93
W. A. Carter		799	13-18
B. Rowe		773	103-108

MINORCAS.			
<i>Singles—</i>			
V. F. Gameau		141	139
M. O. and C. A. Roberts		105	143

BLACK ORPINGTONS.			
<i>Singles—</i>			
A. G. Dawes.....		204	176
N. F. Richardson		200	205
H. H. Hefford		189	171
<i>Trios—</i>			
N. F. Richardson		510	205-207
H. J. Mills		479	187-189
H. J. Mills		479	184-186
<i>Teams—</i>			
H. J. Mills		958	184-189
L. H. Crawford		678	{ only 5 } 151-156
S. E. Reedman		671	193-198

ANY OTHER HEAVY BREEDS.

<i>Rhode Island Reds.</i>			
<i>Singles—</i>			
H. J. Mills		153	229
B. Rowe (Barnevelders)		145	238
V. F. Gameau.....		143	228
<i>Trios—</i>			
H. J. Mills		365	229-231
V. F. Gameau		338	223-225
V. F. Gameau		321	226-228
<i>Teams—</i>			
V. F. Gameau		659	223-228
W. R. Williams		559	232-237

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of February, 1934, also the average precipitation for February, and the average annual rainfall.

Station.	For Feb., 1934.	Av'ge. for Feb.	Av'ge. Annual Rain-fall.
FAR NORTH AND UPPER NORTH.			
Oodnadatta	0.25	0.57	4.69
Marrce	0.83	0.50	5.93
Farina	0.21	0.53	6.48
Copley	0.84	0.52	7.93
Beltana	2.30	0.65	8.53
Blinman	1.64	0.73	11.92
Hookina	0.74	0.45	11.46
Hawker	0.86	0.57	12.31
Wilson	0.78	0.62	11.82
Gordon	0.70	0.78	10.59
Quorn	0.70	0.60	13.29
Port Augusta . . .	0.53	0.52	9.46
Bruce	0.58	0.58	9.95
Hammond	0.30	0.60	11.27
Wilmington	1.71	0.59	17.43
Willowie	0.38	0.72	12.28
Melrose	0.88	0.86	22.04
Booleroo Centre . .	0.68	0.66	15.23
Port Germain . . .	1.14	0.51	12.55
Wirrabara	0.51	0.61	19.34
Appila	0.44	0.68	14.66
Craddock	0.70	0.66	10.83
Carrieton	0.57	0.58	12.29
Johnburg	0.77	0.53	10.59
Eurelia	0.68	0.62	12.85
Orroroo	0.64	0.63	13.23
Nackara	1.07	0.68	11.18
Black Rock	0.59	0.63	12.43
Oodlawirra	0.86	0.61	11.67
Peterborough . . .	0.83	0.60	13.27
Yongala	0.64	0.67	14.47
NORTH EAST.			
Yunta	0.90	0.62	8.54
Waukaringa	0.98	0.51	7.97
Mannahill	1.00	0.68	8.21
Cockburn	0.06	0.61	7.98
Broken Hill, N.S.W.	0.22	0.85	9.57
LOWER NORTH.			
Port Pirie	0.60	0.53	13.26
Port Broughton . .	0.65	0.54	13.92
Bute	0.49	0.52	15.49
Laura	0.52	0.69	17.99
Caltowie	0.47	0.69	16.75
Jamestown	0.44	0.66	17.75
Gladstone	0.54	0.61	16.33
Crystal Brook . . .	0.79	0.63	15.82
Georgetown	0.95	0.71	18.41
Narridy	0.60	0.62	15.88
Redhill	0.69	0.63	16.61
Spalding	0.44	0.80	18.99
Gulnare	0.56	0.81	18.71
Yacka	0.44	0.64	15.40
Koolunga	0.68	0.65	15.43
Snowtown	0.75	0.53	15.71

Station.	For Feb., 1934.	Av'ge. for Feb.	Av'ge. Annual Rain-fall.
LOWER NORTH—continued.			
Brinkworth	0.54	0.69	15.83
Blyth	0.27	0.64	16.80
Clare	0.39	0.83	24.56
Mintaro	0.25	0.75	23.47
Watervale	0.31	0.80	26.91
Auburn	0.27	0.84	24.00
Hoyleton	0.20	0.57	17.35
Balaklava	0.38	0.57	15.49
Port Wakefield . .	0.61	0.63	12.96
Terowie	0.63	0.82	13.40
Yarcowie	0.63	0.72	13.63
Hallett	0.90	0.70	16.48
Mount Bryan . . .	0.44	0.80	16.81
Koorunga	0.47	0.69	17.92
Farrell's Flat . . .	0.47	0.65	18.68
WEST OF MURRAY RANGE.			
Manoora	0.39	0.63	18.93
Saddleworth	0.37	0.72	19.61
Marrabel	0.34	0.62	19.94
Riverton	0.32	0.68	20.81
Tarlee	0.15	0.64	18.13
Stockport	0.19	0.61	16.97
Hamley Bridge . . .	0.16	0.65	16.61
Kapunda	0.32	0.70	19.82
Freeling	0.09	0.62	17.88
Greenock	0.21	0.70	21.57
Truro	0.23	0.68	19.95
Stockwell	0.79	0.71	20.17
Nuriootpa	0.33	0.67	20.72
Angaston	0.28	0.71	22.47
Tanunda	0.17	0.66	22.03
Lyndoch	0.06	0.69	23.46
Williamstown . . .	0.02	0.72	27.77
ADELAIDE PLAINS.			
Owen	0.06	0.86	14.53
Mallala	0.12	0.62	16.59
Roseworthy	0.11	0.58	17.39
Gawler	0.05	0.69	18.97
Two Wells	0.81	0.55	15.75
Virginia	0.37	0.59	17.18
Smithfield	0.05	0.73	17.65
Salisbury	0.11	0.64	18.59
Adelaide	0.14	0.73	21.15
Glen Osmond	0.04	0.72	26.03
Magill	0.05	0.82	25.60
MOUNT LOFTY RANGES.			
Teatree Gully . . .	0.17	0.88	27.33
Stirling West . . .	0.17	1.22	47.05
Uraidla	0.14	1.11	44.19
Clarendon	0.26	0.88	32.89
Morphett Vale . . .	0.37	0.73	22.68
Noarlunga	0.35	0.69	20.41
Willunga	0.21	0.80	26.03
Aldinga	0.14	0.70	20.28

RAINFALL—*continued.*

Station.	For Feb., 1934.	Av'ge. for Feb.	Av'ge. Annual Rain- fall.
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MOUNT LOFTY RANGES—*continued.*

Myponga	0.19	1.17	29.68
Normanville	0.63	0.66	20.73
Yankalilla	0.67	0.78	22.90
Mount Pleasant ..	0.27	0.77	27.24
Birdwood	0.17	0.72	29.24
Gumeracha	0.26	0.83	33.44
Millbrook Res....	0.32	1.12	34.82
Tweedvale	0.22	0.89	35.97
Woodside	0.39	0.90	32.30
Ambleside	0.17	0.88	34.90
Nairne	0.33	0.91	28.17
Mount Barker ..	0.20	0.92	31.97
Echunga	0.20	0.92	33.26
Macclesfield	0.28	0.90	30.44
Meadows	0.25	0.98	36.21
Strathalbyn	0.39	0.72	19.32

MURRAY FLATS AND VALLE

Meningie	0.72	0.61	18.42
Milang	0.35	0.57	14.97
Langhorne's Ck. .	0.58	0.62	14.90
Wellington	0.59	0.59	14.70
Tailem Bend	0.54	0.79	15.08
Murray Bridge ..	0.22	0.59	13.64
Callington	0.18	0.57	15.22
Mannum	0.26	0.49	11.53
Palmer	0.21	0.67	15.55
Sedan	0.24	0.54	12.11
Swan Reach	0.54	0.72	10.62
Blanchetown	0.66	0.57	11.03
Eudunda	0.47	0.65	17.18
Sutherlands	0.25	0.52	10.88
Morgan	0.36	0.56	9.21
Waikerie	1.17	0.96	9.70
Overland Corner	0.10	0.66	10.37
Loxton	0.32	0.98	11.65
Renmark	0.21	0.76	10.49

WEST OF SPENCER'S GULF

Eucla	0.15	0.68	9.98
Nullarbor	0.10	0.48	8.84
Fowler's Bay	0.40	0.49	11.93
Penong	0.60	0.72	12.23
Koonibba	0.67	0.86	12.11
Denial Bay	0.67	0.64	11.52
Ceduna	0.39	0.58	10.16
Smoky Bay	0.39	0.53	10.51
Wirrulla	0.81	0.39	10.50
Streaky Bay	0.19	0.50	14.88
Chandada	0.42	—	—
Minnipa	1.24	0.78	13.87
Kyancutta	0.84	—	—
Talia	0.40	0.43	14.63
Port Elliston ..	0.48	0.45	16.50
Yeelanna	0.99	0.50	16.02
Cummins	0.83	0.53	17.61
Port Lincoln	0.36	0.52	19.43
Tumby	1.02	0.55	14.14
Ungarra	0.77	0.68	16.87
Port Neill	0.63	0.73	13.16
Arno Bay	0.56	0.68	12.63

Station.	For Feb., 1934.	Av'ge. for Feb.	Av'ge. Annual Rain- fall.
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WEST OF SPENCER'S GULF—*continued.*

Rudall	0.66	0.76	13.12
Cleve	1.11	0.68	14.79
Cowell	1.42	0.61	11.12
Miltalie	1.40	0.67	13.64
Darke's Peak ...	1.06	0.80	15.23
Kimba	1.04	0.91	11.84

YORKE PENINSULA.

Wallaroo	0.76	0.51	13.99
Kadina	0.42	0.51	15.69
Moonta	0.56	0.53	15.10
Paskeville	0.25	0.48	15.52
Maitland	0.26	0.65	19.97
Ardrossan	0.12	0.48	13.98
Port Victoria ...	0.37	0.51	15.49
Curramulka	0.16	0.52	17.95
Minlaton	0.20	0.50	17.85
Port Vincent ...	0.10	0.61	14.50
Brentwood	0.25	0.56	15.58
Stansbury	0.16	0.50	16.84
Warooka	0.18	0.54	17.53
Yorketown	0.56	0.50	16.94
Edithburgh	0.55	0.54	16.40

SOUTH AND SOUTH-EAST.

Cape Borda	0.11	0.65	24.86
Kingscote	0.70	0.60	19.16
Penneshaw	0.17	0.82	19.02
Victor Harbor ..	0.25	0.74	21.42
Port Elliot	0.32	0.72	19.95
Goolwa	0.30	0.70	17.87
Copeville	0.55	0.77	11.57
Meribah	0.89	0.64	11.46
Alawoona	0.23	0.70	10.29
Mindarie	0.64	0.66	12.22
Sandalwood	0.43	0.72	13.73
Karoonda	1.30	0.79	14.48
Pinnaroo	0.16	1.00	14.57
Parilla	0.36	0.76	14.01
Lameroo	0.60	0.81	16.10
Parrakie	0.62	0.76	14.64
Geranium	0.52	0.75	16.53
Peake	1.42	0.86	16.13
Cooke's Plains ..	0.51	0.64	15.43
Coomandook	0.79	0.67	17.20
Coonalpyn	1.00	0.63	17.53
Tintinara	1.28	0.81	18.73
Keith	1.08	0.95	17.96
Bordertown	0.45	0.79	19.26
Wolseley	0.64	0.77	18.52
Frances	0.25	0.80	20.01
Naracoorte	0.27	0.76	22.63
Penola	0.09	0.88	26.05
Lucindale	0.04	0.70	23.29
Kingston	0.09	0.72	24.37
Robe	0.12	0.76	24.68
Beachport	0.02	0.93	27.07
Millicent	0.07	1.05	29.81
Kalangadoo	0.11	1.53	32.38
Mount Gambier..	0.15	1.07	30.55

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page.	Dates of Meetings.		Branch.	Report on Page.	Dates of Meetings.	
		Mar.	April.			Mar.	April.
Adelaide	*	—	—	Gladstone	*	30	27
Alawoona	*	—	—	Gladstone Women's	†	20	17
Allanah East	*	30	27	Glencoe	*	13	10
Aima	*	—	—	Goode	1040	—	—
Appila-Yarrowie ...	1034	2	6	Goode Women's...	*	—	—
Arthurton	*	—	—	Greenock	†	5	9
Ashbourne	*	28	25	Green Patch	*	29	26
Auburn Women's ..	*	30	27	Gumeracha	*	26	30
Balaklava	*	26	23	Hanson	*	27	24
Balhannah	†	—	—	Hartley	†	28	25
Balumbah	*	—	—	Hindmarsh Island..	*	—	—
Balhannah Women's	1067	21	18	Hope Forest	1047	5	2
Balumbah Women's	*	7	4	Hope Forest (Wom's)	†	—	—
Beetaloo Valley ..	1036	26	23	Hoyleton	*	19	16
Belalie Women's ...	*	13	10	Inman Valley	1048	15	19
Berri	*	26	30	Jamestown	*	21	18
Belvidere	*	—	—	Jervois	*	8	12
Blackheath	†	1	—	Kalangadoo Women's	*	10	14
Black Rock	*	6	3	Kalangadoo	*	10	14
Black Springs	†	—	—	Kalyan	*	21	18
Blackwood	*	12	9	Kangarilla Women's	*	15	19
Blyth	1036	23	27	Kanni	*	—	—
Booborowie	*	26	23	Kapinnie	*	—	—
Booleroo Centre ...	*	30	27	Kapunda	*	9	13
Boolgun	*	22	—	Karoonda	*	28	25
Boor's Plains	1039	—	—	Keith	*	29	26
Borrika	*	—	—	Kelly	†	31	7
Bowhill	*	26	23	Ki Ki	*	—	—
Brentwood	*	1	5	Kilkerran	*	29	26
Brinkley	*	28	25	Kongorong	*	26	23
Brinkworth	*	26	23	Koolunga	*	—	—
Brownlow	*	—	—	Koonibba	*	29	26
Buchanan	†	—	—	Koonunga	*	—	—
Bute	*	15	19	Koppio	*	27	24
Butler	*	—	—	Kringin	*	26	30
Caliph	*	6	3	Kuitpo	†	—	—
Caralue	*	28	25	Kulkawirra	*	13	10
Carrow	*	28	25	Kyanetta	1041	6	3
Charra	*	—	—	Kybybolite	1031	29	26
Cherry Gardens ..	*	31	28	Kybybolite Women's	1068	—	—
Chilpuddie Rock ...	*	—	—	Lameroo	*	31	28
Clare Women's	*	—	—	Langhorne's Creek .	*	28	25
Clarendon	*	26	23	Laura	*	31	28
Cleve	*	3	7	Laura Bay	1042	13	—
Collie	*	7	4	Laura Bay Women's	*	13	10
Coomandook	*	30	27	Lensw'd & F'st Range	*	—	—
Coonawarra	*	29	26	Light's Pass	†	—	—
Coonawarra Women's	*	21	18	Lipson	*	31	28
Cummins	*	9	13	Lone Gum & Monash	1043	28	25
Cungena	*	1	5	Lone Pine	†	26	23
Currency Creek ...	1046	26	30	Lowbank	*	28	25
Dudley	*	—	—	Loxton	*	9	13
Elbow Hill	*	29	26	Lyndoch	*	27	24
Eudunda	*	5	2	McLaren Flat	*	—	—
Eurelia	*	10	14	McLaren Flat Wm's	1069	1	5
Eurelia Women's ..	*	7	4	Macclesfield	†	15	19
Farrell's Flat	*	30	27	MacGillivray	*	27	24
Finnis	*	—	—	Mallala	*	19	16
Frances	*	—	—	Maltee	*	29	26
Frayville	*	—	—	Mangalo	*	—	—
Gawler River	*	—	—	Mangalo Women's .	*	14	11
Georgetown	*	31	28	Marama	*	—	—
Geranium	*	31	28				

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Branch.	Report on Page.	Dates of Meetings.		Branch.	Report on Page.	Dates of Meetings.	
		Mar.	April.			Mar.	April.
Meadows	*	28	25	Rosedale	†	—	—
Milang	1048	31	14	Roseworthy	*	—	—
Millicent	*	30	27	Rudall	*	27	27
Millicent Women's ..	1070	—	—	Saddleworth	*	30	24
Miltalie	*	31	28	Saddleworth Women's ..	*	6	3
Monarto South	1044	—	—	Scott's Bottom	†	31	28
Moorlands	*	28	—	Shoal Bay	*	27	24
Morchard	*	2	6	Smoky Bay	*	—	—
Morchard Women's ..	*	31	6	Snowtown	*	9	13
Mount Barker	*	19	16	South Kilkerran ..	†	6	14
Mount Bryan	*	—	—	Springton	*	7	4
Mount Compass	*	—	—	Stanley Flat	*	19	16
Mount Gambier	1032	9	13	Stockport	*	—	—
Mount Hope	*	27	24	Strathalbyn	*	14	11
Mount Pleasant	*	9	13	Streaky Bay	*	23	27
Mudamuckla	†	10	14	Sutherland	1038	—	—
Mundalla	†	—	—	Tailem Bend	*	8	—
Mundalla Women's ..	*	29	26	Talia	*	30	27
Murray Bridge	*	—	—	Tantanoola	*	3	7
Murraytown	†	—	—	Tantanoola Women's ..	1034	7	4
Mypolonga	*	—	—	Taplan	*	27	24
Myponga	*	15	19	Taplan Women's ..	*	—	—
Myrla	*	28	25	Taragoro	*	29	26
Nantawarra	1038	29	26	Tarlee	*	—	—
Naracoorte	*	10	14	Truro	*	19	16
Narridy	*	—	—	Tulkinera	*	29	26
Nelshaby	*	—	—	Tweedvale	*	15	19
Nelshaby Women's ..	*	—	—	Ungarra	*	8	—
Netherton	*	28	25	Upper Wakefield ..	*	—	—
Nunjikompita	*	29	26	Urindilla & Su'merto'n	*	5	2
Nunkeri	†	28	25	Waddikee Rocks ..	*	31	28
O'Loughlin	*	12	9	Waikerie	*	9	13
Overland Corner	†	28	25	Wallala	*	14	11
Owen	*	12	13	Wanbi	*	28	25
Palabie	*	—	—	Wandearah	*	27	24
Parilla	*	20	17	Warowie	*	27	24
Parilla Women's	*	21	18	Warowie Women's ..	*	—	—
Parilla Well	*	26	30	Warramboe	†	27	24
Parilla Well Women's ..	*	27	24	Warramboe Women's ..	*	—	—
Parrakie	*	—	—	Wasleys	†	8	12
Parrakie Women's ..	†	27	24	Wasleys Women's ..	1070	1	5
Paruna	*	2	6	Watervale	*	19	16
Paskeville	*	27	24	Wauralte	*	27	24
Pata	*	2	6	Weavers	†	12	9
Penola	*	3	7	Wepowie	†	26	23
Penola Women's	*	—	—	Wepowie Women's ..	*	—	—
Penwortham	†	28	25	Wilkawatt Women's ..	*	20	17
Petersville	*	27	24	Williamstown Wm's ..	*	7	4
Petina	*	24	28	Willowie	*	26	23
Pinbong	*	—	—	Wilmington	1034	13	10
Pinnaroo	*	—	—	Wirrabara	1037	—	—
Pinnaroo Women's ..	*	30	20	Wirrilla	*	1	28
Port Elliot	†	—	—	Wirrilla Women's ..	*	1	5
Pygery	†	27	24	Wirrulla	*	21	18
Pygery Women's	*	—	—	Wolseley	*	12	9
Quorn	*	—	—	Wudinna	*	—	—
Ramco	1044	26	23	Yadnarie	*	27	24
Redhill	†	—	—	Yandih	*	9	13
Rendelsham	†	31	28	Yaninee	*	—	—
Rendelsham Women's ..	*	—	—	Yeelanna	*	28	25
Riverton	*	12	9	Yurgo	*	—	—
Roberts & Verran ..	*	—	—	Yurgo Women's	†	—	—

No reports received during the month of February. † Held over. x In recess. ‡ Formal.

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

[Branch Secretaries are reminded that the following are exempt from payment of the Annual Bureau subscription:—Life members, Branch Secretaries, members appointed before August 1st, 1930, and new members who reside in the same house as (a) a life member, (b) Secretary, or (c) another member who already subscribes.

The subscription for all other members is 2s. 6d., commencing from August 1st in each year, provided that—subject to the above exemptions—nominations forwarded during the months of January to June must be accompanied by a payment of 1s. 6d. each nomination for that period.]

MEN'S BRANCHES. SOUTH-EASTERN DISTRICT.

KYBYBOLITE.

December 15th.—Attendance, 32.

FARM MACHINERY.—Mr. A. R. Shepherd read the following paper:—"The most important points in the care of farm machinery are protection, lubrication, careful handling, adjustments, and an occasional coat of paint. All implements which contain woodwork of any description should be afforded protection. Quite a number of machines are only used one month in the year and then left under a tree for the remaining 11 months. Consequently they are rotted and rusted long before they have a chance of wearing out. This necessitates a large machinery shed, preferably constructed of galvanized iron. A straw shed continually needs fresh straw to keep it waterproof. The risk from fire when using straw is enormous, and it also makes a comfortable home for the sparrows. An occasional coat of paint or oil will greatly add to the life of implements, but if machines are cleaned and put away under cover as soon as their jobs are completed they will retain their original coat of paint for years and painting will become almost unnecessary. If all wooden wheels on wagons, carts, drays, and buggies are soaked in oil once a year, it will not only dispense with the trouble and cost of cutting and shutting tyres, but will preserve the wood indefinitely. The lives of boxes and axles of ploughs can be prolonged by making a good leather or tin guard around them, or a super bag is quite satisfactory. Never put a drill or combine in the shed before first cleaning out the super hopper, and see that the tubes hang straight, or take them right off. Lubrication: Only the very best oil and grease should be used. Before starting a machine that has been idle for some time, all oil cups should be thoroughly cleaned, wicks replaced in their right positions, and broken ones renewed. The cups can then be filled with kerosene, this will remove all gummy oil from the bearings and give fresh oil a good lead. All machinery will at some period need some small adjustments, and these should be done as soon as they become necessary and not left until some damage has been done. After working a new machine for a day or two, it should be examined thoroughly to see if all bolts are tight, and none are broken, as it is the first few days that they are likely to work loose. Thereafter, if the operator keeps his eyes open when oiling, he will notice anything that is amiss; it is the 'stitch in time that often saves nine.' The preparation of all harvest machines should be done a week or so before they are needed, then when the crop is ready one can get straight at it with no waste of time. The binder, header, and harvester, having many working parts, need special attention—all chains and gears need adjusting occasionally. A gear meshed loosely will wear rapidly and be very noisy, one meshed too tightly will give heavy running and throw undue strain on the bearings. In these localities where very little sand is encountered, frequent applications of old sump or gear case oil to crown wheels, pinions, and gears will be found of great benefit. The mower—which is now becoming popular in this district—needs more attention than the average farmer is led to believe. Ledger plates should

be renewed as soon as the edge becomes dull or broken. The steel knife supports on finger bar should be adjusted as they wear to keep the knife in its right position. The knife clips will also need binding, thus ensuring that the knife will be kept down on ledgers. The knife should be sharpened at least twice a day, and if these points are watched, there will be not only a great saving on working parts, but also on horse flesh. To get the best out of the farm engine there are quite a number of points to watch. One often sees an engine belching smoke like a railway locomotive, consequently it is probably wasting as much fuel as it is converting into power. The most likely causes for this are unsuitable fuel for that particular engine, engine too cold or wrongly adjusted. It is a good plan to try a variety of brands of fuel, it will be soon noticed which is giving the best results. Speaking generally, more harm is done to engines through running them at too low a temperature than results from overheating. The reason for this is immediately the vaporised moisture in the air taken in strikes the cold cylinder wall it condenses, thus forming a film of water. This water on account of it being a poor lubricator causes the piston and cylinder to wear rapidly. Therefore, to eliminate this, engines should be worked very near to boiling point and some of the smaller types give best results while working at boiling point. There are many farmers, regardless of repeated warnings given by manufacturers, using heavy bearing oil for lubricating the cylinder. A lot of good will result from giving the valves a grinding occasionally, this being done similar to those of a motor car. The ignition being of vital importance, magneto and spark plugs should not be neglected, although good makes need little attention. It is now being found with the high compression used for the charcoal gas producer on tractors and trucks that cheap magnetos are worthless. So it will be seen the higher the compression the more efficient the ignition must be. If an engine is prone to pre-ignition on heavy loads it can sometimes be stopped by making the mixture a little richer. The most essential item for cutting expenses of repairs is a blacksmith shop, and no farm is up to date without one. One great advantage is that many a wet day can be very profitably spent. Quite a useful outfit can be purchased from £20 to £25. No expert knowledge is needed to effect a number of repairs which otherwise would be tied with a piece of wire, only to break again at some inconvenient time. To say nothing of the countless other jobs such as sharpening tools, making swings, gate hinges, hooks, and shoeing, that can be accomplished by any handy man. If these things are made from old scrap iron, which can be easily obtained, their costs would be practically nil." At the conclusion of the paper Mr. Shepherd gave some interesting hints on grinding combs and cutters for a shearing machine. (Secretary, A. Shepherd.)

January 30th.—Attendance, 15.

The meeting took the form of a Question Box. What was the cause of fermentation in tomato sauce? *Ans.*: Nearly always faulty vinegar. Remedy—Empty sauce into large basin and add a little baking soda (1 teaspoon to quantity contained in 6 bottles). basin and add a little baking soda (1 teaspoon to quantity contained in 6 bottles). Stand for a while and then boil again. How to deal with borers in sideboards? *Ans.*: Spray with mixture of turpentine and epsom salts. How to remove grass stains from clothes? *Ans.*: Rub with eucalyptus, then wash. How to overcome the difficulty of buttermaking in summer? *Ans.*: Hang cream out in air overnight in wet calico bag. (Secretary, Mrs. W. Kekwick.)

MOUNT GAMBIER (Average annual rainfall, 30.55in.).

January 12th.—Attendance, 9.

IMPORTANCE OF THE DAIRYING INDUSTRY IN THE SOUTH-EAST.—Mr. R. W. Grancy delivered the following address:—"The dairying industry in the South-East is a major industry, yet a great number of people insist on saying that their cows are a sideline. The man at the factory regards this as a feeble excuse for lack of care in the delivery of milk. Suppliers fail to realise the importance of this branch of their product. They pay more attention to their fences, land, and animals. But in the milking process and carriage of the milk to the factory haste seems to be the chief factor, and cleanliness suffers.

Cleanliness Important.—It is not possible for every dairyman to build perfectly clean milking yards, because of the expense involved, but they can, with very little expense, ensure these points, which are easily carried out:—(1) That their hands are clean before going to milk; (2) that the udders and teats are washed before milking; (3) that each bucket and can has been thoroughly cleansed since the last time it was used. This point is the greatest cause of trouble to the supplier and to the factory. In some districts milk obtained from cows with milking machines is not accepted at the factory because it has always been difficult to determine how clean these machines

really are. When milking, all milk should be carefully strained, and cans removed from the cowyard and any odour. Aerating is very beneficial if it is done in a clean place away from smells and dust—it allows the food flavor to escape, and, by cooling, the growth of germs is retarded. Aerating in an impure atmosphere does more harm than good. It is remarkable how very few farmers cool their milk. Cooling can be done by placing the cans in cold water, but it must be remembered that the water must be changed as it becomes warm from the heat of the milk. As in all branches of dairying, cleanliness is of the greatest importance. Sufficient care is not devoted to the raw material by those who milk the cows and handle the milk before it is delivered into the factory, and it is at this stage that it is more liable to contamination from careless and uncleanly habits.

Conditions at the Farm.—While conditions of manufacture have been brought to a reasonably good standard, the general conditions on many dairy farms leave much to be desired. The conditions there are far from ideal, and without suggesting

Roseworthy Agricultural College.

JERSEY BULLS FOR SALE

ROSEWORTHY PRETTY DUKE 7589.

Born, May 19th, 1929. Tattoo Ry. 032.

Sire—King Solomon of Dalebank 1699 by Makarini (Imp.) 995.

Dam—Pretty May of Dalebank 23560 by Duke of Dalebank 2642.

G.Dam—May 3rd of Dalebank 13845 by You'll Do of Dalebank 1711.

G.G.Dam—May 2nd of Dalebank 6626 by Pretty Mike 787.

Record of Dam.—As Junior 4 years old—Milk, 5,845½lbs.; average test, 5.30 per cent.; butterfat, 310.02lbs.

ROSEWORTHY SPRITE—Entered in Herd Book, Vol. 20

Born April 15th, 1930. Tattoo Ry. 041.

Sire—King Solomon of Dalebank 1699 by Makarini (Imp.) 995.

Dam—Roseworthy Fairy 19077 by King Solomon of Dalebank 1699.

G.Dam—Fairy Queen III. of Linden 7525 by The Chief of Linden 1065.

G.G. Dam—Fairy Queen II. 5528 by Admiral 1062.

Record of Dam.—	Lbs.	Per cent.	Lbs.
As Junior 2 years old . . .	6,000	5.24	314.18
Junior 3 years old . . .	7,270½	5.44	395.56
Junior 4 years old . . .	8,098½	5.40	437.87
At 5 years	10,108½	5.64	570.68

Both bulls are eligible for sale under Government Subsidy. Bull calves also available.

SOUTHDOWN EWES FOR SALE.

A number of Stud Southdown Ewes for sale. Prices according to age and quality.

For further particulars apply to—

The PRINCIPAL,

Agricultural College,

Roseworthy, S.A.

improved milking yards and bails at a time when low prices are the rule, a general improvement in handling the product and associated conditions could be effected in most cases with no extra expense and with very little extra time.

Dairy Regulations.—Since the Dairying Regulations have come into force in the South-East it has been compulsory to grade all milk brought to the factory. This, no doubt, has to be done by the man that holds the grading certificate. The man grading relies on taste and smell; failing this he has his acidimeter, which science has brought forward. These have been used in factories continuously of latter years. The acidimeter is not new to dairying, as many years ago Mr. John Davidson, a great cheesemaker in early days, brought it from New Zealand and used it at a factory near Millicent. Many taints and smells develop in milk as a result of people carting whey in milkeans and leaving it in them until they want them for the evening's milk. This practice, combined with a hurried wash at the last minute, becomes a serious menace to good quality. The regulations state that no whey shall be removed from any factory in cans used for milk unless scalded to 180 degrees and held at same for 30 minutes. This scalding of whey seems impossible, and the sooner we leave off putting whey in the cans the better for all concerned. The observance of regulations by persons who are usually clean in regard to handling milk products presents practically no difficulty at all, but these regulations are really formed with the intention of straightening up the careless or negligent supplier. Strict grading of milk and its products is an absolute necessity nowadays if we wish our product to maintain a good reputation not only on the local market, but overseas as well. The cheesemaker, no matter how good he may be, has not yet been born who can make a satisfactory article from inferior quality milk. Unfortunately, the careful supplier in the past has had to suffer to some extent as a result of the careless one. One or two faulty milks have frequently ruined a whole vat of reasonably good quality milk, and the reduced price which is realised for the finished product affects all patrons in a like manner. If the regulations provide the means of improving some, if not all, of the low quality milk to a higher level they have been well justified." (Secretary, G. Gurry.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Rendelsham ...	3/2/34	7	Formal	F. White
Mundalla	12/2/34	11	Question Box	A. Ross
Mount Gambier	9/2/34	25	Social	G. Gurry

UPPER NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

APPILA (Average annual rainfall, 14.66in.).

February 2nd.—Attendance, 14.

HARVEST REPORTS.—Members reported an erratic germination. Other than a little damage by smut, no diseases were reported. Although hot winds in October made some reduction in yields, in many instances crops turned out much better than was anticipated. The following yields were reported:—Nabawa, 18bush.; Ranec, 18bush.; Turvie, 18bush.; Sultan, 16bush.; Sepoy, 15bush.; Leather Head, Currawa, 15bush.; Free Gallipoli, Gallipoli, Dan, Canaan, 14bush.; Noongar, 13bush.; Waratah, 16bush.; Nawab, 12bush.; Teagle, 14bush.; Daphne, 9bush.; Caliph, 8bush.; Sword, 8bush.; oats, 36bush. and 15bush.; barley, 19bush. and 9bush. (Secretary, E. Wurst.)

WILMINGTON (Average annual rainfall, 17.43in.).

February 13th.—Attendance, 17.

HARVEST REPORTS.—The two outstanding crops in the district were those of Messrs. E. H. Hampel and M. H. Modystach. Mr. Hampel's crop was sown on fallow with 60lbs. seed with 80-90lbs. super, and the seed dry pickled with 2ozs. to the bushel. No disease or haydie present; a little flag-smut in Onas and Gallipoli. Yields:

Ranee 26bush.; Onas, Currawa, and Gallipoli 24.25bush. Mr. Modystach: Sown on fallow and 65lbs. seed, 60lbs. super. Ranee 21bush., Joffre 18bush., Federation 21bush., and Free Gallipoli 27bush. Mr. J. J. Modystach: Ranee 21bush., Ford 18bush., sown on fallow, 1bush. seed per acre and 30lbs. super mixed with 30lbs. stable manure. Other crops not in favored areas were poorer in yields owing to the unfavorable growing period, mainly through lack of rain. The most outstanding wheat was Ranee, which did well in every instance. Gallipoli made a favorable impression by yielding better than it looked, although only a small area is yet sown with this variety. In many instances Nabawa was not favorable, and a few farmers are discarding this variety. All late sown crops were practically failures. Mr. E. L. Orchard (District Instructor), in a summary of the reports, mentioned that Ranee was the most outstanding wheat in the north, closely followed by Nabawa. He advocated the sowing of Ghurka where Nabawa was unsatisfactory, as this variety was closely related to Ranee. The Hon. Secretary (Mr. C. Cole) read a paper, "Aberdeen-Angus Cattle."

PARAFIELD POULTRY STATION.

NOW BOOKING ORDERS FOR SPRING, 1934.

EGGS FOR HATCHING AND DAY OLD CHICKENS

WHITE LEGHORNS.

EGGS.—7s. 6d. per Setting of 15 Eggs. Incubator Lots, £2 per 100.

DAY OLD CHICKENS.—15s. per dozen; £4 per 100.

BLACK MINORCAS.

EGGS.—7s. 6d. per Setting of 15 Eggs. Incubator Lots, £2 per 100.

DAY OLD CHICKENS.—15s. per dozen; £4 per 100.

**Free on Rail,
Salisbury.**

**DELIVERY.—CHICKS—July to September.
EGGS—July to September.**

Intending breeders should recognise the importance of establishing their flocks with only the very best of stock also, pay particular care to the size of the egg. The future of the poultry industry in South Australia is almost entirely dependent on the export trade; the size of the egg for export is of the greatest importance. The breeding stock at Parafield is carefully selected and every egg set or sold is of a minimum weight of 2ozs., and a large percentage considerably over.

All Eggs and Chickens sold from Parafield Poultry Station are guaranteed to be produced at Parafield.

EARLY BOOKING IS ADVISABLE.

Further particulars can be obtained from the Manager, Parafield Poultry Station, Salisbury, or Poultry Expert, Department of Agriculture, Flinders Street, Adelaide.

C. F. ANDERSON, Poultry Expert.

Other Report Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Wepowie	5/9/33	14	"Weed Destruction"— H. Noste	E. Roocke

MIDDLE-NORTH DISTRICT.**(PETERBOROUGH TO FARRELL'S FLAT.)**

BEETALOO VALLEY (Average annual rainfall, 23.50in.).

Attendance, 9.

HARVEST REPORTS.—Mr. J. Fradd reported that wheat yielded better than the previous year; Ranee 11 bags, and Nabawa sown on stubble land 5 bags per acre. Mr. P. Ourtin received 11 bags per acre from Sword, 8 bags Nabawa, and 7 bags from Currawa. Hay cut was heavy and prices were good for the light wool clip. The citrus crop was light with low prices. Mr. W. Semmens' average was low: Daphne 5 bags, Currawa 4, Nabawa 3½, and Florence 4. Mr. B. Giddings received 6 bags of Brunswick peas per acre from a crop slightly affected with grubs. Hay cut 30cwts. Citrus crop light. Mr. J. Ryan's citrus crop was light, tomatoes good, and hay cut fair. Mr. J. Halse's wheat crop averaged 7 to 8 bags; Sword 10, Currawa 8, and Nabawa 6 bags per acre. The wool clip was light, but prices compensated with a 19d. average. Citrus very light. Mr. S. Jones received a 30cwts. hay cut from Waratah and 6½ bag yield from Currawa. Apples fair, citrus light, and prices low. The Secretary reports there is every prospect of a good citrus crop for next season, although the season is rather dry at present. Apples and pears are light owing to frosts. (Secretary, B. W. Giddings.)

BLYTH (Average annual rainfall, 16.77in.).

January 26th.—Attendance, 19.

DO SIDELINES PAY?—Paper read by Mr. W. Brereton:—"I am of the opinion that sidelines are a profitable avenue of farm activities. The figures quoted are the average prices of the various products over the last few years. The best sidelines are sheep, cows, fowls, and pigs. *Sheep.*—I have worked this out for a farm to carry 120 for the breeding of fat lambs for the market with an 80 per cent. lambing (96 lambs). All of these may not be fit for market, and allowing 16 to be culled out and 30 other sheep for filling, the meat should pay the interest and paddocking of the rest:—120 ewes, cutting 10lbs. of wool at 8d. per lb., £40; 80 lambs, averaging 12s. each, £48; 46 skins at 4s. each, £9 4s.=£97 4s. *Cows.*—A farmer can keep six or eight cows, so I have worked this out on the larger number. It takes no more to feed a good cow than a poor one, and a cow that does not give 300lbs. butterfat at maturity is not worth keeping. There will be seven calves a year from this number of cows, and five of these could be sent to market and the other two kept to place in the herd if it is decided to cull one or two for age at a later period:—8 cows produce 2,400lbs. butterfat at 9d. per lb., £90; 5 calves at 35s., £8 15s.=£98 15s. Eight cows would consume 16 tons of chaff at £2 per ton, £32; 3 tons bran at £5, £15; 2 bags salt at 6s., 12s.; bonemeal and super, £1=£48 12s.; total=£48 12s.; balance=£50 3s. *Fowls.*—Fowls running on free range do not require so much feed as those kept in houses. Two hundred fowls would eat about 75 bags of wheat in a year and lay about 15 dozen eggs per bird; 200 hens would lay 3,000 dozen eggs, at 6d. per dozen, £75; 75 bags wheat at cost of production, 10s. bag, £37=£37 10s. *Pigs.*—It takes three bags of wheat to produce a handy-weight bacon pig of about 140lbs, and a farmer should be able to put 20 pigs through his hands in a year with the separated milk and plenty of water, buying them as weaners and selling as baconers:—20 baconers at £3 10s. each, £70; against 20 pigs bought as weaners at 12s. 6d., £12 10s.; 60 bags wheat at 10s., £30=£42 10s.; balance=£27 10s. These figures added together show:—Sheep, £97 4s.; cows, £50 3s.; fowls, £37 10s.; pigs, £27 10s.; a total of £212 7s." Members considered that the writer had over-estimated the income from sidelines. Mr. Stuart delivered an address on "The History of the Merino Sheep." (Secretary, R. Eime.)

WIRRABARA (Average annual rainfall, 19.34in.).

August 12th.—Attendance, 14.

MANAGEMENT OF HORSES.—Paper read by Mr. A. Hill.—“Working horses need good care, plenty of feed and water, and well-fitting harness. Collars should fit them comfortably, and the hames fit the collar. I prefer the short hames with a strap at the top. The long hames tend to spoil the collar by pushing it out of shape and pinching the top of the horse’s neck. If the collar is pulled too narrow in the top, immerse it in water until it is properly soaked, and then obtain a piece of board the right width and put it in the top of the collar and buckle it up and leave the collar until it is dry. It will then be the right shape. If a horse has a sore shoulder, procure a fresh sheep skin—just shorn, if possible, is best—no matter how fat it is, line the collar with it, with the flesh side to the horse’s shoulder, and that in many cases will cure bad sores. When working horses they should be in the yard by sundown, or they will not keep their condition. Do not over-drive or overload them. See that trace chains are both the same length, and swings and spreaders the right width, and there will be very little trouble with sore shoulders.” (Secretary, F. Borgas.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Wirrabara.....	9/9/33	10	Formal	F. Borgas
Wirrabara.....	7/10/33	9	Formal	F. Borgas
Wirrabara.....	9/11/33	12	Homestead Meeting	F. Borgas
Redhill	30/1/34	12	Address—W. J. Spafford	S. Pengilly



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The SCIENTIFIC WET AND DRY PICKLE

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

NANTAWARRA (Average annual rainfall, 15in.).

January 25th.—Attendance, 9.

LUCERNE.—Mr. W. J. Hamdorf read an article from the *Journal*, "Establishing Lucerne in the Bute District," and spoke of his experience of lucerne on sand, carrying three times more stock to the acre than natural pasture. It made good use of many acres of drift sand that was useless for feed previously. Mr. Hamdorf said Wimmera rye grass was a good green fodder, was no trouble in the cereal crop, and kept green much longer than any natural pasture. Mr. E. V. Hamdorf thought lucerne a wonderful feed plant; 2lbs. of seed to the acre could be sown. He had tried 4lbs. this year with wonderful results. Wimmera rye grass was a splendid winter feed, and made enough growth to choke out barley grass, and was a remarkable fodder for fat lamb raising. Mr. Palfrey thought Italian rye grass made better growth and would be better than Wimmera rye grass. Mr. G. Belling spoke of livestock activities coming more into prominence. Mr. Nicholls thought the introduction of grasses a wonderful asset, and mentioned Mitchell grass as being good for fodder. Mr. W. Starkey introduced a discussion on the care and treatment of the draught stallion. (Secretary, S. Herbert.)

SUTHERLANDS (Average annual rainfall, 10.88in.).

December 7th.—Attendance, 14.

DAIRYING IN THE SUTHERLANDS DISTRICT.—Paper presented by Mr. J. Schroeder:—"It is necessary to find out as soon as possible which are the good cows and which are the boarders, because there is little enough in good cows and less in bad ones. This can be done by weighing the milk from each cow and testing it, for which purpose a Babcock tester is necessary. Failing that, the factory manager will do the testing and the Department of Agriculture will also test the herds for a small fee. Testing should be done at, say, intervals of three to four weeks, to ascertain which cows should be excluded from the herd. In districts where it has been necessary to economise an attempt should be made to build up the herd with stock that will produce well.

Milking Cows.—Before commencing to milk the milkers should always wash their hands, and to avoid the fine dust from entering the milk, the cow's teats should be washed, as this dirt or fine dust enters the bucket and dissolves in the milk and no strainer will catch it.

Feeding Cows.—It is impossible to get good returns from the best of cows unless given a ration from which to produce milk and butterfat. It is most unfortunate for farmers of this district who are so often handicapped with failing seasons, but if possible in good seasons oats could be sown so that cows could be fed on a little crushed oats and bran. It is advisable to find out the most suitable feed, because some cows can consume more concentrates than others without hurting them. To assist the cows in dry years, a drench should be given once every month.

A large plot of lucerne would require too much water and prove too costly, but those farmers who have the water would be amply rewarded if they grew a small plot of lucerne, so that a handful or so a day could be given the cows. It is a common occurrence for cows to chew bones and rags, which signifies that there is something lacking from their food. To correct this habit I suggest a salt lick, or mineral added to the feed.

Young heifers should be encouraged to become accustomed to handling. This helps to break them in for when they have to be milked. If possible, milk without the use of the bail; the cows are more contented and can be approached anywhere in the paddock. Teach each cow to know its place at feeding time, because the 'bosses' soon devour their rations and then keep the others away from theirs.

Calving.—A week or so prior to calving it is a good plan to treat the udder of the cow with a little lard; it is a simple remedy and cheap, but will often help to prevent a lot of trouble. Continue this for several days after calving. A cow that has calved should be milked three times a day until her milk is fit for use." (Secretary, E. Schiller.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Greenock	8/1/34	27	Address—W. C. Johnston	A. Schubert
Greenock	1/2/34	31	Address—S. Shepherd ...	A. Schubert
Light's Pass ...	29/1/34	23	Question Box	C. Verrall
Penwortham ...	31/1/34	7	Discussion	A. Jenner
Black Springs ..	30/1/34	12	Harvest Reports	K. Dunn
Rosedale	5/2/34	15	Annual Meeting	S. Sincok
Buchanan	22/2/34	13	Harvest Reports	L. Bell
Koolunga	13/1/34	14	Harvest Reports	I. Jones

YORKE PENINSULA DISTRICT.

BOOR'S PLAINS.

February 4th.—Attendance, 14.

HARVEST REPORTS.—Mr. R. Yelland gave the following report:—"The season has been below an average rainfall for the district, and the lack of winter rains, together with the dry finish, thinned the crops considerably, and some crops suffered with the late frosts. Despite these factors, it is pleasing to see the amount of wheat that has been reaped. Good fallow and the right time of sowing, &c., together with suitable wheats are points in favor of the grower. The most popular wheat was Sword; it has done well in practically every district. Barley was not up to standard, but if one had a good sample it was a better proposition than wheat. Seventy acres of Sword on fallow yielded 508 bags; a fine crop until damaged by the hot winds. It is inclined to be a little delicate—like Ford—on the poorer class of ground. One hundred and fifty acres of Nabawa and Daphne on fallow returned 1,076 bags. Daphne was the better crop. The best of it went eight bags, but it had the better end of the paddock. One hundred acres of Rance on fallow yielded 724 bags. One hundred and fifty acres of Waratah on fallow returned 884 bags. This crop was severely frostbitten. Sixty

1933

CALENDAR

1933

SEPTEMBER

OCTOBER

NOVEMBER

DECEMBER

S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	
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24	25	26	27	28	29	30	29	30	31	26	27	28	29	30	31
...

1934

CALENDAR

1934

JANUARY

FEBRUARY

MARCH

APRIL

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MAY

JUNE

JULY

AUGUST

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SEPTEMBER

OCTOBER

NOVEMBER

DECEMBER

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...

● FULL MOON.

acres of fallow and grass ground sown with Ranee yielded 336 bags. The total yield off 770 acres reaped was 4,826 bags, and with the overweight an average yield of 19bush. per acre." (Secretary, S. Chynoweth.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
South Kilkerran	6/2/34	10	Discussion	O. Heinrich (actg.)

WESTERN DISTRICT.

GOODE (Average annual rainfall, 10.16in.).

November 1st.—Attendance, 14.

CARE OF FARM HORSES.—Paper read by Mr. B. A. Linke:—"There has been a considerable disregard in the breeding of draught stock, the adoption of tractors in many cases being the cause of this neglect. The tractor, which had the effect of discouraging breeders of draught horses, is not likely to prove such a deterrent in future as it has in the past, unless, perhaps, if gas producers prove a success, and even if they do, we have still to meet the necessary costly repairs, which have to be imported. Many tractor owners are desirous of either reverting to or making greater use of horse power, and in many cases are prevented by doing so by their inability to purchase horses. The tractor slump is largely responsible for the high prices being realised for horses to-day, therefore some tractor owners are forced to continue with their tractors for the present, and if farmers do not breed draught stock there will be an acute shortage in the future, for not only a large number of the present tractor owners will require horses, but farmers who have relied solely on horses have many old ones which will need replacing. Horses are the best form of pulling power and are also best for both the health of the driver and the life of the implement. It is not a wise plan for farmers to breed the big, heavy horse for this district; the medium, nuggety draught is preferable. This type of horse stands up to the work and conditions better, does more work in less time than the heavy horse, and requires less feed and water. As his livelihood largely depends upon his horses, it behoves the farmer to give them reasonable care and attention. A good stable, warm in winter and cool in summer, will go a long way towards keeping horses fit and in good working condition. After long spells, horses should be stable fed for a few days before beginning to work; give them only a small amount of feed for a start and gradually get them used to feed. It is advisable to work for two or three hours only for the first day, gradually increasing the length of time until at the end of the week the team should work full days without showing signs of distress. If horses are worked full days from the outset, they rapidly fall away in condition, besides getting badly scalded shoulders. Working horses are only capable of doing a given amount of work each day; if pushed beyond this point, a reaction sets in and horses rapidly fall away in condition, and one will not accomplish any more work, in fact one will not accomplish as much, because the team will be worn out and will not travel nearly so well. To get the maximum work from horses they should be carefully stabled, have as much water as they will drink at least three times a day, and good, nourishing food, for preference, oaten hay chaff. Regular punctual feeding is of paramount importance. Always feed enough but not too much; be sure that they always eat all the food which is given to them. Horses should have free access to water; oftentimes when they first come in from work they do not drink properly. It should be the aim of every farmer to keep his horses in good condition. It takes less feed to keep them in good condition than it does to keep them in a poor condition. Do not work horses after sundown, the sweat will not dry overnight and is therefore likely to cause a chill and other illness. To work horses half an hour after sundown is much more detrimental to their health than several hours earlier in the morning. When driving horses do not 'push' them; they will go their own pace and will do much more work than the pushed horse in the long run. Horses should be well groomed each morning before they are put to work; this not only adds to their appearance, but also assists in keeping them in good health. It is not a wise practice to turn horses out on greenfeed on week ends in seeding time, as this is likely to cause scours. Use one more horse in the team than is

necessary to do the job; this not only considerably lightens the work, but the horses work along more quickly. Horses should on no account be tied up overnight; if they are managed correctly, they will feed all together at a long manger quite contentedly. The teams should be driven home from work and not let run on their own accord, especially when there are brood mares among them. The teeth of horses should have periodical attention; a large number of internal troubles are caused through defective teeth; amateurs should not attempt the cutting and filing of the teeth. The hoofs should also be cut and trimmed whenever necessary: if they are left unattended for any length of time they split and cause lameness. The manes and tails should have frequent attention. In connection with sore shoulders, prevention is always better than a cure; slight sores at times may be difficult and perhaps impossible to avoid, but if a team of horses is well cared for, one will seldom find sore shoulders. If, however, horses have sore shoulders, the best method to effect a cure is to put thin pads on either side of where the sore comes on the collar and also keep some softening ointment, such as medicated oil, on the sore. This will be a more permanent cure than if the horse was spelled until the sore healed. Do not spell horses which have sore shoulders, because experience shows that in the majority of cases the sore will again break open when the horse is put to work. Collars should fit well and be kept well lined; sweat marks and dirt should be cleaned off the collars and the horses' shoulders each morning before commencing work. The chains should be equal in length and free from wire or split links. Mares in foal should be worked on the outside of the team, where they are not so likely to get bumped, and thus cause the loss of either the mare or foal. Mares in foal should not be turned out in paddocks to spell; they are likely to get over fat, and when in this condition there is a danger of serious trouble at foaling. Mares that are used for breeding purposes should be kept out of any heavy pulling; ordinary work will not hurt them, in fact they should have light work right within a few days of foaling. When mares are about to foal they should be put in a separate paddock away from the other horses, and preferably near the house, so that they can be watched and have attention if necessary. Until foals are strong enough to look after themselves, keep them with their mothers, away from the other horses. When weaning foals put them in a paddock, where they can get plenty of exercise, water, and feed, and out of sight of mothers and other horses. If foals are properly handled from birth, they require very little breaking in, and if this method is adopted it will greatly minimise the risk of injury to both man and foal. When the foal is only a few days old it should be caught and handled and stroked and have its legs lifted. A small halter should be put on the foal and tied up for a few minutes. This handling should be repeated every few days until the foal is thoroughly used to it, when it should be taught to lead. Foals should not be tied up with a rope around their necks; use a halter and a rope and this will prevent choking down. If it is well grown, a colt can commence light work at 2½ years, but only worked for about two hours a day for the first few days, gradually increasing the length of time until quite fit to work with the rest of the team. Commence working a young horse in fallowing time, at that period a few hours lost is not so important as harvest or seeding. 'Treat horses well and they will give you good service'." (Secretary, B. Linke.)

KYANCUTTA.

November 7th.—Attendance, 13.

HARVESTER versus STRIPPER.—Mr. A. Simmons read the following paper:—"So far as costs are concerned the stripper and power winnower is a more costly unit—to the extent of approximately £100—than the harvester. At this amount, in due course, will be considerably reduced when after a season or two the harvester requires expensive new parts. I realise the extra labor attached to the working of a stripper to that of the harvester, but one is somewhat compensated for this by the maintaining a supply of feed, be it for working stock or sheep, and as too often has been the case, a shed or heap of cocky chaff has never been found to be amiss. It is here that the stripper has proved to be an invaluable machine. It has been argued that the harvester can do likewise in the saving of cocky chaff, but while this is granted to a certain extent, it has its disadvantages in the form of its carrying capacity, unloading, and the broadcasting of undesirable weeds. It oftentimes happens that certain sections of a crop are of a very light nature—necessitating the use of the stripper—and it is here that pride of place must be given this machine. In times of depression,

consequent upon low prices, the order of the day must be economy, therefore one cannot afford to purchase two machines when one can meet all seasons, good or bad, and still maintain the feed supply. The power winnower is also a labor-saver for saving and removing the chaff, for if a suitable frame is arranged on the wagon or truck it can be placed under the chaff elevator, and thereby loaded at will and removed to its destination. The running costs of the stripper are very light, and are few compared with that of the harvester; particularly would this be most noticeable when a stripper and harvester purchased at the same time had been running for a year or two. In many cases on the West Coast farmers are not blessed with an over-supply of horses, consequently they are working with the bare team of eight horses, and it is here again seen that all horses being workable, a change of team can be worked with the stripper, thus preventing the animals from becoming over-tired and saving any waste of time. The sample that each machine turns out: It is often seen that the harvester allows a certain percentage of chaff to congregate in the seedbox, this being due to the team slackening its rate of speed or taking the turns, which sometimes cannot be taken at other than snail's pace; but with the stripper the pace is not altogether an essential factor, for where the stripper has not really done its work, the power winnower will complete the job to the entire satisfaction of all concerned. I would not advocate the hand winnower to work in connection with the stripper, its progress being too slow with that of power. Should the elements prove contrary to seasonal expectations, a start can be made to clean up a heap or two according to size, and anything up to 200 bags or over can easily be put through, providing enough grain prevails throughout the heaps. Why I so much favor the stripper to that of the harvester is because the country generally is too rough for a heavy drawn implement; it is subject to severe straining, to say nothing of broken parts and hold-ups, and costly spare parts." (Secretary, E. Kelly.)

LAURA BAY.

December 12th.—Attendance, 12.

SEED WHEAT.—Paper read by Mr. E. Barnett:—"Care should be taken to select only seed that is true to type, free from disease, and free from barley, oats, &c. In this district most farmers rely on exchange of seed with their neighbors. Harvesting time affords the best opportunity to select seed in this way because it can then be seen which varieties have stood the test of the season. It is a good plan to leave a wheat crop that is intended for seed until the end of harvesting, because it stands a better chance of becoming bleached with rain and dews and is less liable to infection by smut. Farmers should change their seed wheat frequently to keep it true to type. To harvest seed wheat, only the stripper should be used. Choose cool weather and do not set the beaters too close to threshing plates; this method tends to avoid cracking the grain and injuring the germ of the seed. All seed should be graded. Where a grader is not available, it is a good plan to put the seed twice through the hand winnower, using the small zinc sieve. By keeping the sieve level and fairly full of grain most of the inferior grain and foreign matter can be floated off."

CARE OF FARM IMPLEMENTS.—Paper read by Mr. W. Bailey:—"The cost of implements and spare parts has so increased this last few years that it is necessary for the farmers to take every care of the machines, not only when working, but also during the times they are not in use. The plough or cultivator should have all bolts firmly screwed up, and the wheels washered and greased regularly. If an axle becomes so worn as to allow the grease to run out, it should be replaced with a new axle; this should apply to all machines, especially those having complicated parts. It is essential that every working part should have proper lubrication. Carry a small piece of wire with a tapered point for cleaning out all oil holes. Go over the implements at the completion of the season's work and see that they are in good order when needed for the next job. If this is done there will not be a last minute rush to get the machine ready to start work. The machine should not be worked with badly worn parts; this places a strain on other parts and makes it heavier to work and probably shortens the life of the machine. Cover up the drill and combine when left in the paddock, otherwise in case of rain the super gets wet, clogs the distributor cups, and perhaps breaks a casting. All super and wheat should be cleaned out when seeding is finished, the stars cleaned of all super, and placed in proper working order for the next season. On account of the many intricate parts of the binder, the farmer should take every care of this machine; all bearings should be kept tight in the sockets, and a little grease applied to the knotted and knife will prevent them from rusting when not in use. The canvasses should be slackened over night, and when not in use rolled up and hung in a dry place. A dressing of castor oil applied to

all belts will increase their driving power, preserve the leather, and grip the pullies much better. Keep the sprockets and pullies of the harvester and header in proper alignment. A good plan is to pour a drop of kerosene into all the bearings before putting in the oil; this will clear out any dust that might have collected and allow the oil to penetrate into the bearing. All harvesting machines, when placed in the shed, should have a block placed under the offside of the comb to prevent it from sagging and the belts taken off, oiled, and put away out of the heat. For the safe keeping of implements it is necessary to have a good shed to place them in out of the sun and rain, and this should be one of the main buildings on a farm." (Secretary, W. Edson.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Pygery	26/1/34	10	Address—W. H. Browning	A. Day.
Kelly	10/2/34	19	Address—J. Atkinson ...	F. Illman
Balumbah.....	28/2/34	—	Social	A. Jericho

EASTERN DISTRICT.

LONE GUM AND MONASH.

January 18th.

FRUIT DRYING.—The following points are taken from an address delivered by Mr. A. Ingerson:—The speaker contended that it was quite a proposition to pick to the color of fruit; to keep the various types separate in the buckets, even if it meant leaving some of the fruit for a second picking. "Work to sections of the block if the soils vary the type of grape to any extent," he said. "It may be well at times to keep the water off a particular patch in order not to delay a commencement of picking." The time to pick depended on the sugar content of the grape, but it was not possible to set a hard and fast rule, as what would be possible on one property might not be obtainable on another. He had no difficulty in obtaining 12 Baume, and that was a good test at which to start. For drying, the man with racks on his high land undoubtedly had an advantage; for the absence of moisture assisted considerably in hastening the drying. Keeping down the dust in the vicinity of racks, however, was an important factor. Around his racks a short grass grew quite freely, and this trampled down well and had the desired effect of stopping the dust trouble. Racks should run north and south, and be covered, and side curtains provided. "The use of side curtains," said the speaker, "could be overdone. They should not be used until the temperature was between 95 and 100 degrees or over." **Dipping Trouble.**—In dipping, the formula recommended was 1½ lbs. caustic soda, 2½ lbs. potash, and 1½ pints of pure olive oil to every 50 galls. of water. This was, of course, a formula to commence with, but the individual grower would have to vary the caustic according to the fruit he was treating. Should the 1½ lbs. not crack the fruit sufficiently, then add ½ lb. extra at a time until the correct strength is found. In mixing either the dip or the "stock pot" it was not necessary to have a boiling solution in which to dissolve the caustic, &c. It was all soluble in water, so mixing cold would be quite satisfactory. **Advantages of Mixed Dip.**—According to Mr. Ingerson, the main reasons why the C.S. & I.R. advocated the mixed dip were that in obtaining the desired results the cost in comparison with the cold dip was cheaper, and in the time of drying it had an advantage of from two to four days. In taking the temperature of the dip it was necessary to keep the thermometer away from the side of the dip so that a true reading might be obtained. The dip should not be allowed to boil. He changed the dip after dipping approximately 500 picking tins of fruit. **Temperature an Important Point.**—The temperature at which dipping took place was one of the most important points to watch. One must adhere to temperature, as it was definitely found out that

180 degrees F. was the lowest and best temperature of the solution. Up to 185 degrees was all right as a range of temperature, but not higher except under special conditions. Mr. Ingerson considered and had proved that at a temperature of 180 the fruit dipped dried normally the same rate as that dipped at 190 degrees, and the lower temperature gave the lighter color. It was advisable to remove the fruit to the racks as soon as possible after dipping, and the use of a tray on the rack was an advantage and a help in spreading. Fruit on the rack should be spread reasonably thin. *Spraying Not Advocated*.—Spraying the fruit was not advocated. It did not help to dry the fruit, and in hot weather sent it a brown color. Should bad weather be anticipated and it be thought the fruit had been underdipped, then the cold dip spray, if used, would act as a preservative. It was not advisable to take the fruit off the rack too soon, and yet not leave it on too long. It should come off at the earliest possible moment when it was tough enough not to break and yet pliable, as it was then in the best condition to take in the best values from the sunshine. "Dry thoroughly and depend on the packing sheds to add sufficient moisture by their methods of packing," was the advice of the speaker in this regard. Questioned as to the possibility of the Australian-made caustic soda being under strength, Mr. Ingerson explained that he had heard complaints, but he knew of some which had been tested and was found to be true to label, 98-99 per cent. pure. In dipping Lexias and Malagas the speaker stated that as the Australian Lexia required was of a light-brown type, he would suggest to dip at a temperature of from 185 to 190 degrees, and a caustic strength of about 1 in 18 or 1 in 20 (1lb. caustic to 20galls. water)—sufficient strength to just crack the fruit slightly. Oil should be added much the same as in the mixed Sultana dip, but the potash should be omitted. It was a mistake to crack the Gordo too much, which led to excessive sugaring of the fruit during and after packing. (Secretary, L. Bigg.)

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

January 20th.—Attendance, 16.

The first meeting of the year was devoted to weighing samples of wheat of the past harvest. Twenty-seven samples were submitted, ranging from 28½lbs. to 66½lbs. to the bushel—the average being 63lbs. (Secretary, C. Altmann.)

RAMCOO.

October 26th.—Attendance, 8.

THE USE OF SULPHUR IN ORCHARD OPERATIONS.—Paper read by Mr. J. Odgers (Hon. Secretary):—"Flowers of sulphur is the orchardist's standby in retaining color of tree fruits when being dried. In use it is necessary to keep the sulphur dioxide content of the fruit within the regulation limit of 14 grains. The only fruit that appears to cause any trouble in this respect is the apricot; the peach and pear it seems difficult to give too much with ordinary sulphuring. With the pear I generally give a double sulphuring—the whole of the fruit needs to be soft; a hard spot on the bottom of the fruit usually goes off in drying. An experiment in sulphuring apricots conducted a season or two ago for the Department of Agriculture gave as the highest sulphur dioxide content 10 grains, and the sulphur used was 2lbs. to the ½ ton of fresh fruit, exposed for five hours. Dusting sulphur on the vines is recognised as the correct method to adopt to hold oidium in check. Again, sulphur can be used to overcome black scale on citrus. Choose a calm night and place a tin or two containing sulphur under the orange tree affected with scale; set alight to the sulphur and allow the fumes to rise into the tree, and it will kill the scale. These, of course, are well known and understood uses of sulphur in the orchard, but its use in the soil seems to be a question only lately come into use, and the average grower has but a hazy notion of its use, what it is put there for, and if it really does do any good. It is debated by some growers that if sulphur is ploughed in under the rows of vines the fumes rising during the hot weather tend to check an attack of oidium. Probably there is something to be said for this practice, but whether the quantity of sulphur so used is a payable

proposition, compared with the dusting of the vines, is open to criticism. Others argue that the sulphur ploughed in is a manure and increases the crop, but they cannot tell what constituent in the soil it provides or whether their crops have improved by its use. Mr. G. Quinn (Chief Horticultural Instructor), in speaking of sulphur, said it was not a direct manure, but that field dressings had given a definite increase in yield, especially in growing leguminous crops. Professor Prescott advises, for the improvement of the river soils, applications at the rate of 5cwts. to the acre. Ordinary commercial sulphur can be used, but it must be very fine. At the last River Conference Professor Prescott said that in California they had discovered a bacteria that caused the oxidisation of sulphur. This bacteria was not known in Australia, and at the Waite Institute they set to work to try and find it. After two years' work they had succeeded in isolating a bacteria that caused the oxidisation of sulphur. It had been proved that the treatment of our soils with sulphur gave very promising results, and seemed to supply the soil with a very useful tonic. From the above it would seem that an experiment with sulphur tried on a few trees, or a row of vines, would be educational, if not profitable. A short time ago I saw a report of an experiment with sulphur that was very interesting. A grower had a garden containing a few apricot and peach trees which suffered badly from shot hole and curl leaf. One winter in an apricot tree about 15in. to 18in. from the ground a hole 1½in. in diameter was bored with an auger diagonally towards the heart of the trunk. The hole was then half filled with flowers of sulphur and plugged. The tree that year produced a heavy crop of fine fruit with not a sign of shot hole, and right through the season the tree was a picture of health and vigor. A peach tree treated the same way acted in a similar fashion, and was free from curl leaf. Commenting on this experiment, Mr. E. C. Grasby wrote: "I was much interested in the experiment with sulphur, as I had been

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treating my trees for the past eight years in a somewhat similar way, and during the whole of that period I did not have to spray for any disease, the trees being very clean and the crop of fruit heavy. The trees treated included fully grown apricots, nectarines, and Elberta peaches. The method adopted was that about 4lbs. or 5lbs. of sulphur were scattered around the base of each tree during autumn and lightly forked into the ground. The trees responded well to the treatment and grew very strongly, and all carried heavy crops each year, the fruit being of good size and clean. The idea came from a pamphlet speaking of the excellent results obtained in California by treating the prune with sulphur, and the writer decided to experiment on stone fruits with the foregoing results." If Mr. Grasby's operations can be applied to all soils with similar results, then shot hole and curl leaf can be controlled by treatment much less drastic than that of the previous experiment, and the crop yield increased and improved in quality. The results claimed are so good that it would be profitable for growers to definitely experiment on these lines." A good discussion followed, though members had had little actual experience. Mr. J. Boehm had tried sulphur on 50 orange trees, using 3cwts. and 5cwts. He had no sooty mould, but trees alongside looked better. Mr. I. Darling had dusted and ploughed in sulphur, and still had oidium. Mr. F. Lewis considered air and light better than sulphur. Mr. A. E. Seary said dusting vines with a mixture of sulphur and air slaked lime had a favorable effect on vines with black spot.

Other Report Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Nunkeri	31/1/34	7	Discussion	E. Peltz

SOUTH AND HILLS DISTRICT.

CURRENCY CREEK.

December 4th.—Attendance, 10.

EXPORT OF EGGS.—Paper contributed by Mr. W. Robinson:—"In the early days of export no eggs were sent away from Australia after the middle of October, but now owing to the great increase in production it is essential to export eggs during December, and last year exporting was continued up to the middle of January. The cost of placing the eggs on the London market is 7d. per dozen. This covers the cost of cases, fillers, freight, commissions, wharfages, &c., and it is a good thing that the exchange is in favor of the producers to-day, as otherwise the net return to the poultry farmers would be very low. If eggs are selling at, say, 10s. per long hundred in England, the exchange, which is equal to 2s. 6d., makes a total of 12s. 6d. This is equivalent to 1s. 3d. dozen; from this is deducted 7d. a dozen for expenses, which leaves a net return of 8d. to the producer. London buyers to-day, however, are only offering 9s. 6d. per long hundred for eggs for shipment during December, and therefore the best price that can be offered to-day for export quality eggs is 7½d. dozen. Farmers would be well advised to take every care of their eggs, because for pulping purposes the eggs are only worth about 4d. to 5d. dozen. *Egg pulp* is manufactured by hand-cracking the eggs, which have been previously tested as to quality. The liquid is passed through various processes to break up the yolk. The pulp is cooled and tinned in various size tins, the most popular size on the London market being the 40lb. tin. The pulp after being tinned is put into a freezing room, the temperature of which is down to zero, the egg pulp is frozen hard, and it is kept at this temperature until it reaches the baker, either in Australia or in London. If the pulp goes to London it is kept down to a very low temperature on the boat; the freezing-rooms do not go above about 5 or 10 degrees. There is no preservative used in egg pulp, and all the baker needs to do is to allow the pulp to thaw before using it. When the eggs arrive at the exporting floor they are unpacked, and each egg is individually tested. The air cell of the egg should not be larger than a 6d. piece and should be quite firm. Eggs that have shaky air cells cannot be exported to London, and have to be used

for either local trade or for pulping purposes. Eggs for export are packed in 30 doz. cases and fillers. The eggs are graded and exported in 13½lbs., 15lbs., and 17lbs. packs. This means that 10 dozen eggs weigh 13½lbs., 15lbs., or 17lbs. respectively. The 13½lbs. eggs are 1½ozs. in weight, 15lbs. pack eggs weigh 1½ozs. and up to 2½ozs., and the 17lbs. pack weigh from 2½ozs. up to 2½ozs. Eggs are sold in London by *long hundred*, a trade term which means 10 dozen., so that each case holds three long hundreds. After the eggs have been packed they are placed in a cool room, the temperature of which is about 33 degrees; the eggs are sent down to the steamer in cool cars, unloaded on the ship's side and placed into the cool storage chambers on the boat, the temperature of which is kept at about 33 degrees all the way to London. The export of eggs has increased considerably from Australia during the last five or six years. The poultry industry has proved to be of great value to the Commonwealth, and is responsible for the employment of hundreds of thousands of people. The cases create work for timber men; the cardboard fillers for filler manufacturers, and carpenters have to be employed for assembling the cases. Then again the wharfmen and railway men are provided with work, and millions of bushels of wheat, bran, and pollard are consumed every year by fowls. The best time for exporting eggs to London is during August, September, and October. The prices on offer during these months are fairly good, but after the end of October the London buyers pay less for the eggs, as they arrive on the market at a time when prices are generally lower. First, it is essential that the producer should take every care and collect eggs from the nests as often as possible—no less than at least twice a day. The nests should be clean, and any eggs that are stained cleaned immediately after they are picked up. The cleaning should be done with a damp rag, and the eggs must not be washed on any account, as this has a detrimental effect on the keeping quality of the eggs. Carbonate of soda is a good thing to clean eggs, and the damp rag should be dipped in the carbonate of soda powder and rubbed on to the egg; this will be found very effective. To get the best results eggs should be marketed at least twice a week, forwarded to the exporting floor in cases and fillers, and not packed in chaff, as the eggs keep much cleaner in the fillers and carry better on the railways or by carrier. The Chinese are our biggest competitors on the English market; they are able to produce eggs cheaper and their labor costs are much lower. We are further away from the London market, and it costs us more to market our pulp. The price for pulp is certainly low and unpayable to the poultry farmer, and it is all the more necessary to look after the eggs so that the bulk of them can be sent away to London as eggs in shell; thereby the poultry farmer is able to get better returns." (Secretary, D. Jeff Gordon.)

HOPE FOREST.

January 8th.—Attendance, 16.

FENCING.—The following paper was read by Mr. Nielsen:—"Points to consider in the erection of a fence are neatness, adaptability to stock resistance, and economy of time and labor. It is necessary to have suitable tools for erecting the fence and splitting the posts. Tools required for the latter are a sharp axe, well ground back on the steel; a crosscut saw; and a set of wedges, 12in. x 2½in., 9in. x 2½in., and 6in. x 2½in. **Selection of Timber.**—First note the height and thickness of the tree and examine the bark, which is a sure indicator of how it will split. If straight in the fibre and running straight up the trunk without any twists around the trunk it will be a good 'splitter.' Look for any old dry branches of any consequence; if the main branch of the trunk is in the above condition it will surely be decayed in the heart. Next look for the number of branches; if numerous and close together on the trunk, the tree will be awkward to split, for even though the branches are lopped off close to the trunk, the split has a tendency to follow the curl where the branch has been. After having selected a tree, fall it in the most convenient place to work. Next mark the length required for the posts; 5ft. 6in. is the usual length. It is necessary to remove the bark where the timber is to be sawn, otherwise the saw will jamb and possibly take the set out of it. The wood is now ready for the wedges. Take the two smallest wedges and enter one half-way between the centre and the bottom, the other between the centre and the top. Drive these right in, then a crack should appear along the top, put the next to smallest wedge in this, and enlarge until the log falls apart; doubling the big ones will hasten this if done carefully. Then split it into the required size posts. **Erecting the Fence.**—First find the survey pegs and drive erect over them firm straight pegs, about 4ft. 6in. high. This will provide a sight line. Then decide which end to start and place a strainer there, which should be not less than 3ft. 6in. in the ground, 2ins. higher than the smaller posts, to allow for straining the barb. The distance apart of posts and height above ground is a matter of opinion. If they are as far apart as three to the chain, a dropper in

between will strengthen the fence. I favor the fence with the greater number of posts, because they are best to resist great cattle, for which most fences in this district are required." (Secretary, A. Eve.)

INMAN VALLEY (Average annual rainfall, 26in. to 27in.).

February 15th.—Attendance, 11.

LESSONS FROM 1933.—In the course of a paper on this subject Mr. W. Beresford showed how commodities, such as butter and wool, were governed by supply and demand, consequently prices had been very low for butter, and enhanced values for wool, brought about no doubt by the shorter supply. He had found a comeback sheep the most profitable—for a twofold purpose; wool and the mother of a lamb. He advocated the months of November and December as the best time to dispose of surplus sheep. He emphasised the folly of overstocking, and pointed out by figures that a flock of sheep kept in good condition was far more profitable than twice the number neglected. Foot rot was becoming more prevalent, and needed careful attention. It could be combated successfully if sheep were treated with a foot bath every three or four weeks. Serious cases could be dealt with more often by way of leather boots containing a disinfectant, such as bluestone, or tar. The boots could then be tied around their legs and left for some time. This he had proved to be very effective for serious cases. Meadow hay should be cut and stored for a lean period. Too much reliance should not be placed on spring rains. Conservation could be assisted by closing up the paddocks earlier. He advocated *Phalaris tuberosa*, as a grass that was liked by all stock, and more so because it was a perennial. To get a good germination it must be planted on a prepared seed bed. (Secretary, W. K. Mayfield.)

MILANG (Average annual rainfall, 14.97in.).

December 2nd.

MANAGEMENT OF THE LUCERNE PLOT.—Paper read by Mr. A. Matheson:—"There are very few places in this district where lucerne can be said to flourish without irrigation. This district has an abundance of sub-artesian water, and if utilised wisely, with the help of cheap power, will encourage intense culture and closer settlement. That lucerne can be grown anywhere in the district is quite evident, although there are natural conditions where it is much easier established. For irrigation purposes, land that has good drainage is much to be preferred, more particularly in this district, where the water for pumping purposes has a percentage of salt in it. In choosing a site for an irrigated lucerne plot select a sloping sandy rise with a grade of say 6ins. or less to the chain. Lucerne can be more easily established on the stiffer soils, because while the seed germinates readily in sand, there is a likelihood of the young plant being burnt by the heat of the sand, unless the ground is well covered. The sand, being of a loose nature, does not retain its moisture if not covered for any length of time. This can be overcome with sprinklers, but in flooding the young plants, great care must be exercised, since there is always a tendency to wash out. There is not much fear of not establishing a good plant where weather conditions are suitable, but if this fails, great difficulty may be experienced in re-seeding, because the young plants are deprived of the moisture by the stronger plants, although this can also be avoided where sprinklers are used. The sandy rises are preferred, because with proper treatment better results will be obtained and more use can be made of the heavier land. One of the drawbacks of putting lucerne on sandy rises is the fear of the 'blow,' which will soon injure the young plants. To avoid this sow a covering crop, but where there is danger of the soil blowing, it is advisable to cover the plot with well-rotted manure. This takes time, of course, but it repays for the labor, for besides stopping the 'blow,' it adds humus to the soil. A proper soil preparation is essential, although in favorable years it may be possible to get a good plant with indifferent cultivation. The usual way recommended for sowing lucerne is to roll the ground, broadcast the lucerne, say, 16-20lbs. per acre, then lightly harrow, preferably by dragging a hoe over the sown area. An excellent germination can usually be obtained by sowing early in July, through the drill, mixing the seed with super. It is advisable to sow immediately after mixing, because with most other small huskless seeds, there is always a likelihood of killing the germ of the seed. Six inches of water is necessary to get the best results, irrigating if possible every three weeks. Where the water was given to the above requirement I have cut after four to five weeks' growth a crop over 3ft. 6in. in height, and within 2 yards not half the growth, showing evidence of neglect. This result tends to show the need for harrowing the ground, or grading it to allow equal results when watering.

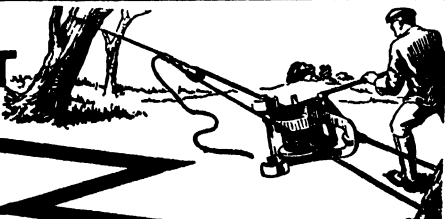
The main essentials for lucerne growing are plenty of water and warm weather. While this is one of the main needs in successful lucerne growing, another necessity is to thoroughly cultivate the lucerne plant at least once a year, some times during the winter months. An interesting illustration of what cultivation will do was shown on a portion of the plot which had such a thin stand that it was decided to take it all up and re-sow. An old spring time was used repeatedly and the lucerne was not killed out, but by October of the same year where this treatment was observed it showed fully 100 per cent. over that which was cultivated in what was considered the usual way. To get the best out of land it is necessary to put back into the soil what the crops have taken out. This necessitates putting heavy dressings of suitable manure on the plot—stable manure and 1cwt. to 2cwts. super per acre. Associate this with good cultivation and abundance of water and an abundance of green lucerne for the summer months should be the result. I regret I did not practice what came under my notice some time back. A farmer at Strathulbyn has demonstrated that lucerne can be grown very successfully under somewhat adverse conditions; he obtained a wonderful growth where previously poor crops were grown. His practice was to cultivate the lucerne right through the winter months, not allowing weeds to grow. Is the method I have adopted sufficiently payable to recommend others to practice it? Under present conditions of low prices and high costs of production I believe that if the capital is available, to invest in an irrigation plant; using a good crude oil engine it pays as well as anything else. Lucerne cheapens the feeding of fowls and pigs as well as cows. It is not a balanced ration by any means, but it is one of the main factors in a good ration." The discussion on the paper was excellent. Mr. B. Casley gave his views on lucerne growing on the Murray swamps and in Tasmania. Questions were answered and a large amount of information gained through the paper. (Secretary, L. Yelland.)

MASON-WORK WALLS.

[Paper read by Mr. W. Bourke at the January meeting of the Laura Bay Branch.]

In the building of such walls it is always advisable to go to a little extra trouble and time and put in good work rather than slum the job, for well-built mason-work will last very much longer, and therefore pay for the extra trouble and time. *Selecting the Material.*—I strongly advocate using newly burned lime. It is always better to use hydrated lime—quicklime slaked with just sufficient water to slake it. The reason for this is because quicklime that has just been bagged from the kiln and allowed to air slake without the aid of water does not bind well, and it is very apt—particularly in plaster—to cause some to powder and not set. All lime should be well sifted to remove charcoal. *Choosing of the Sand.*—Any good, clean, sharp sand can be used. Some masons like a good coarse shellgrit, others a good wash sand from the roads, and others prefer a good pit sand. I favor pit sand, particu-

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Agriculturalists in Australia, New Zealand, Great Britain, South Africa, the Americas, as well as Planters in India, China, Central Africa, Fiji, the East and West Indies, recognized its merits and applied its help.

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larly over-wash sand from the roads, because apart from this sand being apt to have a certain percentage of dirt with it, it is also likely to contain a proportion of magnesia, which is very detrimental. In many cases one has to take what is available, and provided there is no magnesia or dirt mixed with them, any of the above-mentioned sands are quite good. In choosing the stone be particular that it is not quarried from any soils that contain magnesia. Always try to get a stone that is easily trimmed, because in this lies the whole secret of quick building and good tying of the wall. *Mixing.*—For ordinary building work it is always advisable to mix all mortars at least two or three days ahead for building, and in the case of plastering the mortars should be mixed at the very least a week ahead, and if it can be managed it should be left longer. In leaving the mortar to stand mixed ahead of time, it will be found that it binds better, is better to work with the trowel, and gives any little lumps of lime a chance to slake out and be mixed into the mortar when it is remixed for use. There are two ways of mixing the mortar. One is to mix the required quantity of sand and well-sifted lime together thoroughly in the dry state, then add sufficient water to make the mortar again working thoroughly. The next way is to mix the lime and water together in a suitable vessel and then pour this mixture on to the sand. This method—providing one is used to it and knows how thick the lime-water needs to be to get the mortar of suitable thickness—is better, because besides being sure of the lime being well slaked, all charcoal can be removed from the lime; it will float on the lime-water. For the amateur, I advise the first method. The usual quantities are: 1 kerosene bucket of lime to 3 buckets of sand for ordinary building, and 1 kerosene bucket of lime to 2 buckets of sand for plastering and flushing up. In commencing the building, pay great attention to the foundation. A good foundation is very essential. Where stone is not very deep a trench about 4ins. wider than the wall is intended to be right down to the stone will suffice and commence the foundation from this point. Where stone is not shallow, the trench should be sunk down to a depth ranging from 18ins. to 3ft. according to circumstances, such as the nature of the soil and the weight of the building to be placed on the foundation.

When starting the walls, the first thing to do is to set up the line to build between. To do this, first build up each corner to the height of about 2ft. or 3ft.; in doing this be very particular that the stones are well tied both on the outside and inside, and where possible put in a “througher,” i.e., a stone that goes right through from the inside of the corner to the outside. Also when putting up these corners use the spirit level when placing every corner stone. At this point, do not leave anything to chance. It is very essential for the corners to be perfectly level and upright, because it is from these points that the lines from the rest of the building are taken, therefore do not spare the spirit level. When the lines are set up from these points, take notice of the winds if they tend to blow the lines at all, build up a piece or two, according to the length of the wall, in between the corners to stop the lines blowing about. Also when building up these pieces, use the spirit level freely. At all times when building tie the stones well, and as often as possible, and also put as many “throughers” in the wall as possible, because these tend to make the building much stronger. When filling in between the inside and outside stones do not fill up with small stones and then place the mortar on top, because if the mortar is not very thin it will not run through the stones, and therefore leaves hollows in the wall. Always put the mortar on first and then push the small stones into it and then put more mortar on top.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Kuitpo	31/1/34	60	Cinema Lecture—H. N. Wicks	J. Pickup
Scott's Bottom .	27/1/34	8	“Liming the Soil”, Mr. Backers	E. Atkinson
Blackheath	1/2/34	8	“Air Seasoning Timber”	E. Paech
Macclesfield	15/2/34	12	Addresses—Messrs. Wiadrowski and Giffhardt	H. Ross
Port Elliot	—/2/34	—	Homestead Meeting	J. P. Colebatch
Balhannah	19/1/34	17	Visit from Lenswood Branch	C. Grasby
Balhannah	23/2/34	—	Social	C. Grasby

WOMEN'S BRANCHES.

THE FOOD VALUE OF MILK.

THE NUTRITIVE VALUE OF PROTEINS.

[Continued from page 911.]

Previous to 1912 a discussion of the nutritive value of any foodstuff would have been confined to a consideration of the total quantities of protein, fat, carbohydrate, and salts it contained and of its value as a source of energy, that is, its calorific or fuel value.

As a result of work that has been done at this station and later in other laboratories, the field for discussion has become much broader, for it was demonstrated that the *quality* of the protein present in any food is of even more importance than the *quantity*, and a realisation of the essential role that the vitamins play in normal nutrition has raised many more problems.

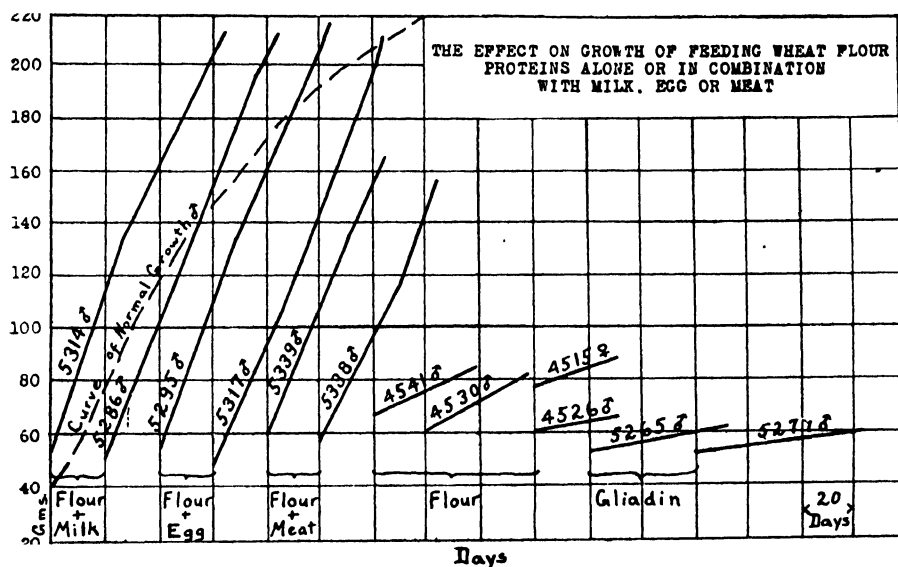


FIGURE 1.

Milk contains several different proteins, but there are only two that occur in notable quantity: *casein*, the protein found in cheese, and *lactalbumin*, the principal protein of whey. These two proteins differ not only in their chemical structure, but also in their nutritive value. Both suffice to promote the normal growth of young rats, but lactalbumin is somewhat more efficient for growth than is casein, for in comparable periods of time a given quantity of lactalbumin will enable an animal to gain about 33 per cent. more in weight than will the same amount of casein.

This is instructive from a practical standpoint, for it demonstrates that the whey—a by-product of the manufacture of cheese—contains one of the most valuable food proteins known and should not be wasted. Casein, which forms about 80 per cent. of the milk proteins, is easily digested. This property makes it especially desirable as a food for infants or persons with weak digestions.

For centuries people have been accustomed to use foods of animal origin together with bread and the other cereal products that form so large a proportion of the average dietary. Bread and milk, eggs on toast, meat sandwiches, and the use of milk on breakfast cereals are a few illustrations of this custom. If any one who was enjoying a meal of any of these mixtures, were asked why he choose the combination of the animal with the vegetable product instead of eating either one alone, he would probably say that "it tasted good," or "it satisfied his appetite better that way," or something else equally indefinite.

If an animal is fed on wheat flour as the whole source of protein in an otherwise adequate ration, it will grow very slowly, if at all, even when relatively large amounts of the proteins are eaten. If, however, one-third of the wheat protein is replaced by an equivalent quantity of protein in the form of milk, eggs, or meat, the animal will grow at a practically normal rate.

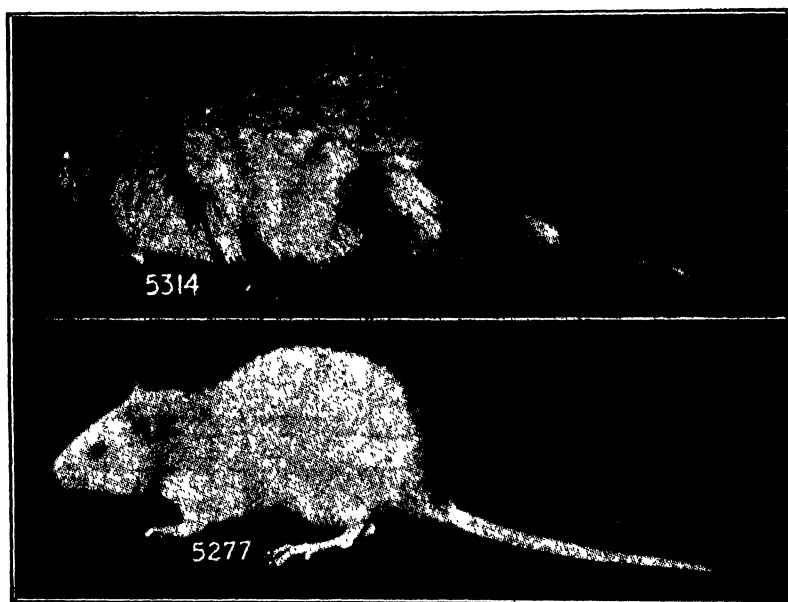


FIGURE 2.

Rat 5277 was fed on a diet in which gliadin from wheat flour furnished the protein. On this food he gained only 10 grams in 10 weeks. Rat 5314 was fed on a mixture of wheat flour and milk. On this food he gained 180 grams in 9 weeks. This illustrates the importance of combining milk with the cereals instead of feeding the cereals alone.

To illustrate this, as well as the results of other experiments with various diets of known composition, charts are employed which give the curves of body weight during the time of feeding. In these charts the squares running horizontally represent the duration time of the feeding experiment expressed in days; those running vertically express the weight of the animal in grams (1 gram equals about one-thirteenth of an ounce). The heavy black lines show the rate at which the animal gained weight; the more nearly vertical these lines the more rapid the growth.

Figure 1 gives a graphic representation of the growth rates of a number of rats which have been fed in these ways, and in Figure 2 are photographs of two of these animals.

All of the animals shown on this chart were of the same size and age at the start, and were growing vigorously when put on the experimental diets. The differences in size at the end of each experiment were due solely to the protein of the diet. In this series of experiments the percentage of protein and the nutritive ratio* of the mixtures were practically identical, the foods differing only in the kind of the protein. The animals in the group labelled "flour" received all of their protein from wheat flour, those in the groups labelled "flour + milk," "flour + egg," and "flour + meat" received a diet in which the total concentration of

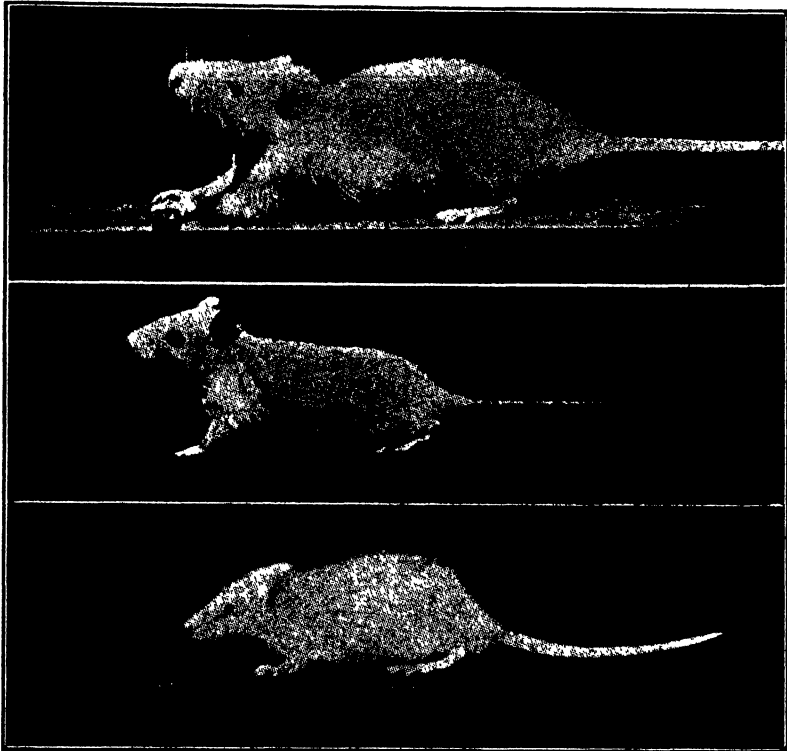


FIGURE 3.

The contrast between feeding a good or bad protein to a young rat. The upper two rats are 5 months old and have been fed on diets exactly alike except that the one at the top had casein from milk on which it grew normally and the one in the middle had gliadin from wheat flour on which it could not grow at all, so that when it was 5 months old it weighed exactly the same as the rat at the bottom which was only 1 month old.

protein was the same as in that of the "flour" group, but one-third of the protein was furnished by milk, eggs, or meat, respectively, the remaining two-thirds being furnished by flour. It is obvious that relatively small quantities of these animal proteins greatly improve the value of the food for growth. The value of these animal products lies in the fact that they are so constituted as to supplement the chemical deficiencies of the flour proteins.

The proteins are broken up by digestion into amino-acids, which are then used in constructing the new proteins of the tissues of the growing animal. Unless the food protein furnishes a sufficient amount of certain of these amino-acids, which

* The nutritive ratio of a diet is the ratio of the calorie value of the digestible protein to the combined calorie value of the fats and carbohydrates therein.

are needed to make the tissues required for normal growth, the animal grows correspondingly more slowly than it would if more of the needed amino-acid were available.

Wheat flour contains two proteins one of which, gliadin, yields only a very small amount of the amino-acid called lysine. The effect of a limited supply of lysine on growth is illustrated by rats 5277 and 5265, whose curves of body weight are shown in Figure 1. These were fed on a diet in which all of the protein was furnished by gliadin. They were maintained in good health, but gained only about 10 grams.

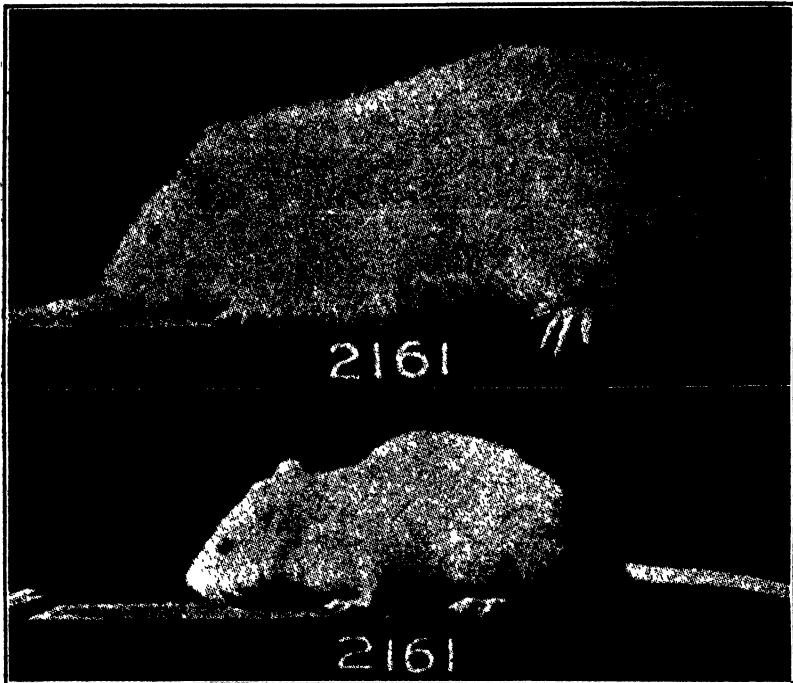


FIGURE 4.

The lower photograph is that of a rat which has been fed for 7 months on a diet containing zein (one of the proteins from corn) together with a small amount of amino-acid tryptophane. On this diet the rat could live but not grow, and the upper photograph is one of the same animal taken a few months later, after casein from milk had replaced the zein and tryptophane.

The rats on the "flour" diets grew somewhat more than those on the gliadin food because flour contains another protein which yields more lysine than does gliadin and hence supplements to some extent this deficiency of the gliadin. However, the amount of lysine thus supplied was too little to promote normal growth. In this connection it is interesting to note how perfectly a young animal can be maintained in health, but without growing, even for a very long time when its diet is adequate in respect to everything except the chemical constitution of its food protein.

Two foods which thus far have proved to be efficient supplements to flour are milk and eggs; either of these is somewhat better than meat. Thus, under similar conditions of feeding when the food contains two parts of flour proteins to one

part of meat protein, rats gain about three times as much per unit of protein eaten as when flour furnishes all the protein, and nearly four times as much when milk or eggs are used as supplements.

Figure 4 shows in a striking manner how essential it is to supply the young animal with protein that furnishes sufficient lysine. The lower picture is that of a young rat that lived for 7 months in perfect health on a food containing zein + tryptophane as its sole protein. During all of this time it failed to grow and weighed only 70 grams. It did not even show signs of maturing but looked exactly like a recently-weaned rat; it remained a baby. At the end of 7 months casein was used to replace the zein + tryptophane. No other change was made in the diet. During the next 3 months it grew at the normal rate to 240 grams and as the upper picture shows, became a fine, vigorous animal.

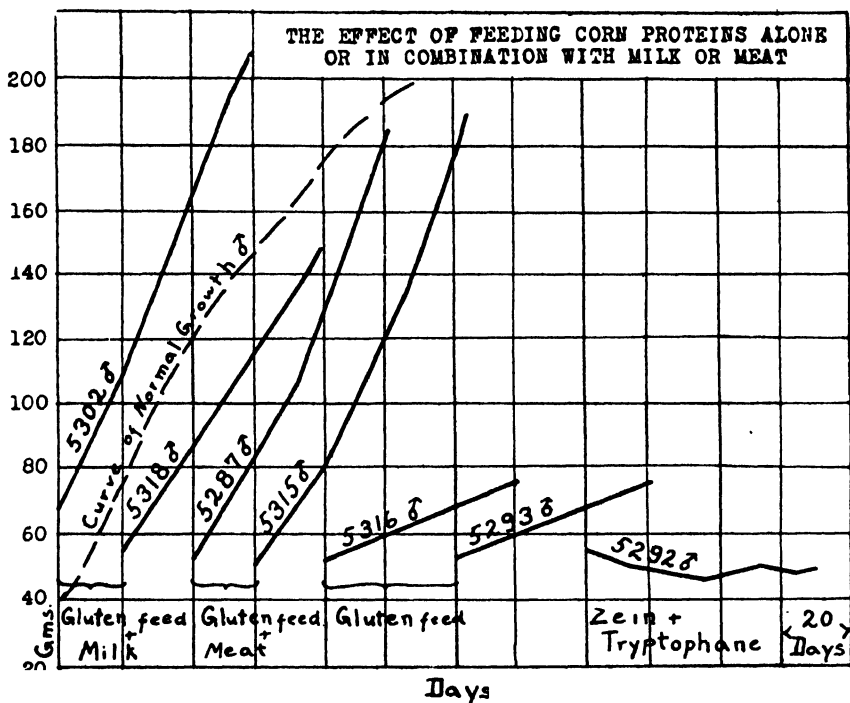


FIGURE 5.

What this means might be illustrated in this way: For about one-fifth of its life period the rat did not grow. Calling a man's span of life 70 years the case would be somewhat like that of a boy, kept as a healthy infant in arms until 14 years old—weighing perhaps 16 to 20 lbs.—and who, by a change of diet when 14 years old, attained a man's size and weight at the age of 21.

Two of the rats, 5293 and 5316, whose graphs of body weight are shown in Figure 5, received a ration in which the protein was furnished by gluten feed. Rats 5302, 5318, 5287, and 5315, on the other hand, had two-thirds of their protein in the form of gluten feed and the other third as milk or meat. The nutritive ratios of all of these three foods were alike, but the results were strikingly different.

This juggling with proteins and amino-acids is very interesting to the chemist and physiologist, for it represents a triumph of science that excites the wonder of those who appreciate the almost insurmountable difficulties encountered in these investigations. It would be of little use to discuss it here if these facts could not

be applied to the feeding problems of the household and farm. Amino-acids are not commercially obtainable but products are at hand which contain proteins that furnish these amino-acids in readily obtainable form.

When whole corn is fed, the other proteins in this seed supplement the zein to such an extent that the animal can grow slowly, but if the corn is combined with milk, the proteins of which are rich in tryptophane and lysine, growth is very rapid. Thus it appears that the chemical constitution of the protein of the food

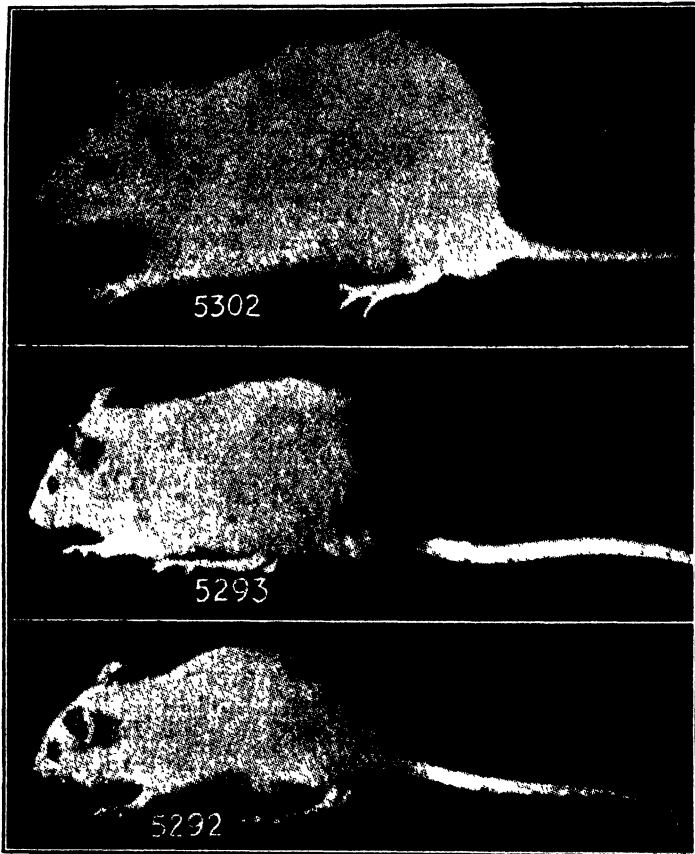


FIGURE 6.

Photographs of some of the animals whose curves of body weight are shown in Fig. 5. Although all three were of the same age, rat 5302, which had received a mixture of gluten feed and milk, is nearly three times as large as 5293, which received the gluten feed alone, and is more than four times as large as 5292, which was fed on zein plus tryptophane.

influences growth and that it is absolutely necessary to provide animals with proteins of the right kind, if they are to grow well. This applies not only to growth, but also to milk or egg production. Both milk and eggs are rich in protein. The animals producing them need large amounts of protein in their food, but until the differences in chemical constitution of the proteins of different feeds were discovered, it was not appreciated how important it is to provide proteins of the right kind.

(To be continued.)

WHY NOT EGGS?

[By ABBY L. MARLATT.]

*(Special circular issued by the Extension Service of the Wisconsin, U.S.A.,
College of Agriculture.)*

The value of the egg was recognised in early history not only in the diet but also in the superstitious rites dealing with the mystery of the origin of life, and even in the foretelling of the future.

So great a respect was there for the germ which "nature had destined for the production of chicken" that among the early Greeks the abstinence from eggs was increasingly recommended. The egg was venerated as the symbol of the world and the four elements. The shell "represented the earth; the white, water; the yolk, fire; and the air was found under the shell."

The Romans, while they revered the egg, served it at the beginning of a repast. Horace speaks of remaining at the table from "the egg to the apple," since the apple came last in the feast. The Romans preferred the soft cooked egg and took it directly from the shell "in one gulp."

The use of the egg during celebrations of the seasons of the year, especially the New Year, is an old custom in both Asia and Europe, and even the use of different colors in dyeing eggs is recorded. The Christian Church adopted many of the older customs; hence we have the use of eggs on Easter Sunday as part of the festival.

Eggs have long been a favorite food and also are of real value in promoting health. Not only do eggs build muscle but they also supply some of the necessary vitamins and valuable minerals which the body needs. For the child, eggs are especially necessary.

Of course, it is important to buy clean, fresh eggs from a reliable dealer and to keep them in a cool, dry place—preferably in a covered dish in a refrigerator.

The muscle building value of the entire egg is high, due to its proteins. Therefore, it is not necessary to serve meat and eggs at the same meal. When eggs are used with cereals, peas, beans, and most of the other vegetables, as well as with gelatin, they enrich and make them adequate building foods. The rule to-day is to serve a muscle building food in at least one of the meals of the day. This is essential for the growing child; hence both milk and yolk of egg should be included in the diet of the child under five.

YOLK RICH IN VITAMINS AND MINERALS.

The yolk contains vitamins A, B, C, D, and G, as well as a large amount of phosphorous and iron in easily usable form and a small amount of copper—so needed in blood building—as well as other useful minerals.

The egg yolk is valuable in preventing rickets, which is a condition shown by enlarged, crooked or bent bones. The right balance of phosphorus and calcium along with vitamin D will prevent and even cure rickets, hence the need for the yolk of egg and milk in infant feeding.

Dr. Dorothy Reed Mendenhall, of this department, recently stated: "If every child, after it was one month of age, had the yolk of an egg every day it would probably never have anemia."

The fat in the yolk of egg is in a form which is easily digested. The yolk is also richer in solids than is the white since it contains only 50 per cent. water.

The presence of iron is shown in hard cooked eggs at the point where the white and yolk touch. The white of the egg when heated gives off a sulphur compound that reacts with iron, coating the yolk and staining the white. The egg is just as valuable in this form although somewhat unsightly. To avoid this discoloration, cook the egg in the shell at a lower temperature for a longer time.

For the adult the building protein may be taken from many different sources, but none is better than that from the egg itself. Of course, in health the adult needs only to repair the body, not to build new tissues. In diseases that tear down tissue the yolk of the egg is used in increasing amounts. Egg yolk, either raw or just coagulated or finely divided hard boiled, is easy to digest.

It is seldom advisable for children to eat egg white raw. For normal adults it is probably not objectionable, but to give the raw egg white to infants may produce a sensitization to the egg white that shows itself in digestive disturbance or even skin eruption. Hence, use only the egg yolk for infants.

EGGS EASILY DIGESTED.

Both yolk and white, when cooked at temperatures that leave them jellylike, are very easily digested. If hard cooked eggs are put through a sieve or chopped very fine, they are found to be easy to digest in this form also.

The white and yolk will cook far below the boiling point of water (134° F. to 180° F.). This is even below the simmering temperature of water, so that in cooking eggs in the shell or poaching eggs out of the shell, putting the cold egg into boiling water and then placing to one side to let the temperature fall slowly will give excellent results. In the laboratory it was found that the least amount of boiling water to use in cooking an egg by this method is 1½ cups of water to each egg. This rule should be followed both in poaching eggs or boiling eggs in the shell for best results.

STORAGE EGGS GOOD AS FRESH FOR COOKING.

For ordinary cooking, storage eggs are just as valuable as fresh eggs. Recent studies showed that a good angel food cake could be made from eggs that had been kept in storage from seven to nine months, although it was necessary to add water before beating the whites to make up for the loss from the weight of the egg. The cake was faintly yellow and not quite so light as that made from fresh eggs but would be called a fair angel food. In fact, the beating quality of the freshly laid egg improves slightly up to the second day and keeps this value for 28 days under good storage conditions.

Even when the white of the egg after long storage has lost water slightly, the addition of an equal amount of water will improve the beating quality. This seems to show the beating value of the egg depends on the nature of the egg white but varies with the loss of water.

The common test for freshness is based on the egg not having lost moisture, shown by the tiny air cell at the end of the egg. The fresh egg sinks in water. The egg that has lost part of its moisture and has had this replaced by air, increasing the air cell, will tend to rise in water. Candling eggs is an ancient Egyptian practice. To-day it is done by holding the egg and rotating it in bright light. If the air cell in the large end is small the egg is likely to be fresh.

HOW STORAGE AFFECTS EGGS.

At present, due to the improvement in cold storage, it is possible to keep eggs in good condition from eight to ten months. The best commercial method is to seal the shell and keep the egg cold.

The newest storage method is the vacuum treatment used in the United States Department of Agriculture. Air is removed from the storage area and carbon dioxide substituted. Eggs treated in this way lost one-tenth of 1 per cent. in weight in 10 months whereas storage eggs usually lost 18 times as much.

The amount of moisture lost in storage is an important thing to consider in buying eggs for it reduces the weight of the egg and may affect the color of the white. It increases the air pocket so that when heated it expands and breaks the shell with loss of white.

In the home economics laboratories at the University of Wisconsin it was found that there is probably no loss of vitamin D in eggs stored from six to seven months at 40°F. nor in fresh eggs which had been dipped in hot fat, 375°F. for five seconds or dipped in hot water, 205°F. for five seconds. This method of home storage of eggs is, therefore, possible. However, the best home storage method is sealing with water glass. The difficulty is that waterglass weakens the shells so that if the eggs are packed in too many layers some of them may break and spoil the solution in which they are packed.*

The size of hen's eggs varies according to the age and breeding of the fowl, the smallest being laid by the pullet. The weight of the egg may vary from 1oz. to 3ozs.

The food value, regardless of size, is quite dependent on the diet of the fowl itself. The color and vitamin content of the yolk are quite dependent on the hen's feed and on the amount of sunlight, artificial ultra-violet light, fish oils or other sources of vitamin D she received. To know the source of the egg, therefore, is as important as to know the age of the egg if we are going to get our money's worth.

USING YOLKS AND WHITES.

One of the economies in the use of egg white and yolk separately is that many dishes that are especially valuable for the child call for yolk of egg only. The white of the egg can be placed in a jar, sealed and put into the refrigerator and will keep perfectly for days. The yolk, on the contrary, has to be covered with a layer of water before sealing to keep the surface from drying.

The fat of the yolk if mixed with the white lessens the beating quality of the whites; therefore, in breaking eggs it is important to keep yolk and white separate. A fresh yolk does not break easily because it has a tough protective covering. As the eggs get older this protective covering seemingly becomes tender, and hence in eggs that have been kept for some time there is a greater danger of the yolk breaking and a part mixing with the white. Fortunately, in the art of cookery there are many recipes calling for the white and the yolk used together so that when this occurs, change the recipe "and go again."

USES FOR EGG WHITES.

Egg whites are used in all dishes where the beating of the white encloses air which makes the product light and fluffy. The week-old egg beats better than the newly laid egg, as it has had time to lose a little water. Experience has shown that adding a pinch of salt tends to increase the beating quality of the fresh egg. There are many uses for egg whites, including the following:—

Angel food cake, white cake, kisses, and tarts.

Soufflés, both fruit and vegetable.

Fruit snows and sherbets.

Frostings and fillings.

Meringues for pies and puddings.

Cookies.

Clarifying agents for soups and coffee.

*Earthenware crocks or wooden pails are the most satisfactory containers. Waterglass can be bought at any store, but purchase only enough to preserve the eggs which you expect to put down this year. The proper proportions for mixing are 1 part (about 1 pint) waterglass to 9 parts boiled water, which has been allowed to cool. Stir the mixture thoroughly, pour it into the crock or pail, and put in the eggs. Waterglass in powdered form is also on the market. This, if dissolved according to directions on the package, is more reliable than the liquid form.

ANGEL FOOD CAKE.

The art of making angel food cake consists first of all in beating the white of the egg until very light. Beating with a large wire whip is most satisfactory, but a mechanical beater may be used, though the cake is apt to be smaller, due to less air retained. The powdered or fine granulated sugar and pastry flour used in making angel cake are folded in carefully so as not to lose the air from the white. Once the art is learned, it is easy to make an angel food cake successfully if one can regulate the oven to a temperature not over 310°F., while the cake is being baked.

In angel food cake the addition of cream of tartar to the whites not only increases its power to stretch, and therefore make a larger bulk in beating, but also whitens the product and changes the flavor from decidedly alkaline to neutral, or slightly acid. Cream of tartar is always used in making angel food cake, though other powdered acids may be used. 1 cup egg white (average is 11 egg whites), 1 cup fine granulated sugar, $\frac{3}{4}$ cup cake flour (sifted 3 times before measuring), 1 teaspoon cream of tartar, $\frac{1}{4}$ teaspoon salt, $\frac{1}{4}$ teaspoon vanilla. Add salt and beat egg white on large platter, using flat wire whip. When foamy, add cream of tartar and beat with long steady strokes until mass is stiff and will form in heaps and ridges. Sift over the sugar, folding it in (not beating). Then sift over flour, folding it in gently. Place batter in unoled angel cake pan, keeping batter slightly higher at rim. Bake at 310°F. for about one hour. Invert in pan on wire rack until cold.

EGG WHITE DESSERTS.

Cold soufflés used for dessert are usually made with a gelatin foundation, into which the beaten whites of eggs are folded just as it begins to thicken. The product is then put into a mould to harden.

Fruit snows are made by folding the beaten whites of eggs into the cooked, seasoned, and pureed fruit, for example, prune whip, apple snow, peach, pineapple, or apricot snow. (If the fruit snow is to be given to children, it should be baked for 20 minutes. For adults it may be chilled.) Use one egg white to a half a cup of fruit for each person and serve with a soft custard made of $\frac{3}{4}$ cup of milk, 2 tablespoons sugar, salt, 2 eggs, and $\frac{1}{2}$ teaspoon vanilla.

HOT SOUFFLES.

Another use for egg white is in the various hot soufflés in which the basis is thick white sauce enriched with any of the following:—Grated cheese, spinach, dates, figs, meat, or vegetables. The yolk of the egg may be stirred into the warm sauce, or it may be omitted entirely. After the fruit, meat, or vegetable is put into the white sauce and mixed thoroughly, the beaten white of the egg is folded in and the product quickly put into an oiled casserole or other cooking dish and baked in a slow oven for 45 to 69 minutes. Soufflés so cooked must be served immediately, as they fall quickly. A soufflé foundation may be prepared at any time of the day and the whites folded in just before baking.

USES FOR EGG YOLKS.

Egg yolk may be used in the following ways:—Custards—soft, baked, fruit; golden angel food, chocolate sponge drops, date bars, and lemon pies; fried cakes and pan cakes; and noodles and soup garnishes.

Other uses are—

Boiled dressing and sauces.

Egg beverages—milk shakes and eggnogs.

Coating for croquettes with bread or cracker crumbs.

To enrich scrambled eggs or cream sauces.

To bind meat loaf or vegetable loaf.

Coating for bread in French toast.

CUSTARDS.

Custards are mixtures of eggs (whole or yolk only), milk, sugar, flavoring, and a pinch of salt. A general rule for custards is: 2 cups of milk, 2 large eggs or 5 to 6 yolks, $\frac{1}{2}$ cup of sugar, $\frac{1}{2}$ teaspoon salt, and flavoring. The sweetening, salt, and flavoring may be added to the yolks and beaten in as warmed (not hot) milk is added. Place custard mixture in dish, set dish in lukewarm water and bake in oven 300°F. until custard is just set or solid. The time varies with bulk and depth of mixture in custard cups or mould. Too long cooking or too high a temperature will spoil the texture or even cause the egg mixture to separate.

The "sweetening" of custard may be sugar, $\frac{1}{2}$ cup to a pint of milk, or $\frac{1}{2}$ cup maple syrup, or $\frac{1}{2}$ cup honey, or $\frac{1}{2}$ cup dark corn syrup.

FRUIT CUSTARDS.

Fruit custards are popular with children and most adults, although these custards tend to be over-sweet and rather cloying. Lemon juice is of value not only in giving better flavor to the fruit custard, but also in adding some vitamin C.

In these custards 1 egg yolk is used to $\frac{1}{2}$ cup of milk if the custard is to be eaten from the dish in which it is cooked. If it is to be turned from the mould, 1½ egg yolks should be used to every half cup of milk.

Bananas, dates, raisins, cooked prunes, and figs may be used. The sliced or cut fruit is put into the bottom of the mould, a few drops of lemon juice added to the fruit and the custard, made of $\frac{1}{2}$ cup of milk, 1 tablespoon sugar, 1 egg or 1½ egg yolks, and a few grains of salt, is poured over the fruit. This makes one serving. Beat the yolk slightly, add the sugar and salt, then the cold milk, and pour the fruit in the individual custard cup. Set the custard cup in warm water, the water coming up as high as the custard in the cup. Keep the oven temperature at 300°F., and when the custard is set, remove it, take it from the water and set in cold water or in a cold place to chill quickly. If a large number of custards are desired, multiply the quantity by the number to be served.

If the lemon juice is added to the milk and egg mixture, curdling may take place, but if it is added to the fruit, the fruit tends to absorb it sufficiently so that it does not affect the quality of the custard.

Golden Angel Food.—9 egg yolks, 1 cup sugar, 1½ cups cake flour (sifted once before measuring), $\frac{1}{2}$ cup water, 1 teaspoon baking powder, 1 teaspoon lemon flavoring, 1 teaspoon vanilla. Sift the flour and baking powder four times. Beat yolks until light and lemon colored, add sugar slowly, then the water and flour alternately. Add flavoring and bake in an ungreased angel food tin in a slow oven (300°F.) for 1 hour.

Chocolate Sponge Drops.—3 egg yolks, $\frac{1}{2}$ cup sugar, $\frac{1}{2}$ cup boiling water, 1 teaspoon vanilla, $\frac{3}{4}$ cup pastry flour (sifted with 1 teaspoon baking powder), $\frac{1}{2}$ teaspoon salt, 2 tablespoons cocoa. Beat egg yolks, gradually adding sugar. Continue beating until sugar is dissolved and eggs are lemon colored and thick. Gradually add boiling water and flavoring, mixing thoroughly. Fold in sifted dry ingredients. Drop by spoonfuls on ungreased cookie sheets and bake 15 minutes at 375°F. Ice lightly with chocolate icing.

Date Bars.—2 cups sugar, 1 cup butter, 10 or 11 egg yolks, $\frac{1}{2}$ cup cold water, 3 cups flour, 1½ lbs. dates, 1 cup nut meats. Cream butter and sugar. Beat egg yolks until light, and add water. Add this mixture to creamed sugar and butter, then fold in the flour, and beat well. Add stoned dates and nut meats, cut into not-too-small pieces. Bake in a slow oven until firm. When cool cut in bars and roll in powdered sugar. These will keep moist indefinitely in a covered metal or stone container.

Noodles.—1 egg yolk, $\frac{1}{2}$ teaspoon salt, flour. Beat egg slightly, add salt and flour enough to make very stiff dough. Knead, toss on slightly floured board

and roll paper thin. Cover with towel and set aside 20 minutes. Cut in thin slices. Dry, and when needed cook 20 minutes in boiling salted water, and add to clear soup.

Cheese Custard à la Royal.—2 egg yolks, 1½ tablespoons grated cheese, ½ cup milk, ½ teaspoon salt. Beat yolks of eggs. Add milk and salt, and strain custard into flat bottom pan. Add grated cheese and set in pan of hot water. Bake until set in oven of 350°F. Leave in pan until cold. Cut in fancy shapes. Place in soup bowl and pour over hot consommé and serve.

Hollandaise Sauce.—1 cup butter (½ lb.), 4 egg yolks, 2 tablespoons lemon juice, ½ teaspoon salt, ½ teaspoon cayenne, ½ cup boiling water. Warm butter, add yolks of eggs one at a time, beating thoroughly after each is added until mixture is thickened. Add lemon juice, salt, and cayenne, place in double boiler. Add water. Beat with a rotary beater until thickened. Serve over poached eggs.

Mayonnaise for Any Salad.—2 egg yolks, 1 teaspoon mustard, 1 teaspoon salt, ½ teaspoon pepper, 1 teaspoon sugar, 2 tablespoons lemon juice, 2 tablespoons vinegar, 1 cup oil or 1½ cups oil. Mix all dry ingredients into egg yolks, add the lemon juice and vinegar and beat. Add the oil slowly, beating with rotary beater steadily and slowly. The oil and egg should form a smooth mass in seven minutes. If the mayonnaise is to be used as decoration, add the larger amount of oil. This will keep in cold place for weeks. When using from the mass in the jar, leave the surface level.

Thousand Island Dressing.—1 cup mayonnaise, 1 tablespoon chopped chives, 1 tablespoon chopped pimiento, 1 tablespoon chopped green pepper, 4 tablespoons chili sauce, 1 teaspoon paprika. Stir carefully into the mayonnaise and serve at once on lettuce.

Boiled Dressing.—½ tablespoon salt, ½ tablespoon mustard, 3 tablespoons flour, 4 egg yolks (or 2 whole eggs), 3 tablespoons melted butter, 1½ cups milk, ½ cup vinegar. Mix dry ingredients; add eggs, butter, milk; cook over hot (not boiling) water; when it thickens, cool. If it gets too hot it will "curdle," but these lumps can be taken out if the mixture is beaten violently while still hot. When cool, add vinegar. The boiled dressing should be made, cooked, and cooled before the vinegar is added; then it will not affect the quality of the product.

BEVERAGES.

When the various beverages are enriched with beaten egg yolk their food value for children, adults, or for the sick is correspondingly enriched. There is also the advantage that the yolk may be taken raw or only slightly cooked.

Egg Lemonade.—(Serves two)—2 beaten egg yolks, juice of 2 lemons, ½ cup sugar, ½ teaspoon nutmeg, ice water—1 pint. Beat the sugar and egg yolks together. Add the lemon juice and nutmeg. Stir all together and add water. Serve with chipped ice.

Hot Eggnog.—2 egg yolks, 1 tablespoon sugar, ½ teaspoon vanilla, ½ teaspoon grated nutmeg, 1 cup hot milk. Beat yolks very light with the sugar; add the vanilla. Stir in the hot milk, pour into a glass, put grated nutmeg on the top and serve hot or cold.

Chocolate Eggnog.—1 teaspoon cocoa, 2 teaspoons sugar, 1 egg yolk, 1 cup hot milk. Mix cocoa and sugar and add to well-beaten yolk. Stir in the milk slowly, and serve hot or cold.

SUBSTITUTING YOLKS.

Yolks of eggs may be substituted in many recipes which call for whole eggs. Especially where high temperatures are necessary in cooking, as in fried cakes and pancakes, using the yolk of the egg makes a much more tender product than when the whole egg is used. This is due to the fact that the high cooking temperature toughens the egg white but not the yolk.

In using the yolks in this way, three yolks are substituted for each egg, and for each extra egg yolk used one teaspoon of fat is deducted from the amount of fat called for in the recipe. This is done because each egg yolk contains about 1 teaspoon of fat.

This recipe for fried cakes illustrates how a favorite recipe may be changed in this way. The original recipe called for 3 eggs and 7 teaspoons butter. Because the 6 extra egg yolks were used, however, 6 teaspoons butter were subtracted, so that the recipe now reads 9 egg yolks and 1 teaspoon butter.

Fried Cakes.—1 teaspoon butter, 1 cup sugar, 9 egg yolks, 1 cup milk, 4 teaspoons baking powder, $\frac{1}{4}$ teaspoon cinnamon, $\frac{1}{4}$ teaspoon grated nutmeg, $1\frac{1}{2}$ teaspoons salt, $3\frac{1}{2}$ cups flour. Warm butter and add half the sugar. Beat until creamy. Add remaining sugar to well-beaten egg yolks and combine mixtures. Add milk alternately with the flour, which has been mixed and sifted with baking powder, salt, and spices; more flour will probably need to be added to make dough stiff enough to roll. Cut and cook in deep fat.

USES FOR WHOLE EGGS.

SALADS.

There are many varieties of egg salads. One which always delights the children is sunflower salad, made by cutting the hard cooked egg lengthwise into four or five pieces, laying the whites on lettuce in the shape of a flower and using for the centre a mound of the grated yolk covered with mayonnaise. This really does look quite like a sunflower.

Instead of the grated egg yolk for the centre a mound of cottage cheese covered with mayonnaise is often acceptable. If the mayonnaise is not used, French dressing may be sprinkled over the petals of the sunflower and stoned dates and prunes may be used for centres.

A very good mixture for salad is chopped hard cooked egg, a little grated onion, and one-half as much chopped beets as there is egg. This, made into the shape of an egg and laid on a lettuce leaf, is very attractive. French dressing is good with it.

Japanese Salad.—(Serves two)— $\frac{1}{2}$ cup hot boiled rice, 2 hard boiled eggs, 1 slice of onion chopped, 1 slice of red pepper chopped, 1 slice of green pepper chopped, 1 sprig of parsley chopped. Put hot rice into a French dressing, toss carefully so grains do not stick together. Chop the egg whites and rice the yolks, add all the ingredients to the rice, chill thoroughly and serve on a platter of lettuce. Garnish with the parsley or with sardines.

Easter Salad.—Put eggs in upper part of double boiler and cover with boiling water. Put over lower part of double boiler which contains boiling water, cover, and let cook on range 35 minutes. Remove shells, and while hot hold between thumb and finger while pressing into apple shapes. Mix a bit of allowable vegetable color with cold water and apply to eggs, using a brush. Insert a clove to represent blossom end, and a stem and leaves to represent stem end (hot-house lilac leaves answer the purpose), and arrange on lettuce leaves. Serve with mayonnaise.

German Hot Slaw.—One small head cabbage, shred very fine. Put in saucepan with 2 tablespoons water, stir frequently, cook till tender, drain. Make following dressing:—2 eggs well beaten, $\frac{1}{3}$ cup vinegar, $\frac{3}{4}$ cup milk, 1 tablespoon butter, 2 tablespoons sugar, salt and pepper to taste. Combine ingredients, beating well. Turn over the cabbage and cook until dressing thickens. (*Recipes from Many Lands, compiled by Dorothy Ayers Loudon.*)

MAIN DISHES.

MAIN DISHES.

For breakfast and for lunch or supper the whole egg may be cooked in so many ways that its use answers the ever present problem of what to serve.

Combinations of egg and milk, egg and vegetables play their part from soup to dessert. The wise cook knows the temperatures which may be used to insure success and never fails to please with her egg cookery. Even her fried egg will not harm the most particular.

It is possible to cook an egg so that it has the flavor of a fried egg and yet is almost as digestible as a poached egg. This is done by melting a small amount of butter in a frying pan which has a close fitting cover. Slightly brown the butter. Drop in the eggs, add one teaspoon water, cover, and cook over a very slow fire. Enough steam will form to congeal the top of the egg so that it has an opaque appearance, and yet the bottom will be very tender.

SCRAMBLED EGGS.

To produce a light, tender, fluffy yellow mass of scrambled egg requires the cooking over water of the slightly beaten eggs, one to each person. Add one tablespoon whole milk, cream, or even hot water to each egg as they are beaten and cook slowly, stirring the mass away from the sides and bottom of the dish as the mixture cooks. Serve on toast and decorate with butter and paprika.

Scrambled Eggs with Bacon.—Cook in hot frying pan 2 half slices bacon to each person, keeping the pan tipped so the fat does not burn. As the bacon becomes crisp and brown, remove it to the warm platter. Set the frying pan away from the fire and put into it with the fat an egg for each person. Stir the mixture quickly to mix the eggs and fat and then cook gently over the fire until mass is soft. The fat prevents the mass hardening too much. Serve on toast with strips of bacon across each serving. This is excellent at picnics.

Scrambled Eggs (Japanese).—Break into frying pan half a dozen eggs, stirring lightly with knife. Add quickly, before egg begins to cook, a tablespoonful of chopped green pepper, the juice of an onion, half a cupful of chopped mushrooms, and a half a cupful of boiled rice. Toss all quickly together. Cook over a very slow fire, and serve hot.

Chinese-Japanese Cook Book by Sava Bosse Onoto Watanna.

Eggs St. George.—Heat crab flakes in cream with a slight seasoning of curry and paprika and mix them with scrambled eggs.

Scrambled Eggs with Peas.—Cut bacon into inch squares and cook crisp. Add slightly beaten eggs, two eggs to a person, and one cup peas to each eight eggs. Add seasoning to taste. Cook in frying pan over very low heat, stirring slowly until egg is thick. The fat prevents the egg from hardening and becoming a tough mass. This may be cooked over hot water, stirring the mixture until it is thick and creamy.

Scrambled Eggs and Cheese.—Scrambled eggs and cheese may be the main dish for your lunch, or can be successfully used as a filling for hot sandwiches. Scramble the eggs and when they barely begin to thicken, add grated cheese and continue stirring until the eggs are thick. The cheese will just melt, and that is enough. High temperature in cookery retards rather than aids digestibility of cheese. This is an easy way to use your small pieces of dry cheese.

POACHED EGGS.

To poach eggs, have ready a frying pan two-thirds full of boiling salted water, allowing $\frac{1}{2}$ tablespoon salt to 1 quart of water. Break 4 eggs one by one into a saucer and carefully slip them into the quart of water. The water should cover the eggs, and it should not be allowed to boil after the eggs have been put into it. When there is a film over the top and the white is firm, carefully remove the eggs with a buttered skimmer. Season with butter, salt, and pepper. Browned butter poured over the eggs adds flavor and attractiveness.

Carrots and Eggs.—Scrape and slice thin a bunch of carrots (2 cups). Melt butter in a stew pan. Add the sliced carrots. Cover with meat broth and cook

until tender—15 minutes. In this poach three eggs until nearly done. Then set aside to finish without added heat. Serve as luncheon dish. (*Belgian recipe.*)

Eggs a la Louisianne.—Poach an egg for each person. Leave them in water until needed. Fry circles of Canadian bacon or thin ham. Cut stale bread into circles, the size of the egg, and toast. Prepare a brown sauce—Spanish is best. Serve piled as follows:—Toast, meat, poached egg, covered with the sauce. Excellent luncheon dish.

Spanish Sauce.—3 tablespoons butter, 3 tablespoons chopped onion, 3 tablespoons chopped green peppers (may be omitted), 3 tablespoons flour, $\frac{1}{2}$ cup strained tomato, $\frac{1}{2}$ cup meat stock, $\frac{1}{4}$ teaspoon salt, $\frac{1}{4}$ teaspoon paprika. Cook onions and peppers slowly in hot butter until soft, add flour, and brown. Add tomatoes and stir until the mixture thickens. Season and serve over eggs. Chopped mushrooms may be added.

BOILED EGGS.

Remember that eggs need to be cooked at a low temperature; extreme heat toughens the white in eggs and causes them to be rubbery or leathery. Use $1\frac{1}{2}$ cups water to each egg. Heat water to boiling point. Add the fresh eggs to the water and place dish in warm place where temperature falls slowly. Ten minutes will give a soft cooked egg. Twenty minutes will give a medium hard egg. Forty-five will make the egg firm but not tough.

These eggs dropped in cold water will shell easily and may be used for creaming, as escalloped dishes and salads.

Eggs Mollet.—The eggs in the shell are first cooked as for soft boiled egg, cooled, carefully shelled and placed in cold water until needed. Before using them, warm gently in the water.

Eggs Duchesse.—Serve eggs mollet on flat oval shaped potato croquettes and pour over a cream sauce. Garnish with asparagus tips.

Eggs Mollet with Spinach.—Cook fresh spinach in waterless cooker five minutes. Chop it, mix it with cream and season with salt. Form it as a bed on which the eggs mollet are placed and surround with brown gravy.

Egg Barcelona.—Cut tomatoes in half. Broil in pan in oven and serve an egg mollet on each. Garnish with shredded green pepper lightly cooked in butter.

Eggs in Tomato Baskets.—Cut the tomato in halves, remove the seeds. Season with salt, pepper, and bits of butter, and bake in the oven. Fill with any flaked fish—crab, lobster, tuna, salmon—cooked in cream. Put the eggs mollet on top and cover with a cream sauce.

Scotch Eggs.—Use 2 hard boiled eggs, $\frac{1}{2}$ lb. uncooked sausage, and bread crumbs. Remove shells from eggs. Divide meat into two parts, place an egg in each part and mould sausage evenly over eggs. Roll in beaten egg, then bread crumbs. Fry in deep fat. Brown as doughnuts. Drain, then cut in halves. Serve surrounded by tomato sauce. (Equally good served on squares of toast.)

Recipes from Many Lands, compiled by Dorothy Ayers Loudon.

French Curried Eggs.—Take half a pound of onions, half a pound of tomatoes, one carrot, and two apples. Prepare these and cut into small pieces. Fry the onions first in butter until lightly brown. Add the other vegetables, putting some bacon fat into the pan. When these are nearly cooked put in one or two tablespoons of curry powder according to taste, adding sufficient salt, and two tablespoons of brown sugar. Fry for another half hour, adding more fat or butter if necessary. Just before pouring over the eggs which should, of course, be hard boiled first, add sufficient milk to the curry to reduce it to the consistency of a thick sauce.

A Second Helping, by X. Marcel Boulestin.

BAKED EGGS.

Soufflès are made with a thick white sauce foundation into which are mixed slightly beaten yolks and the finely divided food. The stiffly beaten whites are folded in last. The product is put into a buttered glass or porcelain mould and baked in a slow oven (325°F.) for 45 to 60 minutes. The soufflé must be served at once from the dish in which it is cooked.

Liver Soufflé.—(Serves four)—1 cup thick white sauce, 1 cup ground boiled liver, 2 egg yolks, 2 egg whites. *White Sauce:* 2 tablespoons butter, 4 tablespoons flour, $\frac{1}{2}$ teaspoon salt, $\frac{1}{2}$ teaspoon paprika, 1 cup milk. Prepare the sauce either directly over heat or in a double boiler. Cook thoroughly. Stir the ground liver and the yolks into the warm white sauce. Beat the whites until stiff and carefully fold them into the sauce mixture. Place in a buttered pudding mould so that it is half full. Cook one hour in a moderate oven. Serve at once in dish in which it is cooked.

Corn Custard.—1 cup canned cooked corn, $\frac{1}{2}$ cup milk, 2 tablespoons sugar, $\frac{1}{2}$ teaspoon salt, 1 egg beaten. Mix together and cook like a custard in the oven until egg thickens.

Spanish Loaf.—1lb. hamburger steak, $\frac{1}{2}$ lb. pork sausage, 2 eggs, 1 cup catsup, 6 crackers (rolled), salt, cayenne pepper. Mix and pack in baking dish. Bake one hour. This is fine cold.

Recipes from Many Lands compiled by Dorothy Ayers Loudon.

Scalloped Eggs.—Make a white sauce of 2 cups milk, $\frac{1}{2}$ cup sifted flour, $\frac{1}{2}$ cup butter, 1 teaspoon salt, and $\frac{1}{2}$ teaspoon pepper. Then add one tablespoon each of chopped parsley, pimienta, celery, onion, and green pepper and 1 cup of mushrooms which have been heated 5 minutes in 1 tablespoon butter. Pour this mixture over 8 hard boiled eggs and place in a buttered baking dish. Cover with buttered cracker or bread crumbs. Bake until thoroughly heated and brown on top.

Mexican Eggs.—(Serves six)—(1) 1 pint cooked tomato, $\frac{1}{2}$ onion chopped fine, $\frac{1}{2}$ cup butter. (2) 4 eggs, $\frac{1}{2}$ tablespoon paprika, $\frac{1}{2}$ tablespoon salt. Cook (1) together $\frac{1}{2}$ hour. Add this to the beaten eggs and seasonings, stirring them all the time. Continue to cook the mixture until it just thickens. Grated cheese may be added. Serve on toast.

DESSERTS.

The many kinds of custard, such as floating island, soft custard, baked custard, caramel custard are familiar to every housewife. Here are some further suggestions for egg desserts.

Rice Custard.—(Serves four)—Cook $\frac{1}{2}$ cup of cold cooked rice in 1 pint of hot milk until every grain is distinct, add yolks of 2 eggs, $\frac{1}{2}$ cup of maple syrup, a pinch of salt, and a teaspoon of vanilla. Cook a few minutes, turn into a baking dish, cover with a meringue made of two egg whites beaten stiff with two tablespoons sugar, brown slightly and serve cold.

Egg Soufflé.—(Serves six)—2 tablespoons butter, 2 tablespoons flour, 1 cup scalded milk, 1 cup scalded cream, 4 eggs, $\frac{1}{2}$ cup sugar, 1 teaspoon salt, $\frac{1}{2}$ teaspoon vanilla. Cream butter, add flour, and pour on milk and cream gradually. Cook in double boiler five minutes; add sugar and egg yolks beaten until thick and lemon-colored. Remove from fire, add seasonings, fold in egg whites beaten until stiff. Turn into buttered dish or individual moulds, set in pan of hot water, and bake in hot oven (350°F.) 45 to 60 minutes or until firm. Serve from baking dish.

Orange Omelet.—(Serves six to eight)—6 egg whites, $\frac{1}{2}$ teaspoon salt, 6 egg yolks, 2 tablespoons sugar, 2 tablespoons lemon juice, 4 tablespoons orange juice, $\frac{1}{2}$ teaspoon grated orange peel, 4 tablespoons butter. Beat the whites and salt until stiff. Beat the yolks until thick with the sugar and fruit juices. Fold these

into the whites one third at a time, so as to retain the air. Melt the butter in a large omelet pan. Pour in the omelet mixture and put in a slow oven for 20 minutes. Fold on platter. Serve at once.

Cottage Cheese Torte.—(Serves six)— $2\frac{1}{2}$ cups toasted bread crumbs, 1 cup sugar, 1 teaspoon cinnamon, $\frac{1}{2}$ cup butter (melted), 4 eggs, 1 cup sugar, $\frac{1}{2}$ teaspoon salt, $\frac{1}{2}$ lemon (juice and grated yellow rind), 1 cup cream, $1\frac{1}{2}$ lbs. cottage cheese, $\frac{1}{2}$ cup flour, $\frac{1}{2}$ cup nuts chopped. Mix crumbs, sugar, cinnamon, and the melted butter. Set aside $\frac{3}{4}$ cup of the mixture to sprinkle over top. Butter a 9in. mould, spread mixture over the bottom and sides of the mould. Beat the eggs together with the sugar until light; add salt, lemon juice, and grated rind. Then add the cream, cheese, and flour. Mix these well and strain through a sieve. Again stir the mixture and pour it into the lined mould. Sprinkle the $\frac{3}{4}$ cup crumb mixture and the nuts over the top. Bake in a moderate oven 1 hour. Then turn off the heat and let the torte stand in the oven 1 hour to cool slowly.

German Blitz Torte.— $\frac{1}{2}$ cup butter, 4 egg yolks, 1 cup flour, $\frac{1}{2}$ cup sugar, 4 table-spoons milk, 1 teaspoon baking powder. Mix as for cake and bake in two layers. Cover with following: 4 egg whites beaten stiff and mixed with 1 cup powdered sugar. Add cocoanut or fine nuts before putting on meringue. Bake 30 minutes in slow oven. Put together with whipped cream, fruit or custard filling.

Recipes from Many Lands compiled by Dorothy Ayers Loudon.

Lemon Cheese Cakes.—Melt $\frac{1}{2}$ cup butter in a double boiler, add 2 cups granulated sugar, 6 eggs, well beaten, and the grated rind and juice of 3 lemons. Stir until it is the consistency of thick cream. Line patty tins or shallow gem pans with a light crust, rolled very thin. Fill with lemon cheese, and bake in a fairly quick oven. The lemon cheese may be poured into glasses and sealed. It will keep good for months, and makes a fine spread for thin slices of bread or wafers.

Old English Recipe.

Custard Fruit Pie.—1 pastry shell baked, 3 eggs, $\frac{1}{2}$ cup sugar, $\frac{1}{2}$ teaspoon salt, 2 cups milk, 2 cups halved sweetened strawberries or other fruit, $\frac{1}{2}$ cup whipping cream. Scald milk in double boiler. Beat eggs slightly, add sugar and salt, and add gradually to milk, stirring constantly. Add the fruit, and pour into pastry shell and bake 30 minutes in slow oven. Just before serving spread whipped cream over the top of pie.

BALHANNAH.

January 17th.—Attendance, 14.

SAUSAGE-MAKING.—Paper read by Mrs. H. Spoehr:—“Place the cut-up pig’s head, liver, and heart in water overnight, put in the water one handful of salt to take out all blood. Next morning, put pieces on to boil in a large boiler or copper, also all spare rinds and a piece off the bacon 2ins. wide on the bottom side. When tender, lift meat out to cool. *White Pudding.*—Mince liver and all the fattest parts, no rinds, add salt and pepper to taste, a few caraway seeds and marjoram, also boil four onions in a saucepan with some of the stock in which the meat was boiled. Strain through a colander into the minced meat, add enough stock to enable it to be filled into the casings and tie well. Then put the sausages into the stock until cooked. They must not boil or they will burst. Have a table ready covered with white paper, lift sausage out carefully, and dip it into a dish of cold water and then lay it on the table to cool. *Dark Pudding.*—Mince all rinds and a little of the cooked pork and heart. Have ready about 8lbs. of rice soaked overnight in a jam pan. In the morning pour off the water and then cover rice with the stock in which the meat was boiled, add a handful of salt and boil until tender, then take off the fire and stand to cool. Add the rice to the minced meat, also pepper, salt, marjoram, a little ground allspice to taste, blood to make it moist and dark. Put into the casings, tie tightly, and cook same way as white pudding. Try with a hatpin; if red shows they must stay in until clear fat comes out, then lift out and treat same as white pudding. When cold and set they can be hung up in the smokehouse and smoked for a day or two to give them a smoky taste, or hung in a cool dry place. *Metwurst.*—25lbs. meat, 14ozs. salt, $\frac{1}{2}$ oz. saltpetre,

3ozs. white pepper, 1lb. white sugar. Mince a shoulder of pork weighing 16lbs. and 9lbs. of tender red beef. Then put through the mincer, add all the ingredients, and mince again. Mix thoroughly, then hang in smoke room and smoke gently for eight days.

February 23rd.—Attendance, 27.

JAM MAKING.—Paper read by Mrs. F. Leane—"Rule for jam making vary slightly for different fruits, because all do not contain the same proportion of pectin and acid, which helps to dissolve the pectin. Fruits low in pectin may have lemons or acid fruits added. Over-ripe fruit is unsuitable, it contains little pectin, and is not likely to keep so well. Sound and dry fruit is essential, and it must be free from dust. Insufficient cooking is often the cause of failure, and mould on the jam is the result. The object in cooking is to evaporate the water in the fruit. If insufficiently cooked the jam will not set, and if overcooked the jellying properties are destroyed and the color is spoiled and alters the flavor. Whether jam should boil quickly or simmer is much disputed. Candy on the top of jam is caused by the jam being brought to the boil too quickly after the sugar is added, it should be brought slowly to boiling point and then boil briskly until done. Apricots and figs are preferred by some to have sugar put on fruit over night, it keeps the fruit from breaking and makes more of a conserve. Berry fruits are best brought to the boil and sugar added afterwards. The usual proportions are 1lb. sugar to 1lb. fruit, but acid fruits, such as certain varieties of plums and quinces, often require 1lb. sugar to 1lb. of fruit. Berry fruits and marmalade should be allowed to cool before bottling, the heat drives the berries and light shreds to the top, leaving a gap of clear syrup. When mixing fruit, such as blackberry and apple, and blackberry and plum, it is best to boil each fruit separately until soft, then mix; if boiled together the fruit remains hard and will not mash. Brewers crystals are often used in preference to ordinary sugar. To make jelly successfully, boil the fruit slowly and thoroughly, strain through a jelly bag, and on no account squeeze nor wring bag, or the jelly will not be clear. Measure the juice and bring to the boil before adding sugar, which is usually 1 cup of sugar to one of juice. Boil for about 20 to 30 minutes and then test a little in a saucer. If the sample is cooked it will jell and wrinkle when lifted with a spoon. Care should be taken when bottling jam—make sure that the jars are clean and dry, if the jars are damp it will cause a ferment. There are various ways of sealing jam. Paraffin wax is very good; clag is another good paste, also boiled starch. Mice will not touch either of these two pastes mentioned." (Secretary, Miss D. Spoehr.)

KYBYBOLITE (Average annual rainfall, 22in.).

December 5th.—Attendance, 34.

HOME-MADE CONFECTIONERY.—Mrs. G. Davidge read the following paper:—"In addition to recipes it is necessary to learn to adapt any formula to one's own requirements, and to do this, close application to the subject and careful observation of the different results obtained are required. Great care must be exercised with heat, in order not to scorch the syrup before the proper degree of boiling has been registered. If making large quantities of sweets, have a marble slab to work the sweets upon, and also for pouring the confections. Failing this, enamel dishes turned upside down, and damped with cold water, are quite satisfactory, or sandwich tins well buttered for toffee or butterscotch. These must be cut into squares before the toffee is quite cold. No butter is ever used on the slab or dishes for cream confections. Do not attempt any recipe until quite conversant with all details, especially the degree of boiling. A thermometer and maize syrup are the secrets of successful confectionery; sugar is boiled to various degrees with the thermometer, more or less according to the kind of sweets being made. Watch the degree carefully and only take it to the number stated in the recipe, then remove from the fire immediately. After a little careful experimenting it will soon be possible to handle the thermometer in an expert manner. Handle this article with great care in order not to break it. Keep the thermometer scrupulously clean, because if placed in any syrup with the previous boiling sticking to it, the whole mass will probably be spoilt. Success in sweet-making depends on strict attention to this and similar small details. Fondant is one of the first foundations in the making of many kinds of sweets; great care should be taken with this, it will require both patience and care. Success depends entirely upon boiling the sugar to the exact degree; the heat should be strong and steady, but not too intense. In making up very small batches of sugar, such as 1lb., it is sometimes difficult to get the thermometer to register correctly on account of the fact that it will not go deep enough down in the syrup. During the boiling process stirring must only be done when specified, as this is likely to granulate the batch, causing it to

become hard and revert to sugar. Fondant made of sugar and cream of tartar produces a firm and smooth cream, and is the purest. *Recipe for Fondant Products.*—Place 1½ lbs. of sugar, a scant teaspoonful of cream of tartar, and about a pint of water in a clean saucepan. Set on the stove and stir with a wooden spoon until the sugar is thoroughly dissolved. When it comes to a boil skim off all foreign matter carefully, place lid on saucepan, and allow to boil two or three minutes. Remove lid and insert thermometer, which should be in a jug of warm water near the stove. When it registers 240 degrees remove instantly from the fire, leave until lukewarm, then start the creaming process. Stir well with a wooden spoon. It will turn cloudy and become quite thick. Wring out a cloth in cold water and place it over top of fondant. Leave for half-hour or more and it will then become mellow. Scrape and mash down well, knead with the hands, which have been dipped in cold water; knead on a marble slab if possible. It is now soft and creamy and can be moulded into different shapes and colors. Chopped nuts may be added for variety. They can be dipped in chocolate, and almonds, walnuts, raisins, &c., placed on them. *Recipes for Coconut Ice or Swiss Cream.*—3½ lbs. sugar, ½ lb. maize syrup, moisten with water, and place on the fire, stir until dissolved, then put lid on saucepan for a few minutes to get all the sugar steamed off the side of saucepan. Take off lid and place thermometer; when it registers 240 degrees remove from fire and beat, gradually adding 1 lb. of fine cocoanut. When a thick heavy cream, pour on marble slab or enamel plate. Color some pink to make a variety. If Swiss cream is desired use flaked cocoanut instead of the fine. *Snowballs.*—Soak 2 ozs. gelatine in 2 cups of water for two hours, add 2 cups of hot water, and 2 lbs. of white sugar; boil 20 minutes. Allow to cool, add 1 teaspoon vanilla, then beat with a egg-beater until firm and frothy and it will not turn back into jelly. Pour into dishes and leave for several hours, then cut into squares, dip in chocolate, and add small decorations. They can be varied with different colors. Cocoanut can also be toasted on the oven slide in a slow oven until a light brown, then roll some in this, calling them toasted marshmallows. *Serbian Rock.*—2½ lbs. sugar, 1½ lbs. maize syrup, water to dissolve same. Boil to 255 degrees, then remove from fire, beat, and when cool, add stiffly-beaten whites of two eggs, then beat hard, adding nuts that have been cut into small pieces. When getting fairly stiff, pour on marble slab, then when quite cold, break into small pieces. This can be colored different shades, but keep the colorings pale, as this will make the sweets more tempting. *Clear Toffee Recipe.*—2 lbs. sugar, ½ lb. maize syrup, moisten and place on fire, bring quickly to boiling point—212 degrees. Put lid on saucepan, and steam down sides of saucepan, then remove lid, place in thermometer, and boil very quickly until 310 degrees. Pour into buttered tins and cut up when cold. The same recipe is used for butterscotch, but when it is removed from the fire, add 3 ozs. of butter and stir it in well with nuts or cocoanut. Always keep butterscotch and toffee in an airtight tin.” (Secretary, Mrs. Kekwick.)

McLAREN FLAT.

February 1st.—Attendance, 17.

SCONES AND PASTIES.—Recipes supplied by Mrs. J. Smith:—When making scones, use a large shallow dish to give plenty of room for mixing. Do not stir the mixture, this makes the scones heavy. Small quantities do not turn out as well as larger ones. Care must be taken not to mix the dough too stiffly, the mixture should be fairly moist and just dry enough to be cut with a knife. It is better to cut scones with a knife, a round cutter leaves odd pieces, which have to be rolled out again, and these are not so light because of the second handling. The less scones are handled the lighter they are. When using thick milk for mixing, always beat well first. Milk is generally used for glazing, but scones are much lighter if left unglazed. Test the oven with a piece of kitchen paper, which should turn a dark brown in 30 seconds. *Plain Scones.*—Take 1 lb. S.R. flour, 3 ozs. butter, ½ teaspoon salt, ½ pint milk, 1 teaspoon icing sugar. Method.—Sift sugar with flour, add salt, rub in butter lightly with fingertips, make hole in centre and pour in milk. Mix together very quickly, turn on to floured board, fold edges under with sides of the hands—not the fingers—press out and cut into desired shapes. Cook at once in a very hot oven from 5 to 10 minutes. *Gem Scones.*—Two cups S.R. flour, 1 cup milk, pinch salt, 1 egg, 2 dessertspoons butter, 2 dessertspoons sugar. Method.—Sift flour and salt; rub in butter lightly; beat egg and sugar together, adding milk; add these to the flour, &c.; beat well until smooth. Place a dessertspoonful in hot greased gem irons. Bake in a very hot oven for 10 minutes. *Cornish Pasties.*—To make good Cornish pasties the choicest beef should be chosen. The same applies to the vegetables, which need to be young and fresh. If coarse meat or old vegetables are used they require longer cooking, resulting in dry, indigestible pasties. Take ½ lb. steak, 4 ozs. potatoes, 1 large onion, 1 teaspoon salt, ½ teaspoon pepper, ½ lb. short crust. Method.—Remove fat and skin from meat and

cut very finely, also onion and potato and add to meat. Mix well with pepper and salt, and divide into 8 equal parts. Make short crust and divide this also into 8 equal parts; form each piece into a ball and roll as round as possible and about 6in. in diameter, trim the edges neatly. Place the divided mixture on to each round of pastry, brush half way round each piece with cold water, fold the two edges together and press well, then make a neat frill by placing the first finger of the left hand on the rim of the pastry and pinching with the thumb and first finger of the right hand. Place on a cold greased dish or oven slide, brush over with yolk of egg, and prick with a fork. Cook in a hot oven from 30 to 40 minutes. Garnish lightly with parsley and serve on a hot dish with brown sauce or tomato sauce. A point to be avoided is over-garnishing, just one small piece of parsley is sufficient for each pasty. It is important to have the oven very hot. (Secretary, Mrs. D. Elliott.)

MILLICENT (Average annual rainfall, 29.8in.).

February 16th.—Attendance, 11.

RECIPES FOR PEARS AND QUINCES.—Mrs. Cassells: *Pear Preserve No. 1*.—6lbs. pears, 3lbs. sugar, 4ozs. whole ginger (bruised), $\frac{1}{2}$ pint of vinegar. Boil all together until red and clear. *Pear Preserve No. 2*.—2 $\frac{1}{2}$ lbs. pears, 2 $\frac{1}{2}$ lbs. sugar, $\frac{1}{2}$ pint of vinegar; add cloves and cinnamon to taste. Boil all together until clear and a good color. *Pear Preserve No. 3*.—6lbs. pears, 4lbs. sugar, $\frac{1}{2}$ lb. green ginger, 1 cup of water. Pare and quarter the pears; stand in sugar and water all night, add ginger, and boil until clear. Mrs. Ey: 8 large quinces, 5lbs. sugar, 2 $\frac{1}{2}$ cups water; grate the quinces, boil sugar and water together, skim, add grated quinces; boil for 20 minutes and skim if required. Miss Kath. Hutchesson: *Quince Marmalade*.—To each pound of fruit allow 1 cup of sugar. Boil and core quinces and cut fruit into dice. Cover peel and seeds with water, boil one hour, strain, add sugar, and put on to boil. When boiling, add fruit and boil from 1 to 2 hours. *Quince Honey*.—Take 10 cups of sugar, 2 pints of water, and 6 large quinces. Boil sugar and water about 20 minutes, then add grated quinces; boil until a nice color, and the thickness of honey. Mrs. J. M. N. Altschwager: *Quince Marmalade*.—Cut quinces into dice, and to every 1lb. of fruit allow 1 pint of water and 1lb. of sugar. Boil cores and peel separately in water; strain and pour over the sugar. Boil syrup 30 minutes, then add fruit and continue boiling until a deep rich red and the liquid jells when tested. *Preserved Quinces*.—12lbs. quinces, peeled, cored, and quartered, 4lbs. sugar, 1 cup water, 2 cups white wine vinegar, 2ozs. cinnamon bark, $\frac{1}{2}$ oz. cloves. Boil water, vinegar, sugar, cinnamon, and cloves for a few minutes; then put enough quinces in just to cover the bottom of the pan; remove when soft and bottle. When all are cooked, if there is not enough syrup to cover the fruit, make some fresh syrup in the same proportions. *Quince Jelly*.—Cut quinces into quarters, use peel and pips; cover with water and stew gently; do not allow fruit to mash. Use green quinces fully grown, strain and measure, and return to pan. As soon as it boils add cup for cup of sugar, boil rapidly until it will jelly. Mrs. A. Bryant: *Preserved Fruits*.—Take 6lbs. sugar, 12lbs. quinces, pears, or figs, 1 $\frac{1}{2}$ pints vinegar, 1oz. each cloves, allspice, and whole ginger (boiled in muslin bag). Put vinegar and sugar on to boil with spices and just as it is boiling drop in fruits, peeled and cored (figs whole), and boil about 1 hour until the syrup thickens a little and the fruit is tender and nice color. Mrs. H. J. Hutchesson: *Quince Jam*.—To every pound of peeled and cored quinces use $\frac{1}{2}$ lb. sugar. Boil the peels and cores until tender, then strain. To every 4 cups of juice add 3 cups of sugar. Pour over cut or minced quinces and boil until it will set. *Pear Jam*.—12lbs. pears cut into rather large pieces, 9lbs. sugar, 4 $\frac{1}{2}$ pints water, 1 tablespoonful cloves, 1 teaspoonful citric or tartaric acid. Boil sugar and water together for $\frac{1}{2}$ hour, add fruit, and boil for 4 or 5 hours or until it turns red. The cloves must be tied with muslin and boiled with jam. A small quantity may be used if liked. Add acid about 20 minutes before it is done. (Secretary, Mrs. M. Hutchesson.)

TANTANOOLA.

February 7th.—Attendance, 10.

BOTTLING FRUIT.—Mrs. Edgecombe read the following paper:—"The fruit should be ripe but firm, and of even size. If peaches and pears have to be peeled, drop them into cold water to prevent discoloring; pack very tightly in bottles, fill with cold syrup, and leave a few moments for the syrup to soak into fruit. Then screw on lids—for Mason bottles—not too tightly, put in copper, kerosene tin, or any other vessel that has a good fitting lid. Bring to almost boiling point and maintain at that for about $\frac{1}{2}$ hour or until fruit is cooked. Take from tin and screw lids down tightly. To preserve with a Fowler's outfit, the process is much the same, there being a steriliser and thermometer instead of a tin. Fill the bottles as full as possible, fit the rubber

ring, fill with cold syrup, put lid on and clip down. Place in steriliser and continue until full, and place on fire; bring to required heat and keep at same until cooked. Mason's and Fowler's bottles can be done at the same time in the steriliser. The syrup I use is 1lb. sugar to 1 qt. water, and the cost of sugar is about 1d. a bottle, so that if the fruit is a reasonable price, or any one has their own fruit, the cost is very little. I use the rubber rings more than once, but they must be sound. I find apricots the hardest of all fruits to preserve for appearance, as they are apt to rise in the bottles and will not stand so much rough handling as other fruit." (Secretary Mrs. Telfer.)

WASLEYS.

February 1st.—Attendance, 24.

RECIPES.—Miss G. George contributed the following:—*Shortbread Tart*.— $\frac{1}{2}$ lb. S.R. flour, 4ozs. each butter and sugar, 1 egg, essence lemon. Beat butter and sugar to cream, add egg and flour, roll thinly, and bake in pattypans. *Lemon Filling*.—1 tablespoon each cornflour and custard powder, 1 cup hot water, $\frac{3}{4}$ cup sugar. Put sugar and water on to boil and thicken with cornflour and custard powder mixed with juice of lemon. Mrs. W. O. Toll supplied the following:—*Plum Sauce*.—6lbs. plums, 6 cups vinegar, 3lbs. sugar, 6 teaspoons salt, 1 teaspoon white pepper, 1 handful each whole ginger and cloves, 2 large onions; boil one hour then strain. *Worcester Sauce*.—2 quarts vinegar, 1 $\frac{1}{2}$ ozs. each onions and eschalots, $\frac{1}{2}$ oz. each mace, black pepper, cloves, cayenne, 1 pint Indian soy; put in a jar and shake every day. *Genoa Cake*.—1lb. each butter and sugar, 1lb. 3ozs. plain flour, $\frac{1}{2}$ lb. chopped peel, 1lb. each raisins, sultanas, and currants, 1 teaspoon each spice and grated nutmeg, $\frac{1}{2}$ lb. each blanched almonds, dry figs, and crystallized cherries, small glass brandy or sherry, small $\frac{1}{2}$ teaspoon baking powder. Clean and dry fruit the day before. Cream butter and sugar, add eggs one at a time, and beat well; add fruit and sifted flour alternately. Icing: $\frac{1}{2}$ lb. almond meal, 1 white of egg, $\frac{1}{2}$ lb. icing sugar, few drops almond essence; mix icing sugar and almond meal to flour with whipped white of egg, then stir over fire until warm and stiff enough to roll out; sift icing sugar on to board to roll and make size of cake, and pat on to top of cake. Ice and decorate in the ordinary way. *Tomato Sauce*.—12lbs. tomatoes, $\frac{1}{2}$ lb. salt, 1oz. each cloves, whole spice, and peppercorns, $\frac{1}{2}$ oz. bruised ginger, $\frac{1}{2}$ oz. each mace and garlic, 1lb. onions, 2lbs. sugar, 3lbs. apples, 2 pints vinegar. Put all on to boil (except vinegar) for two hours, then strain and put back with vinegar and boil until thickness of cream. Miss G. Smith: *Blow-away Sponge*.—4 eggs, $\frac{3}{4}$ cup sugar $\frac{1}{2}$ cup cornflour 2 teaspoons plain flour, 1 level teaspoon cream of tartar, $\frac{1}{2}$ teaspoon soda. Beat whites of eggs with knife until stiff, add sugar, and beat until dissolved; add yolks and beat five minutes; add sifted flour and rising and beat in, still using knife; do not stir, put into sandwich tins, bake in hot oven 7 to 10 minutes. Miss V. Currie: *Cucumber Pickle*.—Cut up 4lbs. each green tomatoes, cucumbers, and onions, 2lbs. beans; do not peel cucumbers. Pour over brine made of 4 quarts cold water and 1lb. salt; stand all night. Put on to boil and boil for five minutes. Lift off and strain well. Boil 1gall. vinegar with 2 teaspoons ground allspice; when it boils stir in the following ingredients, well mixed:—5 cups sugar, 2 cups plain flour or cornflour, 1 $\frac{1}{2}$ tablespoons tumeric, 2 teaspoons white pepper, 2 tablespoons each curry powder and mustard; mix to a paste with 3 cups cold water. Stir well into vinegar, bring to boil, put in the pickles, leave until nearly cold, then bottle and cork well. Mrs. L. C. Teakle: *Tomato Sauce*.—12lbs. tomatoes, 1oz. garlic, 2lbs. onions, $\frac{1}{2}$ oz. ground ginger, $\frac{1}{2}$ lb. salt, 1 teaspoon cayenne, $\frac{1}{2}$ teaspoon cloves (tied in muslin), $\frac{1}{2}$ lb. sugar, 1 quart vinegar. Skin the tomatoes and onions, slice, and boil with cloves until soft; stir well. Press through a colander. Add other ingredients and boil smartly for one hour until right consistency. Stir well with a wooden spoon. When done, pour at once into an earthenware dish, and bottle when cold. Cork well and it will keep for years. An enamelled pot is the best to use. Mrs. J. Mullen: *Three-minute Sponge*.—1 small cup sugar, 1 tablespoon milk, 3 tablespoons melted butter, 3 eggs, 1 large cup flour. Beat all together for three minutes, then add 1 teaspoon cream tartar and $\frac{1}{2}$ teaspoon soda. Miss J. Braun: *Crunchies*.— $\frac{1}{2}$ lb. butter, 1 cup sugar, 2 eggs, 1 cup cocoanut, 5 cups cornflakes, vanilla essence. Cream butter and sugar, beat in the eggs, then add cocoanut and cornflakes and essence; mix well, and drop small spoonful on tray. Bake in moderate oven for about 30 minutes. (Secretary, Miss J. Braun.)

CONFERENCE AT RIVERTON.

Delegates from the Women's Branches situated in the Lower North districts met in Conference at Riverton on February 22nd. Mrs. W. C. Johnston presided over an excellent attendance. The following papers were read:—

KNITTING.

[By Miss VERA GILLEN, Clare.],

Knitting, as well as being a useful occupation, is a pleasant recreation. Many dainty and serviceable garments, &c., can be made for a small outlay. When commencing an article be sure and procure enough wool; it is better to have a little over than not enough to finish the article.

There is always a certain amount of difficulty and uncertainty in producing the exact size of garment at which one aims. One worker knits loosely, another tightly, and the tension of the work varies accordingly, and though given instructions may have been followed stitch for stitch, there is disappointment when the piece of knitting turns out to be larger or smaller than was intended.

This difficulty may be avoided by making it a rule always to start with a specimen of knitting before beginning the actual piece. Cast on 24 or 30 stitches with the prescribed wool and needles, and knit a dozen rows or so. Then measure how many stitches go to the horizontal inch and how many to the upright inch. It will then be perfectly simple to determine by a rapid calculation the exact size to which the knitting will work out.

Another point is to make sure that wool and needles suit one another. Here again a sample piece of work is the only safe and reliable test. These two points take a little extra time, but it will be time well spent.

Work into the back of cast-on stitches. This gives a firm edge. When casting-off, do it on the wrong side; this also gives a firm edge. Garter stitch is plain knitting. A "ridge" or "rib" is two rows of plain knitting. Plain smooth fabric is one row plain and one row purl.

Knitting in pattern requires more thought than plain work, but the stitches are the same. There are only two plain and purl; it is the way you place them that makes a pattern. To make a stitch one way is to knit into the front, then into the back of a stitch. Another way is to place the wool forward before knitting the next stitch. To decrease, knit two stitches together, or knit two stitches and pass the first stitch over the second stitch.

To join wool, take a darning needle and work one strand into the other, or splice the wool; moisten with a little water, lay strands together and rub gently between the fingers. Always try to have the join at the beginning of a row; it will not show so much as in the middle of a row. *Never* knot the wool; as well as being untidy, the knot often gives way, causing stitches to drop. When commencing a row, always slip the first stitch, or, alternatively, knit into the back of the stitch; either way gives an even edge and makes it easy to join. If shoulder-seams are grafted together they are much neater.

Always buy wool of the best quality; poor quality wool does not wear or wash so well. Fine wools and fine needles are best used in knitting baby's woolies. Sports wool, in addition to being used for jumpers and pullovers, makes excellent cot and pram covers when knitted on large needles (size 4 or 3).

The pressing of the finished article is most important; it should be pinned to the exact measurements on to the ironing blanket and pressed with a damp cloth and warm iron. Fancy knitting is best pressed on a thick towel—the towel keeps the pattern from going flat.

Care should be taken in putting the knitted article together; see that each seam corresponds with the other. Before sewing with the machine it is a good idea to join the seams with wool. Be sure that all loose ends of wool are neatly fastened. The neatness of the finishing is just as important as the evenness of the knitting.

ITEMS OF INTEREST TO THE HOUSEWIFE.

[By Mrs. H. C. NIELD, Wasleys.]

The duties of a housewife are liable to become very monotonous, therefore it is necessary to consider the easiest and most interesting methods.

COOKING HINTS.

When dressing poultry—if the bird is scalded in boiling water then wrapped up for a few minutes in several thicknesses of newspaper, the task of plucking the feathers will be a simple one. There is a danger of roast poultry, particularly fowl, becoming dry; this may be overcome by placing the dressed bird in a paper bag to roast in the usual way. I prefer to put all roasting joints into a hot oven and decrease the heat over the last cooking period.

Milk puddings and baked custards are very nourishing. If the pudding-dish is placed in a larger dish containing hot water and baked in a moderate oven, the pudding will set evenly and light without curdle, and the custard will be all that can be desired. When cooking rhubarb, this method can be adopted, and if the dish is covered, the rhubarb remains in dice as it is cut and the full flavor is retained. Slices of lemon or orange added to stewed rhubarb further improve the flavor. Gelatine added to stewed cherries, apricots, or prunes makes a good summer dish, especially for picnics. Any of these fruits set in small pots, such as 4oz. marmite jars, make an appetising school lunch for children. Cornflour added to the juice of stewed fruit is an improvement to plums and apricots.

Baked apples and pears are improved by placing a date in the centre after the core has been removed. Pears should be green for baking—late varieties for preference. I half-fill the baking dish with water when baking these fruits.

When cooking cakes or sponges, place a slide on top. To remove a cake from the tin, first place on a damp cloth and there is no danger of the cake sticking to the tin.

Bread for toast placed in the oven for a few minutes improves the flavor and requires very little heat to brown.

Before boiling milk, first put a little cold water in the saucepan. This prevents burning. To make the washing of the milk saucepan easier, turn the saucepan upside down immediately it has been emptied. In the case of a burnt saucepan, add a handful of salt, fill with water, and place on the fire to boil. Empty the water and put saucepan in the sun for a time. Salt also removes milk or fruit juice from the top of the stove or the oven, if inadvertently it boils over.

During summer, the care of milk and cream is an important factor. Milk should be kept in wide-top jugs—not enamel; and both milk and cream should be cooled as quickly as possible. The task of making butter during hot weather becomes simple if the cream for churning is hung outside in a damp calico bag overnight. Place a pan or bucket under bag to catch the drippings. This is suitable only for household purposes, churning enough cream for 2lbs. of butter. Churning should be done early next morning. A rubber dish-scraper is very useful for scraping all cream dishes and cans, and can be purchased for a few pence.

WASHING AND CLEANING HINTS.

Rainwater gives the best results in the laundry, but if ever compelled to use hard water, Lux added to the copper is an improvement. A cup of fresh milk added to the bluewater prevents streaks of blue on the clothes. These hints greatly minimise the disadvantage of hard water. A very useful article in the laundry is a drain-box; this can be made from a kerosene case with the lid on, opened on one side with holes bored for drainage. Put rope handles at each end and place over a tub to drain; this is much cheaper and more durable than a basket.

To prevent a skin forming on starch, cover bowl with a cloth. This also applies to boiled custard.

The problem of spring-cleaning can often be lightened by using easy methods. A stiff clothes brush is excellent for seagrass furniture. Oak furniture needs much care, but can be easily restored with various furniture polishes. Boiled linseed oil, vinegar and methylated spirits mixed together is a good polish. Vinegar or methylated spirits added to the water when washing windows and mirrors will improve the finish. Turpentine added to stove polish lightens the work and a much brighter polish will result. The backs of pictures, interior of wardrobes and drawers should be periodically painted with turpentine, to prevent silverfish and moths. Aluminium and copper kettles clean easier when hot.

To prevent dust when sweeping a carpet or dusty boards—not polished—place small pieces of damp paper on the carpet or floor. A cloth sprinkled with methylated spirits will brighten hearthstones and grates.

Eucalyptus is a valuable cleaner in many ways; coat collars, marks on suits and frocks can be safely sponged, and black grease will quickly vanish from silk or other fine fabrics. Navy serge is easily cleaned with a strong solution of blue and hot water. Warm flour is an economical cleaner for cream serge, white felt hats, or woollen fabrics. This is not very successful for deep-seated marks.

The difficulty experienced of threading the machine needle is overcome by placing a piece of white paper or cloth under the needle.

The knee of a man's trousers can be patched without bother by opening the leg seam. Old lisle or silkesta stockings are excellent dusters after the feet are past mending. Two stockings opened and stitched together are good; three are even better.

Every mother dislikes the look of crust on baby's head. This can be prevented by sprinkling a little borax on the flannel each morning when washing the head.

During summer small black ants become very troublesome, and a good exterminator is found in this recipe:—1 cup sugar, $\frac{1}{2}$ cup water, 1 good teaspoon borax; boil for five minutes. Place in flat tins and the ants will feast on this and then disappear for weeks or perhaps months.

When washing jam bottles after filling, use cold water; this is easier to use and just as effective.

NEEDLEWORK.

[By Misses S. and L. BLIGHT, Clare.]

Doing fancy work is a gift as well as an art and it is also a very pleasant pastime during winter evenings. Procure the best traced linens, also the best of silks, cottons, and crochet cotton. Semco linens and cottons are recommended, also D.M.C. colored stranded silk. Clarks' stranded is very harshly toned and is difficult to blend in the colors, and if one does not have a good blend the work is not nearly so attractive. We mostly use for our work Semco linen, D.M.C. stranded, and No. 12 Semco crochet cotton. To make a nice supper cloth, choose a good linen with a bold design and a neat edge. In the Semco crochet books there are many dainty edges and it is very

interesting, if one is only a learner, picking out the edge. There are quite a number of stitches and one is never finished learning about needlework. For stems, use Satin and Stem and Snail-trail; for the flowers use Satin and Thousand-flower and Lazy-daisy. The Lazy-daisy is easy to do and pretty, too, but does not wear at all well; the centres can be done French-knots or Satin. Cross stitch is beautiful if done nicely and worked in colors. The back of the work must be as neat as the front and no knots, and if the work is for exhibition, always keep it in a pillow case to keep it clean.

JAMS.

[By Mrs. M. H. RICHTER, Wasleys.]

For making jam I prefer an enamelled steel preserving pan; a wooden spoon is advisable for stirring and accurate scales for weighing fruit and sugar. Do not wash the fruit, but wipe clean with a damp cloth. I never make jam in large quantities; small boilings are more satisfactory; 12lbs. at a time is enough, and only choice, firm fruit should be used.

Apricots should be a little under-ripe to make the jam a nice color, and figs quite ripe, as the jam will be juicier. Care must be taken to see that the berry fruits are not in a fermenting condition.

For most jams I add 1lb. of sugar to 1lb. of fruit, an exception being strawberry, for which I use 1½lbs. of sugar to 1lb. of fruit, and add tartaric acid. The acid counteracts the sweetness and the quantity of sugar increases the quantity of jam.

Some people put the sugar on the fruit overnight to extract the juices, but I prefer to put the fruit straight on the fire with a small quantity of water, about 1 cupful; cook until it pulps and then add the sugar and boil about 1 hour. If boiled too long, the flavor and consistency of the jam is spoiled.

For strawberry and raspberry 5 minutes is sufficient. Do not remove the scum that forms, it will disappear when the jam is taken from the fire. When making quince jam it is not necessary to peel the fruit. After thoroughly cleaning, place the quinces whole in the pan and cover with water and boil until soft, then cut open and remove the core. The remainder, and the water in which they were boiled, can then be mashed together and the sugar added.

Quite a number of fruits can be mixed successfully, for example, plum and blackberry, plum and mulberry, fig and grape, apple and blackberry, peach and pineapple, apricot and pineapple, also equal quantities of rhubarb and strawberries makes an economical jam.

There is no need for the jam cupboard to run low before the fruit season comes in as jam can be made from dried fruit. The recipe for dried apricot jam is:—2lbs. of apricots, 7 pints of water, 6lbs. of sugar. Wash the apricots and soak in water overnight. In the morning boil 30 minutes, add the sugar, and boil quickly for another 30 minutes.

Jam should be bottled while hot in small jars for preference. If glass, warm them in the oven to prevent cracking. Starch can be used to paste them down; label and date before putting away.

VEGETABLE DYEING.

[Mrs. M. C. DUNSTAN.]

Vegetable dyeing has a great attraction for most women. Besides the beautiful colors so obtained, there is always the chance of discovering fresh tints or rediscovering those which have been lost.

In the earlier days of dyeing, England produced most of her dyes from her own vegetation, but during the 17th and 18th centuries native dye plants were largely displaced by those imported. A few were still used, but they were finally ousted by chemical dyes in the 19th century.

The aim of vegetable dyeing is to obtain soft, rich coloring, and a greater permanence than can be obtained by chemical dyeing. The latter method can produce brighter dyes at a much less cost, but against this is the longer endurance of the vegetable dyes and their soft, lustrous coloring, by the side of which the chemical dyes are metallic and hard.

Also, the vegetable dyes, even when faded, retain great beauty and charm, as can be seen in old tapestries; they have lost their pristine brilliancy, but still retain their beautiful colors, whereas chemical dyes change, or even lose their color in the course of time.

Vegetable dyeing is much more expensive, and the method is far longer and more intricate than chemical dyeing, but the result is well worth it when applied to really good craft work. Persian carpets and rugs, which command very high prices, are all vegetable dyed, being made by a nomad tribe who live in tents wandering from place to place as the dye plants they seek are exhausted. There is a law, decreed by the King of Persia, that anyone introducing aniline dyes into the country will be punished with death; nevertheless, inferior aniline dyed rugs are on the market and can be detected by the expert. Vegetable dyes on the whole incline to soft shades, but many clear and brilliant colors are also obtainable.

Another factor which is against the commercial use of vegetable dyes is the unlikelihood of exactly repeating a color, so many factors, such as time of year, varying hardness of water, &c., influence the color. Also, personality plays quite a part, as two people can use the same yarn, water, and dye and yet produce two variant shades.

The vegetation of Australia offers an interesting field for experiment to the vegetable dyer, being mostly unexplored, and it may fall to the lot of the merest beginner to discover some useful and beautiful dye. The few people who are trying out our native flora have learnt in England, where also are written the few text books that we have, but the difference in climate, soil, &c., affects the dyeing qualities of a plant so much that the Australian value of an English dye plant has to be ascertained.

For instance, weld, a wild mignonette, is the best yellow in England; here, on trying it, the color produced was feeble and pale compared to our own quandong, gum tree tips, and many other wild shrubs. St. John's wort produces a yellow quite ideal for putting in the blue vat for green.

The predominating colors of our native plants are yellow, fawn, and pinkish-fawn. From onions we get many shades of orange and yellow. The green husks of walnuts give a beautiful brown ranging from nigger down to the palest tints of fawn, whilst from the lichens found on the rocks in our hills we get a brighter brown ranging from almost titian red through many shades down to cream. Wattle bark commercially used for tanning can, with different treatments, give us a different brown again, as well as useful shades of fawn and grey. The iris root yields an attractive pinkish-fawn.

The buckthorn yields a vivid yellow from its berries. These berries are imported to London from Persia and there sold as "Persian berries." On looking up their name I found that they were the same as the hedges so much in use here around gardens of 40 or 50 years ago. I brought home some berries and planted them and have two plants which are identical with our *rhamnus*.

The most interesting of my results are the dyes obtainable from the *drosera* (sundew) or fly-catcher, so called owing to the curious propensity of its leaves. The tiny bulb at the base of these plants gives a strong dye in shades of fuschia and cyclamen. With different treatments I obtained a most interesting range of colors.

In Scotland lichens are still used by the peasants to dye the wool for their own spinning and knitting and they are also used for dyeing tweeds. The well-known Harris tweed smell is due to crottle, a dye-bearing lichen. This is also used in Sweden and Shetland. Other dyes are made from lichens by preparation in various ways.

Indigo, prepared from the *Indigopera tinctoria*, which grows in Asia, South America, and Egypt, gives us the best blue, though the dyeing process is more difficult than most dyes. It has quite taken the place of woad, which was cultivated in Lincolnshire as recently as the beginning of this century. Woad is supposed to be the "vitrum" of the early Britons.

Logwood gives a greyish-blue, which is not to be compared with indigo for brilliancy and permanency. Several dyes are always included amongst the vegetable dyes, which are produced from an insect parasite. Cochineal, found in Mexico and commercially used for coloring, gives many beautiful reds and scarlets, also kermes, the "scarlet grain" of the old dyes, which is still used in the south of Europe, but can seldom be procured elsewhere. Its vivid color can still be seen on tapestries 300 years old.

Vegetable dyes are of two classes, substantive dyes which dye without any mordant and adjective which require the use of a mordant to fix the dye on the wool fibres. Most dyes are adjective. The word "mordant" comes from the French "modre," to bite, as the mordant enables the dye to bite into the wool and this fixes it. The mordant plays an important part in dyeing; with the same plant many distinct shades are obtained with different mordants. The simplest mordant is alum, and experiments with wool mordanted with alum will show if there is any dye of any value, and further experiments can be made.

To prepare the wool, dissolve 4ozs. powdered alum and 1oz. cream or tartar in sufficient warm water to let 1lb. of wool open up freely and absorb alum evenly in an enamelled vessel; bring this slowly to the boil, boil for one hour, leave overnight, and then wring wool out tightly, put into calico bag; this can be used at once, but is best after two or three days, and can be kept for several weeks. The bag should be hung in a cool place, such as a cellar. When testing a plant or bulb, boil up specimen in water in an enamelled vessel, let cool, take out specimen, put in a dampened skein of the mordanted wool, and bring to the boil—when color shows. It does not hurt the wool to boil it if brought gradually to boiling point; sudden changes of temperature are harmful. Vegetable dyes are particularly suited to wool, though silk will take some of them well, absorbing more dye than wool.

Cotton and linen, being vegetable fibres, require different treatment and are much more difficult for the vegetable dyer; in some cases the trouble and many processes necessary rendering it quite impracticable to the weaver. Cotton has, however, a natural affinity for anything containing tannic acid, so that with wattle bark fawns and greys can be got easily and inexpensively.

In choosing vegetation for dyeing experiments, it is not the brightly colored plants and flowers as a rule that produce strong dyes, native bulbs, hard, woody shrubs, and various gums are good subjects, and the easy and plentiful supply is a matter to consider; also the date should be carefully noted.

PREPARATION AND CURING OF PORK.

HOW TO TREAT AND USE A MEDIUM-SIZE PIG.

[Mrs. E. CATFORD, Riverton.]

Practically the whole of the pig can be used and there is not much waste. It is always advisable to kill in the colder months of the year, as best results are obtained in the setting of the meat. For instance, the pig of medium size (about 150lbs. to

200 lbs. in weight) is killed and cleaned in the usual way and left to hang on the gallows for about 24 hours to set. A good chopper, saw, and a sharp knife are required, and the operations are quite simple.

1. Saw down the pig from tail to nose; put it on a table and cut up one-half at a time.

2. Pull out the flat pieces of lard from the ribs.

3. Saw off the trotters, hind ones just above the hocks, and front ones just above the knees.

4. Cut off hams, leaving the sides as long as possible from bacon.

5. Cut off shoulders close to the shoulder blade.

6. Cut off the head just behind the ears.

7. Shape hams and take out the bone to the socket and nick off the socket knob with a saw.

8. Bone the shoulder and leave it in one piece to cure as bacon, or cut up into pieces of meat to pickle or roast as preferred.

9. Cut out the rib bones from the bacon side and level off the fleshy pieces of meat. These pieces are used for sausages.

This completes cutting up one-half of the pig; treat the other half the same except for the head and smallgoods.

CURING THE MEAT.

There are two ways of curing the meat, to dry salt it and pack it away into suitable boxes or to make a brine.

Obtain a clean pickling cask and sprinkle a layer of salt in the bottom of it. Put into a pan 6 lbs. of coarse salt and 6 lbs. of fine salt, 3 lbs. of brown sugar, and $\frac{1}{2}$ lb. of crushed saltpetre. Mix this well together and rub each piece of meat thoroughly with the mixture. Pack into the cask fleshy part upwards, and put bacon sides on top of the other meat. Cover over securely and keep in a cool place. Stand for about three days, then drain off the brine it has made and turn the meat about. Make another brine by filling a petrol bucket three parts full of cold water and dissolve into it as much salt as will float a fresh egg. Add the brine off the meat and bring all to a boil. Skim off the scum that may occur and stand overnight until cold. Next day pour it over the meat, which should be turned every day.

The pieces of meat will be ready for use in a few days. The bacon should be left in the brine for about a fortnight, and the hams about three weeks, according to size. Then take them out and rinse off the brine in cold water and let drain for a day or so.

TO ROLL THE BACON.

Beat out flat with a rolling pin and sprinkle a quantity of sugar, pepper, and spice over the meat side of the bacon; then roll up tightly, using a buckled strap to keep it in position. Put several coils of strong bacon cord around the roll about 1 $\frac{1}{2}$ in. between each strand, and make half-hitches to keep the cord from slipping, and tie securely. Sprinkle the hams with pepper and rub over the bacon rolls and hams with olive oil to keep the rind soft. Hang them up in calico bags to keep clean and they are ready for use at any time. Bacon and hams may be smoked if desired, or a quicker process may be made by adding a few drops of smoke essence when being cooked.

SMALLGOODS.

Take the head of the pig and cut off the cheeks and the tongue; rub these with salt and put them into the pickle. Then chop the head bones into about six pieces, after taking out the eyes and chopping off the nose. Put these into a dish of salt and water, leave stand for a day or two, changing the water each day. Then make brawn by putting it into a saucepan with clean water, seasoned with pepper, salt, and thyme, boil until all the meat leaves the bones, remove the bones, and put the brawn into a basin to set. When cold it will be quite firm to cut. The brains may be used if wished; they are very nourishing for invalids. The trotters are usually put into the pickle, but may be added to the brawn if preferred.

Clean the sausage skins and the "may" thoroughly and put them into salt and water for about three days, changing the water each day. Mince up all the scraps of meat that have been cut off when shaping the hams and bacon, add the kidneys and heart (if desired and if not used otherwise), also a quantity of soaked bread, some boiled pearl barley, and season with salt, pepper, and thyme; mix all this well together, and fill the sausage skins, divide into lengths, and boil gently for about 10 minutes; take them out and serve hot or cold. The "may" can be filled with mince meat and sewn up and boiled for a longer time, or boiled with the spare sausage skins, then sliced up and fried.

The sweetmeat makes a very delicious dish for those who wish to use it. This is usually fried. Boil the liver and when cold put through a mincer, add sugar, currants, and nutmeg to flavor. This mixture is very nice if baked in pastry. The lard must be rendered and put into a jar to set, cover over, and keep in a cool place. The pieces that are left after rendering of the lard may be added to the sausage meat, or, with other ingredients, made into a cake which is usually called "eritney" cake by the Cornish folk, and it is very delicious.

If black puddings are to be made, the blood must be caught into a dish while it is warm and stirred until it is thick, then add clean wheat and seasoning and make in the usual way. All the rib bones may be roasted or used up in many ways.

PRESERVING AND BOTTLING FRUIT FOR HOME USE.

[Paper read by Mrs. H. N. Wicks at the February meeting of the Balhamnah branch.]

Every home should contain as large a supply of different varieties of bottled fruit as possible, for what is more tempting during the summer months than cold preserved fruits ready for use from the pantry shelf?

There are various methods of preserving, the two simplest being on the vacuum principle, such as the Fowler method, or the open pan system. Those who have not a Fowler outfit can do quite well with a preserving pan, or the ordinary washing copper, a kerosene tin cut lengthways, or any vessel that is large and deep enough for the purpose. Place in the bottom a piece of wire gauze or a few slats of thin, narrow wood nailed together, or anything suitable to enable the water to circulate underneath the jars. Prepare the fruit which should be of that quality which could be classed first grade. It should be of good color, with a firmness of flesh and free from blemishes. It should not be over-ripe, because it requires to be sufficiently firm to stand the application of heat to which it is subjected, and still retain the natural shape. Wipe the fruit free from dust and pack regularly and neatly into the containers. The syrup may be of any desired strength and may be varied according to taste for most fruits. There are exceptions, such as strawberries and figs, when a heavier syrup is required. A syrup suitable and the one mostly used is made by adding 2 cups of boiling water to 1 cup of sugar. Strain through a piece of muslin and pour over the fruit, making sure the bottles are quite full. If using the Mason jars, place on the rubbers, screw the lids on *lightly*, or the jars may burst, place them in the pan, fill with water three parts of the way up the bottle and boil gently until the fruit is cooked.

Apricots, peaches, and soft-fleshed fruits require about half an hour. Cherries, quinces, and harder fruits need much longer. When cooked remove from the pan, screw lids down tightly, and keep out of any draught until cold. As the temperature of the contents of the jars gradually reduces there should be a strong suction, caused by the contraction and cooling off of the contents, and if any leakages are observed—these will be indicated by air bubbles entering the jar around the lid or rubber band—the cover must be released and the defect remedied. Store in a cool, dark place if possible, to protect the bright color of fruits, as they fade if constantly exposed to a bright light.

THE OPEN PAN SYSTEM.

This is another successful way in which fruit may be preserved, and is a very simple process. Make the syrup, and put into a preserving pan, prepare only as much fruit as will be covered nicely with the syrup, then bring gradually to boiling point and gently cook. Care must be taken not to boil too rapidly, or the fruit will become broken and loose in appearance. The time required will depend upon the variety of fruit under treatment, but until cooked through is sufficient. Have the containers ready and the rubber rings in place so that the boiling fruit can be bottled the moment it is cooked. Warm the glass jars before they are filled to prevent breakage. When ready place the bottle on a damp towel, gently fill the jars with the boiling fruit and syrup, then firmly and quickly screw on the lids, making sure that the jars are airtight.

When preserving pears and quinces, they should be bottled as quickly as possible after peeling, for they discolor and turn a dirty brown when exposed to the air. It is advisable to have a bowl of slightly salted water and drop the fruit into it until it can be placed in the bottles, and then cover quickly with the syrup. A little lemon juice or citric acid added to the water will also keep the fruit from becoming discolored.

Pack all fruits firmly and tightly without bruising, and grade the fruit an even size for appearance. There is a tendency for fruit to shrink in the sterilization and rise in the bottles, especially soft fruits; if packed firmly the appearance is improved. A heavy or strong syrup will cause the fruit to rise, leaving a space of clear syrup below. This does not matter for household use, but is unsightly when intended for exhibition purposes. Apricots and plums are very sensitive to heat, and if the fruit is fully ripened it is sure to rise a little in the bottles, and sometimes pushes out some of the liquid from the neck of the bottle, leaving the top piece uncovered. This is no detriment to the fruit. Large plums if cut in halves, pack more evenly and have a better appearance. The stone may be left in the fruit if preferred. If this is done a definite flavor is imparted to which some people are partial. Some varieties of plums, and also gooseberries, after sterilization, appear to be covered with small air bubbles. These are not air bubbles, however, and are caused through oil being drawn from the stones and skins, and will soon disappear after being stored for a while. This being the time and a good district for blackberries, those who are interested in bottling fruit should not miss them. Alone or mixed with apples they are delicious for pies later in the season.

Other Reports Received.

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Hope Forest ...	4/1/34	26	H. J. Apps	Mrs. L. Fincher
Hope Forest ...	1/2/34	18	"Fruit Preserving", Mrs. Peterson	Mrs. L. Fincher
Pinnaroo	1/12/33	11	Discussion	Mrs. F. Atze
Yurgo	14/2/34	7	Dressmaking, Mrs. Jarrett	Mrs. R. Sanders
Gladstone	20/2/34	29	"Infant Nursing", Sister Harslett.	Mrs. L. Sargent
Warramboos	13/2/34	10	Papers from <i>Journal</i>	Mrs. A. Steer

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A. P. BLESING,
Minister of Agriculture.

AGRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Agricultural Bureau Conferences.

District Conferences will be held as follows:—

Dairying, at Milang, Wednesday, May 9th, L. E. Yelland (Secretary).

River Murray, at Barmera, Friday, June 22nd, C. W. Till (Secretary).

Eyre's Peninsula (West), at Ceduna, Wednesday, July 4th, A. R. Maguire, Mudamuckla (Secretary).

Upper North, at Wilmington, Wednesday, July 18th, Chas. Cole (Secretary).

In each case the Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda.

Retirement of Mr. W. L. Summers.

The recent retirement of Mr. W. L. Summers from the Public Service has meant an official break in our association with an officer who over a long period of time so ably conducted the affairs of the Agricultural Bureau and the *Journal of Agriculture*. Convinced that the Agricultural Bureau possessed great advantages to farmers and that it had a powerful influence on the development of agriculture in this State, Mr.



Mr. W. L. Summers recently retired from the office of Secretary to the Minister of Agriculture.

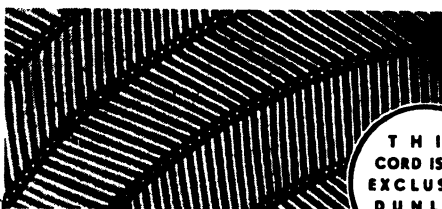
Summers learnt to regard the organisation more as a personal than as an official charge, and it can be said that even after he relinquished direct control the Bureau had not many more earnest supporters than he.

The Department of Agriculture may be assumed to have had its beginning in the Crown Lands Department as far back as 1887, and it was in that Department, as a junior officer, that Mr. Summers first became acquainted with the Agricultural Bureau which

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was established in 1888. In 1892 he was appointed assistant to the then General Secretary and founder of the system, the late Mr. Albert Molineux. Later, in 1898, the duties of Chief Inspector of Fertilisers were added to his work, and in this he pioneered the administration of important legislation which has been a safeguard of users of fertilisers for many years.

In 1908 Mr. Summers was appointed Secretary to the Advisory Board of Agriculture, the controlling body of the Agricultural Bureau, an office which he vacated in 1910 to become the first Secretary to the Minister of Agriculture. As Secretary to the Minister he was made a member of the Grain and Fodder Board in 1914 and also held membership on the Fruit Board, Loans to Producers Board, and subsequently was appointed on the State Bank Board.

For many years Mr. Summers was a familiar figure at Bureau Conferences. He contributed several articles to the *Journal* and laid the foundation of experimental work undertaken by farmers throughout the State.

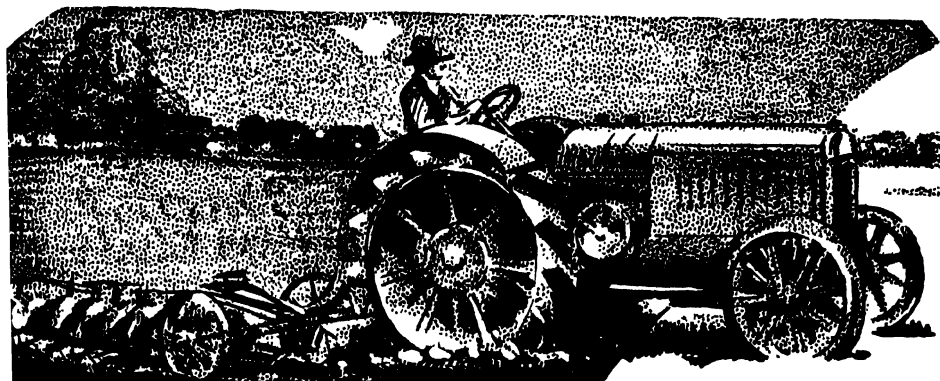
Argentine Wheat Position.

The Department of Commerce has received from Mr. W. J. Jackman, of Buenos Aires, a report on the Argentine grain trade for December last, in which official figures are quoted showing a total prospective export of 4,571,294 tons of wheat for 1934.

Commenting on the market position, Mr. Jackman states that very little can be said with regard to market operations at the present time, as these are almost completely in the hands of the official Grain Control Board which was established by the Government in the closing days of the month of November. The Control Board was created in order to put into effect a plan devised by the Government for extending assistance to the wheatgrowers of the Republic. Briefly, the plan is that the Grain Control Board will from time to time establish basic prices for the produce dealt with (wheat, linseed, and maize), and will purchase at those basic prices all such produce as may be offered to it, afterwards reselling it, for export only, in accordance with the prices prevailing on the world's markets. Another official board, the Exchange Control Commission, daily establishes the rate at which the banks shall purchase the exporters' bills. The exchange thus made available is sold daily to the highest bidders, and any resulting difference is credited to a fund from which the Grain Control Board will meet such losses as may be incurred in its grain operations and also the expenses of the board. According to Ministerial declarations, it is not the intention of the Administration to use any public funds in support of the scheme beyond those obtained in the manner indicated. Nor is it the intention to make the arrangement a permanent one. It is merely a temporary plan for ensuring that the aid intended for the agriculturist shall actually reach him, and not be absorbed by the intermediaries by whom his grain is ordinarily handled.

The grain is accepted by the board at whatever railway station or port is convenient to the producer, and it is held in store at that point until resold to the exporters. Eighty per cent. of the purchase price is advanced to the seller by the local branch of the National Bank upon delivery, and the balance is paid upon re-sale being made to the exporters, after the establishment of weight and grade by the customary methods.

As will be readily understood, the establishment of this system has involved a very radical change in market conditions, and the result is that the futures market is almost stagnant, the number of transactions taking place on the floor being very small indeed. Country grain dealers are still able to do a certain amount of business in competition with the Control Board, by paying cash in full for their purchases, as many owners of grain are willing to sell at a slightly lower price on those terms, rather than wait an indefinite time for the balance of 20 per cent. necessarily held back by the official board pending resale of the grain. Some speculative purchases are also being made at the full official price, on the theory that if the markets outside advance a profit may be made, whereas if they fall the grain can still be sold to the Government at the guaranteed price and only a small loss involved.



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Naturally the operations of the official board are kept secret, and no information as to its transactions is given out. It is, however, known that there has been some direct selling by the board to the English Co-operatives, the amount of wheat involved not being announced, although gossip sets it at ten cargoes.

Brazil continues to be the principal buyer of Argentine wheat, and the pick of the grain of the new crop coming forward at northern points is being purchased for the Brazilian millers.

Wheat Flour.—An interesting development during the month has been the publication of a decree prohibiting the exportation of flour containing any form of chemical improvers, followed a few days later by the prohibition of the sale of such flour within the Republic. As practically all flour milled here contains improvers, some little consternation has been caused amongst the millers.

It is believed that the initial action was taken at the instance of the Brazilian authorities (Brazil being the principal export market for Argentine flour), no doubt prompted by the Brazilian millers. And the Argentine Government's willingness to comply with the Brazilian representations, and even to go a step further, was probably due to a desire to raise the level of the quality of the wheats produced here, so that no artificial improvers may be necessary to secure the desired color and strength.

A similar ambition has led the new Wheat Control Board to outlaw certain varieties of low-grade but high-yielding wheats from the higher classifications of export wheats, and so help to pave the way for the official grading system to be established when the new Grain Act becomes law and when there is an elevator system to make its operation possible.

Publications Received.

The Library of the Department of Agriculture acknowledges the receipt of "Manuring Vegetable Crops," Bulletin No. 71, price 1s. net. Published by the Ministry of Agriculture, England.

"My Garden," a magazine for garden lovers, vol. 1, No. 1; subscription 12s. per annum, post free. Published by T. Stephens, 34, Southampton Street, Strand, London, W.C.2, England.

VETERINARY INQUIRIES.

[Replies supplied by Veterinary Officers of the Stock and Brands Department.]

Tantanoola Conference—"What is the best method of destroying bot fly eggs on Horses?"

Reply—Clipping the hair closely off parts liable to be struck helps to prevent the deposition of the eggs. 2. Singeing the hair of the area over which the eggs are spread will help to destroy them. A taper or candle could be used. 3. The application of the following dressing, twice daily, is useful to prevent strike:—Creosote, 1 part; oil of turpentine, 6 parts; raw linseed oil, 20 parts.

Tantanoola Conference—"What is the cause of blindness in sheep at this time of the year?"

Reply—Where a number of sheep are affected, the disease is probably "Pink-eye" (contagious ophthalmia of sheep). It is due to infection by a germ and spreads very rapidly through a flock. It is common in travelling sheep, and is usually introduced into a farm with bought sheep. There is rapid loss of condition and feeding becomes difficult. The eyes are very painful and may rupture. Treatment consists in isolating all affected sheep and making provision for good feeding, ample water supply, and shade for them. Further, put a few drops of a 5 per cent. solution of zinc sulphate in the affected eyes daily for a few days.

Tampanoolia Conference—"What steps should be taken to prevent red worms in water troughs?"

Reply—The red worms seen in water troughs are not dangerous to farm stock. They are the larvæ forms of an insect and not, as many think, the "blood worms" which affect horses.

"Huddleston" asks what are the reasons for a cow not breeding. Reply—These may be:—(1) The bull may be at fault. This is not probable and can easily be proved or otherwise, *e.g.*, by change of bull or failure of bull to get any cow in calf. (2) The cow may be at fault. This is the usual reason. The causes are many, and are:—(a) *Nutritional Reasons*.—The cow is too fat, or a debilitated condition may be the cause. The part nutrition plays can be shown by good results following "flushing" of ewes. (b) Disease of the ovaries. (c) Chronic inflammation of the breeding-bag following retained membrane and abortion. (d) Catarrh of the outer passage. A change of bulls is recommended, and preferably a young one which can be allowed to run with the cow. Other treatment which gives good results is to douche out passage twice weekly with Condy's crystals solution (port wine color), used at blood heat. Stop one week before heat comes on and one hour before service rake out and douche with bicarbonate of soda solution (dessertspoonful to a pint) used at blood heat.

"Clarendon" has mare lame in both fore feet, which are puffed, hard, and very tender. Difficulty in walking down hill. Reply—From the symptoms and history supplied, the lameness is probably due to deformed feet, the result of an attack of laminitis (founder). Try the following treatment:—Twice a day for a week give two tablespoons of baking soda in feed and if possible reduce grain. Have the horse shod with a shoe thick at the quarters and tapering off towards the heel and toe, which in effect is a "rocker" shoe. If the soles of feet have "dropped," it will be necessary to have a wide webbed shoe fitted so that it extends over the sole a little way, but "seated" in order that shoe does not exert any pressure on the sole. Animals which have been foundered can be used for breeding purposes.

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POSITION OF AUSTRALIAN WHEAT INDUSTRY.

(Statement for the Wheat Growers submitted in evidence by Mr. C. A. S. Hawker, M.H.R., to the Royal Commission on the Wheat Industry.)

SIZE OF INDUSTRY.

The Wheat Industry is the largest contributor to employment in the Commonwealth. It is the greatest of all primary industries in the bulk of its output and second only to wool in the value of its production.

For the very reasons which make wheat farming the great work provider of the Commonwealth, it is very hard for the industry to extricate itself from the present crisis. The fact that so much work is provided on railways, at the seaboard, and in the factories means that much expenditure must be incurred by the farmers for transport material or machinery. The wheatgrower so long as he continues to grow wheat cannot escape the costs of these services nor under Australian conditions regulate their rates. To the extent that he ceases to grow wheat in favor of a more economical crop he escapes from a proportion of the expense and the people whose work provides the services lose their living.

You, Mr. Chairman, have estimated that about a million people in Australia are dependent directly or indirectly for their means of living upon the wheat industry.

In 1931-32 wheat bounty was paid to 74,816 individual growers who produced wheat for sale, and the Commerce Department considers that approximately 65,000 of these grow wheat as the main source of their livelihood. In addition to this large number of individual farmers there are many tens of thousands of farm laborers and casual laborers who obtain employment at harvest or seeding.

The wheat belt is the main area of comparatively close settlement inside the Dividing Ranges of Australia. Throughout the wheat belt the populations of townships are dependent for their business and existence upon the wheat industry.

IMPORTANCE TO RAILWAYS AND HARBORS.

The wheat industry is the largest contributor of freight to the railways. During recent years the tonnage of wheat carried has approached 4,500,000 tons per year. In the State of Victoria alone it has averaged well over one million tons during the last three years, contributing three-quarters of a million pounds in revenue. This represents about 20 per cent. of the total tonnage carried and rather less than 20 per cent. of the total goods revenue. A great deal of back-loading and other freight is also provided by the wheat industry.

In States more dependent upon wheat growing the financial position of the railways and the employment of the railways staff are even more wrapped up with the position of the wheat industry.

The Harbors are also vitally affected by the wheat position. Approximately three and three-quarter million tons of freight have been contributed by the export of wheat during the last three seasons. This has not only meant work on the waterfront, but port and harbor dues to the great public authorities which control the harbors. It also means business for ships' provisions and supplies.

Three-eighths of the net tonnage of all the shipping cleared with cargo from Australian ports during the last three years has been required to lift the wheat crop alone (See Table "A.")

TABLE A.—*Exports of Wheat and Flour from Australia.*
(December 1st to November 30th.)

		Gross Register Tonnage of Shipping Required.	Corresponding Net Tonnage of Shipping Required.
SEASON 1930-31—			
Wheat	3,152,000	2,101,000	1,261,000
Flour	394,000	263,000	157,000
Total	3,546,000 tons	2,364,000 tons	1,418,000 tons
Net tonnage cleared all Australian Ports with cargo ...		—	5,256,000
Net tonnage cleared all Australian Ports with cargo and in ballast		—	5,709,000
SEASON 1931-32—			
Wheat	3,235,000	2,156,000	1,294,000
Flour	613,000	408,000	245,000
Total	3,847,000 tons	2,564,000 tons	1,539,000 tons
Net tonnage cleared all Australian Ports with cargo		—	3,905,000
Net tonnage cleared all Australian Ports with cargo and in ballast		—	4,232,000
SEASON 1932-33—			
Wheat	3,226,000	2,151,000	1,290,000
Flour	595,000	397,000	238,000
Total	3,821,000 tons	2,548,000 tons	1,528,000 tons
Net tonnage cleared all Australian Ports with cargo		—	3,965,000
Net tonnage cleared all Australian Ports with cargo and in ballast		—	4,458,000

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Journal of Agriculture, January and July, 1921.

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GROWTH OF INDUSTRY.

Since the use of superphosphate became general during the early years of this century the expansion of wheat farming has been rapid, and except for a setback in the later war and early post-war period, continuous. Before the days of superphosphate wheat farming had only been successful in districts of relatively good rainfall. Subsequently the wheat belt extended inland. New wheats and better dry farming methods consolidated the new areas. Even in Northern New South Wales where fertiliser is not required, wheatgrowing seemed to have expanded simultaneously with the adoption of better farm methods evolved to suit those districts further south where wheat growing had been a failure without superphosphate. The Table marked "B" gives an outline of the statistics showing the acreage, the yield of wheat in five yearly rests since 1911, and such figures as are available for recent years. It also shows the relation which the area cropped for wheat bears to the total area under crop and the value of wheat compared to that of primary and agricultural production. Comparative figures for exports values are also included. It will be seen that for the three years of which 1911-12 was the middle year, the average crop was 86.24 million bushels, with an average of 11.69 bushels per acre. During the last three years for which statistics are available, of which 1931-32 is the middle year, the total crop averaged 205.5 million bushels, and in spite of the large increase in the area cultivated and its extension inland to drier districts, the yield per acre had increased to 12.83 bushels. This shows not only an enormous increase in the crop, but a definite improvement in returns per acre. When the considerable area which is still only partially cleared and improved is taken into account, the soundness of the main development becomes obvious. No doubt there is a ragged fringe of inferior country which trial has now demonstrated to be unsuitable for wheat growing, but this must not be confused with districts from which low returns are inevitable during the developmental stage. Many localities which are now recognised as well established farming districts had a record of dismal failures during their period of development.

PLACE AMONG RURAL INDUSTRIES.

Table "B" also shows the stability of wheat as the main agricultural crop. The ratio of land under wheat to that under all crops has increased somewhat since 1911, although the percentage has not greatly altered. In 1911 it was 61.3 per cent. out of a total of 12.1 million acres, while 1930-31 it rose to the peak of 18.16 million acres out of a total of 25.16 million acres, or 72.19 per cent. In that year the areas were affected by the "grow more wheat" appeal of the Federal and State Governments. The routine of farming was disturbed, but nevertheless in spite of the fall in wheat acreage to 14.7 million acres in the following year, that was still 69.6 per cent. of the total area under all crops.

The pre-eminent position of wheat farming as an alternative to grazing in districts of medium rainfall has made wheat farming the basis of much closer settlement. This probably accounts for part of the increased proportion of the wheat area and the rest is due to the opening up of large scrub areas in the Mallee districts of the Eastern States and in the scrub belts of West Australia. It is only after long established settlement has been achieved and extensive improvements provided that such districts can diversify their farming profitably.

TABLE B.—*Wheat Data.*

Particulars.	1933-34.	1932-33.	1931-32.	1930-31.	1926-27.	1921-22.	1916-17.	1911-12.	
ACREAGE.									
1. Total devoted to Agriculture (million acres)	—	—	44.1	45.7	36.3	29.3	—	—	
2. Total under crop (million acres)	—	—	21.16	25.16	17.77	15.36	16.8	12.1	
3. Total under wheat (million acres)	(est.) 14.91	15.35	14.7	18.16	11.69	9.72	11.53	7.42	
Percentage of total under crop	—	—	69.6 %	72.19 %	65.8 %	63.3 %	68.6 %	61.3 %	
PRODUCTION AND EXPORT.									
4. Wheat Production (million bushels)	160.0	212.40	19.06	213.59	160.76	129.09	152.42	71.64	(Average 3 years) 1910 to 1913, 86.24) 1910 to 1913, 11.60)
Average 1930 to 1933	10.7	13.8	205.5	—	—	—	—	—	
Bushels per acre	—	—	12.93	11.76	13.75	13.28	13.22	9.64	
Average 3 years	—	—	12.83	—	—	—	—	—	
5. Wheat and Flour Export (million bushels)	—	119.6 30.1	127.4 29.3	119.2 24.9	73.93 23.66	99.95 17.28	55.28 13.97	55.15 8.45	
Percentage Exported	—	149.7	156.7	144.1	97.59	117.23	69.25	63.60	
6. Value of Total Export (£ million Australian)	—	70.0 %	82.2 %	67.5 %	60.7 %	90.8 %	45.4 %	88.8 %	
7. Value of Total Export (Merchandise only) £ million Australian	—	—	£105.84m	£99.92m	£141.91m	£123.49m	£95.04m	£76.21m	
8. Wheat and Flour as percentage of 6 (a)	—	—	£93.72	£37.10	£128.82	£119.16	£38.29	£65.80	
9. Value of Wheat and Flour Export (£ million Australian)	Wheat Flour	£17.80 4.15	£19.22 3.83	£14.74 3.51	£20.79 6.25	£28.84 5.52	£13.37 3.46	£9.64 1.39	
Wheat and Flour as percentage of Total Export ...	—	£21.95	£23.05	£18.25	£27.04	£34.16	£16.83	£11.03	
10. Total Agricultural, Pastoral and Dairy Production (£ million Australian)	—	—	21.8 %	18.27 %	19.1 %	27.7 %	17.7 %	14.5 %	
11. Total Agriculture (£ million Australian)	—	—	*177.5	183.1	256.99	201.36	172.24	108.61	
12. Wheat (£ million Australian)	—	—	*74.5	70.5	98.29	81.89	60.21	38.77	
Wheat as percentage of total Agriculture	—	—	*33.7	25.0	42.45	35.15	33.95	13.8	
	—	—	45.2 %	35.5 %	43.2 %	42.9 %	56.4 %	34.3 %	

* Each includes £3.4 million Federal Bounty.

DIFFICULTIES.

To-day the position is in serious jeopardy. The depression has affected all sections of the Australian people, but none have felt it more severely than the wheat growers.

The price of wheat at the sidings has fallen to little more than two-thirds of pre-war price. Whereas the cost of production has fallen comparatively little from the level which it reached during times of post-war prosperity that was enjoyed by all sections of the people of the Commonwealth.

In 1911-12 the crop of 71.64 million bushels was worth £13,300,000. In 1926-27 the crop of 160 million bushels was worth £42,450,000. (See Table "B"), and all Australian standards were raised in conformity with the prosperity of the Man on the Land. In 1930-31 the record crop of 213.59 million bushels was worth only £25,000,000. Had it not been for the large quantity, the position would have been much worse. This year the price is almost as low and the total crop is about one-quarter less. These estimates are for values at the seaboard end, when allowance is made for the very slight reduction in handling costs and rail freights, it will be plain that the actual shrinkage of farmers' incomes is correspondingly more severe. The particulars of Returns to farmers who were members of the Victorian Wheat Pool show this plainly.

For a limited time a considerable part of the industry was able to carry on by using up reserves, but the position has become steadily worse. The wheat prices which reached their lowest point for all time in 1931 rallied slightly in 1932, but receded again last year, and now are falling to what threatens to be an even lower record than that of 1931.

TABLE C.—Prices.

	Wheat.		Wool, Greasy. Export Prices F.O.B.	Lamb. Export Prices F.O.B.	Butter. Price at Factory Door.
	Weighted Average of Sales by Reporting Merchants. May be Regarded as Approx. F.O.B.	Returns of Wheat in Victorian Pool at Sidings.			
	Per Bushel. <i>s. d.</i>	Per Bushel. <i>s. d.</i>	Per Lb. <i>d.</i>	Per Lb. <i>d.</i>	Per Lb. <i>s. d.</i>
1907-8	4 1½	—	9-17	Not available	0 11½
1907					
1910-11	3 5½	—	9-50	3½	0 10½
1911					
1916	4 7	—	15-17	6½	1 4
1916-17					
1921	5 5	—	13-16	6½	1 5
1921-22					
1926-27	5 3½	4 10-25	17-99	6½	1 6½
1927-28	5 4½	4 6-75	20-49	7	1 6½
1928-29	4 9½	4 1	17-58	7	1 7½
1929-30	4 3½	3 8-75	11-30	6½	1 6½
1930-31	2 4½	1 11-25	9-16	5½	1 2½
1931-32	3 6½	2 7-125	8-97	4½	1 1
	includes 4½d. bounty				
1932-33 export price ..	2 11½	2 3-25	9-1	4½	0 9½

TABLE D.

The distribution of the proceeds of the crops and the payments to farmers' creditors resulted approximately as under:—

	Farmers' 1931 Season. Per Cent.	Farmers' 1932 Season. Per Cent.
Paid all creditors	4.4	1.5
Paid interest, rent, &c., and dividend on antecedent debt ...	30.2	9.2
Paid advances and dividend to interest, rent, &c.	39.7	34.1
Partial failures	20.6	49.8
Total failures	5.1	5.4
	100.0	100.0
Farmers approved	3,459	2,698

These percentages are taken on the total number of applicants approved for relief.

EVIDENCE OF REGRESSION.

It is natural that the breaking point should be reached first at the weakest points in the industry. That is, in the pioneering districts. The West Australian wheat belt is the most recently opened up, and therefore in much the weakest condition to withstand a period of stress. The partly cleared paddocks cannot be let stand. Money must be spent to safeguard the ground that has been partly won. There is not the same opportunity for the pioneer to cut down his expense which presents itself to the established farmer. In West Australia over a thousand farms are reported to have actually been thrown back on the hands of the agricultural bank or other creditors, and a very large proportion of the others are being worked under various forms of supervision. In the other States a similar loss of ground has been occurring. Farmers are protected from bankruptcy proceedings or foreclosure by moratoria or the protection of debt adjustment boards. Many of them are also receiving assistance and protection from various State Authorities, particulars of which will be submitted to the Commission in the evidence. In all districts there is to be seen dilapidation of improvements, depreciation of plant, a spread of noxious weeds, which are signs of a losing battle. This year the rise in wool prices has brought fresh hope to the mixed farmers, but where the holdings are too small or the water and fencing inadequate for live stock to be carried there is alarm and sometimes despair.

The rate at which many farmers have been losing ground can be estimated by the figures which have been published concerning some thousands of wheat farmers in South Australia who have been working under the supervision of the State Bank. These are no doubt farmers on worse than average country, but on the other hand it is almost certain that they have less than average total liabilities. During the 1931-32 season 34.6 per cent. of these farmers paid their expenses, their commitments for interest, and something over to reduce their liabilities; 39.7 per cent. paid their working expenses and something towards the interest on their capital commitments; and 25.7 per cent. actually failed to produce wheat for sale of sufficient value to cover the new money which they received for working expenses.

The following season, 1932-33, the position was very much worse: only 10.7 per cent. made any headway; 34.1 per cent. covered their working expenses and a little towards interest on their liability; while 55.2 per cent. failed to receive returns which covered the assistance they had received for working expenses. Both of these years were seasons that were well above the average. For the

current year the season is not so good and the price of wheat definitely lower. The results will certainly be even more discouraging. This can be taken as fairly typical of the position of farmers who are in comparatively new districts. (See Table "D.")

DEBT STRUCTURE.

On better land the yields are higher and the returns more generally cover actual working expenses, but in most of the better districts the cost of working the land is definitely greater and, in the majority of cases, the interest charges are heavier.

The years after the war were a time of inflation in all business. Instalment purchase was a growing feature. Banks added their tacit sanction to the general trend by many advances for the purchase of land. Values of produce and of land were translated into units of the paper currency of the time. The depression developed rapidly everywhere, but its blast struck the primary industries with unparalleled suddenness. Within a few months the price of wheat plunged from a comparatively high level to depths lower than it had reached during centuries. History has recorded no example from which a warning of the possibility of such a disaster might have been learnt and provided against.

Before the depression a revolution in farm methods was also leading the wheat growers into unusual capital expenditure. Newer and larger machinery was being invented which made production cheaper and easier provided the area farmed was large enough to carry the overhead expense of the new up-to-date plant. The big implements were made easy to acquire by hire purchase; kerosene was available on astonishing terms, but additional land to keep the farmer and his fine plant fully occupied was not readily available. When land did come on the market it was hungrily bid for and more liability incurred by farmers who purchased it, often with aid and approval of banks.

The wheat growers as an industry were therefore caught in a transitional stage with more than their average of liability by the depression which struck them with more than average suddenness and severity.

Some estimate of both the size of the industry and the serious position in which it finds itself can be made from a computation of the aggregate liability of farmers. In both South Australia and West Australia fairly thorough inquiries have been made during the last two years. In West Australia a Royal Commission reported that the aggregate of certain classes only of liabilities of farmers (but including some mixed farmers) were more than £31,600,000.

In April of last year the Royal Commission in South Australia which investigated the matter estimated that the liabilities of farmers in that State aggregated about £38,800,000. This is almost certainly a fair average of the liabilities of farmers in all wheat-growing States, and on this basis, even with some deduction for debts of grazing farms, a conservative estimate of the aggregate liability would place it at well above £150,000,000.

This huge figure represents the debts of farmers, but at the same time these debts are among the assets of the Australian business community. No doubt some of them are not well secured, but it is obviously to the interests of all sections of the community that every reasonable step should be taken to protect the solvent part of this asset from unnecessary deterioration. These debts and their security have become part of the financial structure of the Commonwealth, and it is in the interests of the general public as well as those of the farmers to ensure that the structure is not undermined by any avoidable disintegration in the industry which forms their security.

DISCOURAGING PRICE OUTLOOK.

During the closing years of the last century when the wheat industry was also faced with very low prices, the suddenness of their fall was less severe and the length of time during which low prices ruled was much briefer than on this occasion. At that time farmers were also free from a number of handicaps which seriously impede them at the present time. The Australian level of taxation was low and the prices of the things which the farmer found it necessary to buy also fell. It was therefore possible to carry on with wheat prices round about 2s. or less per bushel, where to-day such prices spell ruin. There was also a better prospect of the prices of wheat improving. To-day there is a number of adverse factors which make the outlook very dark indeed. Details will be communicated to the Commission by expert witnesses; but broadly outlined, a large sections of the nations of the world, previously importers of wheat, have closed their markets against imports for economic and national reasons. This has restricted the field of the wheat trade very drastically, and the best information appears to offer little hope of re-opening of these markets. International trade is tending to become more and more a matter of barter hedged within the terms of reciprocal quota agreements between individual countries. When Australia's tariff hostility to goods of other countries is considered, our farm exports appear to have less chance of regaining their foreign markets than of losing still more. As well as these obstructions to the trade in wheat, the outlook to-day is darkened by the existence of huge stocks of carry-over wheat which were built up during the years immediately preceding and at the commencement of the depression. These stocks are mainly held in North America, and, in spite of short crops during the last two years, in both Canada and the United States, the carry-over has tended to increase rather than to diminish. It appears that the existing world demand for wheat is not large enough to reduce the carry-over as well as absorb the current production at a payable price. Economic and seasonal influences which will ultimately raise demand, or curtail supply, therefore may take a considerable time to correct the position.

The Commission no doubt will make a comparison between the position of the wheat market sunk down by these big accumulations of unmarketed wheat and the position of the wool market, buoyant because of its complete freedom from any carry-over. The notice of the Commission is drawn to the fact that this carry-over was not contributed to in any way by the farmers of Australia, and this fact illustrates the way in which Australian farmers are at the mercy of world conditions and reactions of farmers and Governments in other countries.

SUBSIDIES IN OTHER COUNTRIES.

The Commission may consider that the wheat industry would recover more rapidly if it was left, like the wool industry, to find its own level. This may be the case if the same rule were applied throughout the whole world, but in the face of the assistance to farmers which is being provided by Governments in other countries, any abandonment of the Australian wheat industry to its fate would lead to the elimination of a large area of entirely economic farms in Australia and leave the farmers of other countries to be the main beneficiaries of any improvement in price which followed the correction of supply to the world demand.

The extent to which other countries assist their farmers can be gauged from the following information supplied to Parliament in November.

Among the countries which formerly imported wheat several have imposed quotas on tariffs which have made wheat so profitable to their own farmers that they have now little need of imports.

In France farmers last year received the equivalent of 9s. 10d. in Australian currency per bushel, in Italy 11s. 5d., and in Germany 9s. 4d. In Great Britain the price of home-grown wheat is guaranteed at 5s. 7½d. a bushel, equal to 7s. 0½d. in Australian money. In New Zealand the price varied from 3s. 9d. to 4s. 1d. per bushel.

Among the exporting countries various steps were taken to increase the returns to wheat growers.

In Canada on the date in November in question the price was about equal to 3s. a bushel, and this was partly maintained by Government operations on the future market.

It is difficult to follow all the ramifications of policy in the United States. A Process tax (roughly the same in principal as the Australian flour tax) was imposed to raise funds in order to compensate farmers who would agree to seed a smaller acreage. It is uncertain whether some of its proceeds is not also applied for support of the wheat market, but the Chicago price has been above export parity for some time.

In the Argentine the Government has lately proclaimed a price at which it will buy all grain offering, and has set up an exchange board which pays any profit on exchange into the account of the Grain Board in order to make up any loss which the latter may incur in its transactions.

In the face of these circumstances it is plain that nothing but a considerable wastage in one of the Commonwealth's most valuable assets could follow from the abandonment of the Australian wheat industry to an unequal life and death struggle with competitors who are receiving such aids.

HIGH COSTS OF MATERIAL.

The fact that costs of production remain very high in Australia and that this has been partly caused through the effects of the Australian tariff policy is another reason why Australian farmers should in justice be assisted to struggle through against the competition of highly subsidised wheat from other countries.

The accompanying Tables ("E") prepared by the Director of Agriculture in South Australia, show that essential material, some of it imported free of duty, purchased by farmers which in 1913 would have cost £91 13s., and in 1925 £129 9s. 6d., would this year cost £100 13s. 1d. Although there is a welcome reduction since 1925, the aggregate price of this material still is 9.8 per cent. above the price of 1913.

Essential miscellaneous tools (not all of which are protected by the tariff) show an even greater rise. In 1913 an assortment of those essential on a farm could have been bought for £3 9s. 3d.; in 1925 the cost had more than doubled at £8 15s. 2d. This year the price has come back substantially to £5 17s. 5d., but this is still more than 40 per cent. above the 1913 price. In the matter of harness, the prices this year average more than 41 per cent. above those of 1913, and essential farming machinery 31.7 per cent. (The latter figure has since been corrected to 36.69 per cent.)

The comparison for farming machinery is more difficult to make, because of the change in types, but the cost of plant upon the farm can be safely stated as still considerably above 1913 prices; while the price of produce is disastrously below those prices.

In 1928 enough superphosphate to apply 90lbs. an acre over 100 acres could have been purchased for the proceeds of 76 bushels of wheat. This year in spite of some reduction in the price of super it would require the proceeds of 180 bushels. In 1928 the South Australian railways carried 100 bags of wheat for 150 miles for freight equal to the value of 25 bushels. This year even with some reduction in freight rates the cost to the farmer equals the value of 62½ bushels. This is typical of the position in regard to the relative cost of material and services in all States.

Under these circumstances, the Commission will readily appreciate the justice as well as urgent need of assistance before more farmers sink into insolvency, more plant and improvements deteriorate for want of upkeep, before more land is reduced in fertility because of catch farming by farmers in their honest endeavor to grow enough to meet their commitments.

WORLD WHEAT SCHEMES.

The Commission will have the duty of ascertaining the best means by which the Federal Government can give assistance and the measure of such assistance. Doubtless, they will examine what may be expected through International action to assist the wheat industry on a world basis.

It appears that the existing International wheat agreement has had neither good nor ill effects. It was hoped in some quarters that it would afford such a relief of pressure upon the market by sellers as would raise prices to a point where importing countries might reduce their restrictions upon trade. This has not been the case up to the present. The price of wheat has, in fact, fallen steadily. The Commission can no doubt usefully inquire as to whether the agreement has in effect prevented a more drastic fall in prices than that which has actually occurred.

Possible International action might be attempted along several lines. The actual movement of wheat might be further limited in a way similar to that provided by the existing International agreement, or the shipment of wheat might be made conditional upon sale at a minimum price. Hitherto Australia has at least escaped the embarrassment of holding any large carry-over of surplus wheat. Unless any further world agreement contains sure safeguards for cutting the world's aggregate surplus, it appears to be dangerous for Australia by joining it to limit her export in such a way that the net result might be simply to transfer a surplus from North America to Australia. Any scheme which raised the price without diminishing production would be in danger of breakdown under a growing carry-over. Actually a better price might induce greater production.

It is suggested that, if the limiting of the right of export alone would not be effective because it would not have a deterrent effect upon sowing by farmers, that the compulsory holding of wheat in excess of a certain quota of wheat upon the farms would certainly lead to curtailed sowings. In other quarters a compulsory reduction of the acreage seeded has been advocated as a means of reducing the surplus of wheat to an amount which can be sold at a reasonable price.

As a grower representative of growers' organisations, I feel qualified to advise the Commission that the difficulty of policing of such schemes and their inequity as between individuals, appears to render them quite impracticable.

An intermediate scheme by which farmers were compensated by the United States Government for reducing their acreage is reported in press cables to have broken down owing to the increase of seeding by farmers in what are not normally regarded as wheat producing districts. Such cables may not give a fair account of the actual facts.

In West Australia a suggestion has been made that aid in the form of bounty on home price should be confined to farmers who agreed to reduce their acreage. A thorough report on the working of the somewhat similar scheme in the United States should therefore be obtained and carefully examined. With the present disparity between the price of wheat and that of some other primary products there is little doubt that wherever circumstances of farm management and of finance permit there will be a natural swing away from wheat cropping. In Australia, with the present prices for wool, this will be especially strong. But

it is difficult to estimate how much relief will result to the wheat market. In any case a natural change over is preferable to one which is enforced by Governments.

NEED FOR LOWER COSTS.

The Commission should examine the possibility of the gap between the costs of production and market price being reduced by lower costs. There is no doubt that the farmers have stinted and sweated themselves to a remarkable degree in order that their costs might be lowered and in order to do their best in both their own interests and those of their creditors. The Commission will find ample evidence of this in the accounts of the large number of farmers who are working under supervision by Farm Relief Boards or other authorities established to assist them. The accounts of these farmers, however, disclose that there is still a substantial gap between the annual commitments, even on this sweated basis, and the price which the farmer is receiving for his produce.

INTEREST.

There is a number of farmers' costs which are beyond control. Probably to-day interest on the huge debt is the heaviest. The rehabilitation of the farming industry is probably more dependent upon a cheap money policy in Australia than upon any other single factor except the world price of wheat.

The Premiers' Plan cut in interest was a great help. Since then the representatives of Australia at the London Economic Conference last year were parties to the agreement of British Empire countries to follow a cheap money policy, and the tendency of interest rates has been downward. There is, however, a feeling among farmers that the results of that policy are not developing with enough promptness to prevent a ruinous accumulation of interest arrears.

When farmers are losing ground financially they cannot be expected to appreciate the benefits of keeping Governments from interference between debtors and creditors. The fact that the fear of renewals of such intervention have the effect of diverting fresh investment away from mortgage on land and thereby reducing the chances of borrowing at lower rates to pay off old liabilities, seems academic to those who can only see an interest bill which is destroying their chance of regaining solvency. Delay is therefore certain to strengthen pressure for another statutory cut such as that provided for under the Premiers' Plan. The factors making for delay, such as competition by the Savings Banks for deposits, founding of treasury bills, taxation, &c., might be lessened through a wider knowledge of their existence.

DEBT ADJUSTMENT.

In any case the Commonwealth by itself does not have the power to deal with questions between farmers and their creditors except through the processes of bankruptcy law. The States, however, have power to take steps which make possible the scrutiny and reconstruction of the position of many farmers. Where this is carried out with proper discrimination there are mutual benefits to both the farmer and his creditors.

There is a variety of statutes which deal with the question of adjustment of debts. There are also laws which give the protection of moratoria. The Commission will no doubt examine the working and effects of all these.

It is pointed out that, although on the whole the larger creditors, whose assets are considerably dependent upon the value of land which is the security for numerous loans, have shown forbearance and a helpful attitude, many smaller creditors have attempted to act in such a way that, apart from any harshness to farmers, their action would have precipitated forced sales to the danger of general value of land as any basis of security.

It is important that carefully considered laws made by the States to deal with the emergency should not be rendered invalid because of any conflict with the provisions of Commonwealth Bankruptcy Law.

Some portion of farmers' debts are not secured, or not fully covered by the present or the prospective value of security. In some cases it has been possible to arrange compositions by which creditors are glad to give a very substantial discount for ready cash. The extent to which the credit of the States or the Commonwealth might be used to raise money at low rates of interest to partially liquidate the Farmers' debts in this way should be examined.

TAXATION AND RAIL FREIGHTS.

A factor in high costs of production is high taxation. It is generally recognised that a cheap money policy is absolutely dependent upon the national budget being balanced, and, for that reason, severe taxation is difficult to avoid. It is also recognised that the Federal Government has done a considerable amount to exempt farm produce and farm requisites from Sales Tax and primage, and in some States the State Land Tax and Local Government Rates have been slightly lowered.

There are, however, still many items of taxation which directly handicap the farmers' operations. For instance, a very heavy revenue duty is levied on petrol, and portion of it is allocated for road maintenance and development. The exaction of this tax from farmers who use petrol in stationary engines or in farm machinery or in tractors, is a direct impost upon his means of production. Even where it is possible to run a tractor actually designed to consume petrol, with kerosene for its fuel, there is some loss of efficiency and increase in wear and tear. Sales Tax is still levied on kerosene, lubricating oil, and grease.

The special Federal Property Tax upon income derived from interest on mortgage is, even at its reduced rate, still an appreciable factor in keeping up the rate of interest. The Federal Land Tax falls upon only a minority of wheat farmers, but in places it is a check to the consolidation of inferior holdings which is undoubtedly desirable for the efficient working of the land in marginal districts.

In the primary producing States the wheat farmers are called upon to pay State Land Tax as well.

Rail freights have recently been slightly reduced from the post-war peak, but they also remain in all States at a very high level in comparison with those before the War. Harbor dues wherever charged upon wheat or farm requisites are also high.

EFFECTS OF TARIFF.

The Federal Tariff has a double effect upon the cost of farmers' operations. It raises the cost of a number of his essential requisites, such as some of those enumerated in the Table referred to above, and as such, is a tax which discriminates against him. It has, moreover, a more serious effect owing to the general increase which it causes in the cost of living, and, through the resulting increase in the cost of living index figure, its raising of the basic wage. These increases bring no benefit to the Australian wage earners, since they merely make good their greater expenses. On the other hand, the farmer who has got to sell his produce in markets outside Australia suffers by not being able to raise his returns in accordance with the rise in the basic wage and Australian costs.

The depletion of the farmer's income through these indirect causes is probably a greater burden from the general tariff than the actual increase in the prices of farm requisites due to the tariff upon those items. The combination of both imposts certainly adds several pence per bushel to his costs of production.

The tariff also has an effect upon the overseas freight which the farmer pays to market his wheat. The fact that trade has become so considerably a one-way traffic has meant that the shipping which comes to Australia nearly empty is forced to charge most of its expenses of the round voyage upon Australia's exports.

In certain localities there is an added disability of a similar nature. When the tariff was lower and many more finished articles were imported, there was a great deal more direct importing to all the chief distributing centres in Australia. To-day those imposts which continue are proportionately more in the nature of raw materials which come to the ports of Melbourne and Sydney for use in the great industrial centres adjacent to those ports. As a result shipping which caters for parcels of wheat finds intermediate ports such as those of South Australia less attractive and freight rates are correspondingly increased.

Resentment in some Overseas Countries has so grown at the unreasonable height of the Australian tariff that measures of retaliation have actually been taken in some cases and threatened in others. This has tended to deprive Australian wheat of the premium value which it once had for blending with other wheats.

At a time when Australian wheat-growers are struggling for their existence in competition with wheat-farmers in other countries who are free from such burdens it is simple justice that these disadvantages should be removed or made good in some other way.

EXCHANGE.

Closely allied to the monetary policy of Australia as it affects interest rates is the question of exchange. A high exchange rate is a substantial help to all the export industries to carry on. From time to time expectations arise among interested people that the exchange rate will be lowered. In certain quarters there is a belief that some special virtue would arise from the re-establishment of the Australian pound on a parity with sterling. From the point of view of production and employment in Australia there can be no doubt that any such lowering of the exchange rate would cause a severe setback, and not only would the adverse gap between costs and prices measured in the Australian currency be widened in the case of most of the export industries other than wool (at the present time), but the uncertainty caused by a moving exchange rate would make it necessary for traders to work on wider margins.

Some people have an impression that London funds may grow to such a large amount that the exchange might be broken downward by outside dealers in the same way as it was broken upwards in January, 1931. This is erroneous. There is no real similarity between the impotence of the Commonwealth Bank in 1931 to hold down the rate at a time when it was losing London funds and could not find sellers ready to let it have British money for Australian money at a lower price than the outside purchasers were prepared to pay and the unlimited power it always has to hold the market up so long as it is prepared to buy at its price. No one offering less than 125 would find a seller of exchange so long as the Bank was prepared to pay 125 for exchange. Long before any dangerous inflation occurred in Australia the Australian funds issued by the Bank for the purchase of London funds would necessarily start money circulating and stimulate employment. From that a demand would arise for London funds to pay for imports and relieve the Bank of some of its volume of such funds. If the bank decides to lower the exchange it can only be because by cold calculation the board has decided that employment and prosperity in Australia are excessive and should be checked or else that it is desirable to enhance the dignity of Australia by deflating the Australian pound to parity with sterling.

There is a general agreement among producers that, failing a managed currency which would give some stability in price levels, nothing but adverse results could arise from a lowering of the exchange rate merely for the vanity of re-establishing the Australian pound at parity with sterling.

PREVIOUS GRANTS.

Even with the reductions in costs that have taken place and the slight raising of the price of exports in the terms of Australian money as a result of the exchange, there remains a wide gap between costs and prices.

The Commonwealth has already contributed some assistance to lessen this. In three years approximately £8,400,000 has been distributed in the form of bounty or grants. Although the total amount appears large, it is only because the size of the industry is but dimly understood. Actually it falls far short of the payments made to Governments and public utilities by the industry in taxation and in payment for various services. There can be no question that this subsidy has been of immense help to a very large number of farmers in enabling them to hold their position or to reduce the rate at which they were falling behind. In other cases the payment of the Commonwealth grant has provided some vestige of comfort and living standard to settlers who were struggling with all the difficulties of pioneering as well as low prices and adverse seasons. Full particulars concerning these grants have been furnished by an officer of the Commerce Department.

Probably the most important task of the Commission is to make a recommendation as to what form assistance should be provided in future.

SUB-MARGINAL FARMS.

Objection has been raised to previous grants because a portion of them may have been paid to farmers who are on land that is not suitable for wheat-growing or to farmers who are not efficient managers. Although this can only apply to a very small minority of the farmers representing a still smaller percentage of the productive capacity of the industry, it does indicate a possibility of waste which the Commission should endeavor to find the means of avoiding.

The amount of assistance paid in the form of bounty to such cases is not great. By far the larger amount of public money being spent without result in such cases is by State authorities in the form of advances to develop country which has since proved to be unsuitable or in advances to enable farmers to continue farming such land. There are cases which have been reported in both Victoria and South Australia (and which are paralleled in other States) where the total gross proceeds from wheat grown on certain farms has not only fallen far below the amount necessary to pay any return on capital or provide any standard of living for the farmer, but has been only a small fraction of the money actually spent on seed, fertiliser, and sustenance to enable the farmer to put in the crop.

In cases such as this the provision of further finance can only lead to the prolonging of a hopeless struggle in which the farmer and his family must suffer hardship and disappointment and the amount of money contributed in assistance become a total loss.

At the same time it must not be forgotten that during the clearing of land it must be cropped continually for years with very small prospects of good yields. To abandon these partly developed farms irrespective of their quality as sub-marginal would be indiscriminate waste of the work and capital already expended.

It is not considered that the Commonwealth is in a position to discriminate between the merits of a large number of individual cases. There is probably very little country which should be abandoned altogether. In the majority of mar-

ginal cases the enlargement of holdings so that the farmer would be less dependent on cultivation of cereals is probably in the best interests of both the settlers and the State.

In various districts and in various parts of the same district the size of holdings, which experience has proved to be necessary, will vary. In the same districts the difference between the results obtained by different individuals will vary almost as greatly. There are some districts where it is now obvious that the country has been permanently deteriorated by attempts to cultivate it. The perennial bush has been destroyed and the country has become subject to drift in times of drought. In some cases the remedy may be to change the land over entirely to grazing. In others the land, although permanently injured by being ploughed once, now requires periodical cultivation in order to maintain even its lower level of fertility for grazing. These illustrations of the contrasts and complications serve to show the Commonwealth is quite unequipped to discriminate between individual cases.

There is, however, an obligation to the taxpayer to see that as far as general application is possible, assistance is given in such a way that it shall not be concentrated upon the most hopeless propositions.

BUSHEL OR ACREAGE BASIS.

The provision of a bounty on production, such as that provided in 1931-2 (or through the medium of a home price as is suggested later), does spread the assistance on an industry basis roughly in proportion to the value of each section of the industry to the country. Over a run of years such a basis would average out so that the accidents of season, or other adverse circumstances, cancelled each other. For a single year, however, the provision of assistance on such a basis would have left a great many very hard cases where a crop had been destroyed by hail, fire, flood, or an exceptional season, without any assistance at all. Individuals so missed were certainly those who would require assistance most urgently.

Arrangements with the States were therefore made during the last two years to grant assistance substantially on an acreage basis. This basis, although in a rough and ready way the most effective for short period salvage in the industry, would undoubtedly be open to abuse if made as a regular practice. There has already been a small amount of land lightly cultivated as a catch crop because of the likelihood that payment of a bounty on an acreage basis would ensure a return to cover the meagre outlay for such inferior farming. Any encouragement of extension of this practice is clearly most undesirable.

RESTING LAND.

Further, the payment of assistance on an acreage basis is a direct discouragement to the resting of land. Although it is considered impracticable to compulsorily reduce the acreage on a quota basis, there is no doubt that, if it were not for the debt structure, a great deal of land would be voluntarily diverted from wheat growing to other purposes.

In many of the older farming districts where cropping has been continuous for 30 or 40 years a reduction in the fertility of the land has taken place. It is found that resting the land for a few years restores that fertility, and the increased yields from land cropped after a period of rest go a considerable distance towards making good the loss of turnover incurred while the land was being spelled. The number of extra livestock which it is possible to carry on the uncultivated land contributes a substantial amount to the overhead commitments of the farm, but where the debt structure is considerable the farmer is not in a position to afford to reduce his turnover at all. The highly commendable

anxiety of farmers to meet all their commitments has led to farmers cropping the utmost possible area which their plant and time would allow. Although it is obviously a desirable time to rest land from wheat farming when the price of wheat is low, the low price makes it more difficult for the farmer to exist on the smaller turnover. Receiving a bounty on what he produces may make all the difference and influence the farmer to change to a better rotation.

The payment of assistance on an acreage basis also encourages the farming of the greatest possible area. The effect of this can be plainly seen in a deterioration of the Australian sample of wheat, more and more of which is being grown on partially exhausted land or upon stubble ground or inadequately cultivated land.

Roughly, the Commonwealth cannot be expected to discriminate between the quality of individual farms or farmers. That must be a matter of State administration. It should, however, be assured that the States are not using funds provided by the Commonwealth to prolong the hopeless struggle on uneconomic land. Subject to that where in place of a home price assistance is provided out of revenue the minimum of restriction should be placed upon the State in the way the money is employed so that the variety of cases can be provided for in such a way that the best and most effective method of working the land is not discouraged.

SIZE OF HOLDINGS.

In the case of obviously sub-marginal farms the problem in practice is very much more one of repatriating a proportion of the farmers elsewhere so that the size of the holdings can be increased to give a more balanced and stable livelihood.

Over most of the wheat belt farms are an adequate size. In Western Australia farmers' difficulties are even increased because the average holding is larger than can be developed with the capital which the average farmer can obtain. But there are places in the Victorian mallee and in Upper Eyre's Peninsula where holdings have proved to be too small. Besides these particular congested localities there are scattered all over the farming districts many returned soldiers' settlements where the farms are much too small.

The extent to which Commonwealth might co-operate with the States in financing the cost of repatriating these farmers and also the cost of providing water, fencing, &c., for an alteration in the uses to which the land is put are things which should be considered by the Commission as the lines supplementary to a bounty along which Commonwealth funds might be usefully employed in assisting the reconstruction and re-establishment of the wheat farming industry.

SIDE LINES AND ALTERNATIVE CROPS.

In considering the question of what other crops offer profitable alternatives to wheat growing, the Commission will find that conditions vary between every district and almost every farm. As a matter of general principle, it can be stated that diversity of production, as far as any particular farm is suitable for a variety of products, makes for stability and spreads risks. It is better for the farmer, as for any other investor, not to put all his eggs in one basket. On the other hand, there is seldom much advantage in switching simply to chase the market after some other product than wheat because its price happens to be relatively higher at the moment. By the time a change over is completed market conditions have usually changed also. Wheat farmers and graziers who have gone in for dairying have helped first to put up the price of cows and then to bring down the price of butter. There is little doubt that the present satisfactory price of lamb would be quickly depressed by any considerable increase in the supply.

In addition to this there is a possibility of the market for dairy produce and lamb being curtailed by quota limits to their entry into the British market.

Table C shows the price movements of alternative products up to June last year. Since then wool and lamb have improved and butter fallen further in price. The outlook for wool is reported to be sounder at prices above those of recent years, although not at the high present level. Some sheep on a farm are almost always an advantage to the cultivation irrespective of the price of wool or lamb. The urge is therefore strong to increase their number when the price is attractive. At the present time it is only the high price of sheep and obstacles of finance, limited areas, shortage of water, or incomplete fencing which are likely to prevent less fortunate or less established farmers from diverting some of their resources from wheat to woolgrowing or lamb raising. A number of institutions have been assisting farmers to buy sheep where the investment was sound. Further action by Governments outside the ordinary channels might easily cause a rise in sheep prices similar to that of land values during the time when Governments were buying land for returned soldiers, or to the rise in the price of draught horses when the various State farm relief authorities were assisting farmers to replace their tractors with horses. Where wheat is grown on a regular rotation there will be an effort made to lengthen the rotation between wheat crops so as to reduce the area on the farm actually seeded each year to wheat and replace it with fodder crops or specially sown or self-sown pasture. It has already been suggested that the Commission should advise as to the extent Governments can assist this tendency.

FLOUR TAX.

But when the dismal price outlook is considered and the very great political difficulties in obtaining an adequate reduction in costs, it appears that something more stable than doles is required to support the industry until world conditions improve.

The morale of farmers is being lowered by the annual petitions which it is necessary to renew for assistance. The reaction in Parliament and antagonism on the part of other sections of the community has all an unsettling effect, and is creating a sense of injustice among farmers.

In a few places something approaching demoralisation has been reached. Desperation and sense of injustice have banded whole communities together in desperate remedies which can only do harm to the general body of farmers.

Mortgagees' sales have been boycotted. Attempts have been made to hold up deliveries of wheat. Public opinion in some localities is growing more lenient towards the farmer who is not doing his best for his creditors because he has no hope in the future. The overwhelming majority of farmers in the great majority of districts have remained proof against such temptation and are sweating and skimping in order to pay their way, but when there is a sense of injustice there is always danger of infection spreading.

In comparison with the desperate, though ineffectual, actions of farmers in the United States and other countries the steadiness, the perseverance, and the high standard of citizenship of Australian farmers forms a striking contrast.

The almost general Australian practice has been to guarantee to efficient Australian secondary industries a price for their product to enable them to maintain an Australian standard for the people engaged in the industries. The bounties and grants to wheatgrowers have not been made on this basis, except to the extent which part of the grant made this year has been financed by a flour tax.

The raising of funds for farm assistance through a flour tax is the logical application of the almost general Australian practice, but because it is applied under the name of a tax it meets with bitter antagonism. Altogether, apart from the sentimental objection to a tax upon flour, economists have pointed out that

its effect upon the cost of living, and thereby upon the basic wage, exaggerates its effect upon consumers and also causes a great part of its cost to fall back upon the export industries. This is probably the case, but it has not been made any bar to the making of laws and awards to govern the return to wage earners in the milling and baking industry which equally affect the price of bread and the cost of living.

The protagonists of the consumers appear to be seeking rather a ghoulish advantage from the little cheapness obtained in bread stuffs as the result of the ruinous low liquidation price of wheat—the raw material of bread. This must be a fleeting advantage, part of which must be lost as soon as bankruptcy of farmers and deterioration of land and plant have adjusted the supply of wheat to current demand. It is quite distinct from the ever desirable cheapness derived from better or more economical methods.

Further, in Australia there is a growing feeling that the fall in nominal wages has reached a point where it is seriously lowering the standard of living as measured by comforts not included in the items from which the cost of living index is computed. The case of the wage-earner who is purchasing a house on long period agreement is particularly embarrassing at the present time. For these reasons there has been a growing tendency in more fortunate industries that can afford to ignore costs not to apply in all cases full reductions made in awards as a result of falls in cost of living index. Therefore any compensation to farmers through lowered costs because of bankrupt wheat production appears problematical and remote.

HOME PRICE.

Some of the economic and most of the sentimental objections to a flour tax apply with much less force to a Home Price for wheat milled for consumption in Australia. The home price for wheat would give some stability in the value of millers and bakers' stocks. To that extent it would reduce the risk which they have to face in the fluctuations in the value of stocks and might make it possible for them to work on smaller margins. Furthermore, the home price would remain stationary, and, as the world price of wheat rose, the amount of the subsidy contributed through the home price would correspondingly reduce. It would act as a balancing point to provide assistance in some proportion to its need, and be no drain upon the public at times when assistance was not required.

There are no complaints but only rejoicings about any rise in the cost of living due to increased wool prices. There would be none were the price of wheat to rise in the world's market. Although in both of these cases the proportion of Australian output which is exported is so much greater than that consumed locally that a rise in the world price brings several pounds into the country for every pound which it costs the Australian consumer, this does not apply to the price of meat, of which only a small proportion of the output is exported.

During the last 18 months the price of export lamb has approximately doubled, and this has taken with it the price of mutton and lamb slaughtered for consumption in Australia. Although only a very small proportion of sheep and lambs killed in Australia are exported, there is general satisfaction that the rise in the price of meat has tended to lower the gap between the price of one form of primary production and that of average secondary goods.

The Commission will have the duty of giving advice as to what is a fair home price.

It is pointed out that this is substantially higher than the bare existence costs of the industry at a time when it is in the condition of a sweated industry. Figures have been published in South Australia of farmers who have been working under the Debt Adjustment Scheme. Unlike the farmers working under the Farm Relief Law, these farmers are from good established districts as well

as the pioneering districts. They have sought protection under the Debt Adjustment Law in most cases because of pressure on the part of one or more of their creditors, which appeared to the Judge to be unreasonable. Their accounts have been rigidly supervised now for two years. It is plain from this that the average cost on the bare existence level is something over 3s. per bushel during the two seasons in which yields per acre were well above the average. In average seasons the cost per bushel would be higher. It is probable that this can be taken as a fair average for the whole of Australia as about the price which is needed by the average farmer for all the wheat he sells in order to maintain the struggle for solvency in similar seasons.

BASIS OF HOME PRICE.

This figure represents a sweated standard in comparison with that adopted as reasonable when assistance, whether by Tariff or Bounty, is being considered for other industries. In deciding what is a fair price for Australian-made manufactures the Tariff Board allows for wages at Australian standards and for reasonable interest upon invested capital. On this basis of cost an estimate is arrived at as to whether the value of the industry is great enough to warrant the cost to the public of keeping the industry going. It is only fair that the same standards should be applied to the wheat industry. By stinting and struggling, the average farmer can hold his own with a lower price—probably in the region of 3s. a bushel at sidings, provided he gets that price for all his marketable wheat. As the price to-day is more than 1s. a bushel below that figure, it is only by receiving a price equivalent to that of other industries for the proportion he sells for local use that his return can be averaged up to anywhere near his unpostponable expenses. At present prices quite a low home price would amount to valuable increase per bushel all round. This would not be enough to maintain sub-marginal farmers in uneconomic production. It would, however, enable a great many farmers by stinting themselves and postponing replacements to hold on for a time and reduce the rate of retrogression everywhere that wheat farming has any sound future.

Some farmers, either because of exceptional efficiency or especially good land, produce more cheaply. On the other hand, there are others whose expenses per bushel are higher. This diversity in the conditions of production from the land is inevitable, and should not be a bar to the granting of help similar to that given to the dairying industry and to others, on the basis of the average. Reasons have been given earlier why assistance on the basis of wheat grown is desirable, and it is considered that of all the alternatives the provision of means to ensure a fair home price is the most equitable.

MARKETING.

The means by which a home price can be made effective raises the highly controversial question of marketing. A great many farmers do not approve of the principle of a compulsory pool. They like to retain the alternative methods of disposing of their wheat which the present system of open market sales, storage, or voluntary pools offers to them. They would be reluctant to lose the competition which at present arises from there being several wheat buyers in every yard. A compulsory pool, although it would mean only one buyer, would make the establishment of a home price for home-consumed wheat a simple matter, and there is little doubt that if there were no other way to obtain a home price, the need for it would outweigh the objections of many farmers who do not favor a compulsory wheat pool as the best method of marketing wheat overseas.

There are several methods by which a home price can be established without suppressing the open market for export. The Commission will doubtless receive explanations as to their details.

The simplest would be an adaptation of the English system. In England the mechanism is necessarily more complicated because only a fraction of the wheat gristed is home grown and eligible for the home price. Each season it is necessary to ascertain what that fraction is and then to place upon every miller the obligation to absorb that percentage of the home-grown wheat either in his own grist or that of another miller. Since millers use various proportions of the different types of wheat from many countries according to the "mix" they require, the rights and obligations are necessarily negotiable. Each miller is able to satisfy his obligation towards home wheat and establish his rights to grist whatever mix of imported or home wheat he desires, once he has completed payment of the guaranteed home price for his share of home-grown wheat. This he does by paying to the Administering Authority the difference between the market price and the guaranteed home price. These payments build up the fund from which farmers receive deficiency payments about equal to the difference between the guaranteed price and that for which they sold their wheat in the open market. The wheat and flour trade goes on as before.

In Australia only home-grown wheat is ordinarily gristed. All the complicated arrangement of quotas is therefore unnecessary. The home price would apply to all wheat milled for home consumption, and provision would be made to exempt under proper security wheat milled for export flour. Millers would be required to make deficiency payments as in England, and these would be distributed to farmers on the basis of the quantity of wheat each had marketed. The export trade and the sale of wheat for fowls' feed or livestock could go on as before at world-price levels.

But if the mechanism required for Australian conditions is simpler than in England, the constitutional requirements of Australia are more complex. Both State and Federal legislation would be required. It would be necessary to set up a board in each State in order to establish a home price and to collect from the millers the difference between it and market price because these are in the main matters of intra-State trading. A Federal Board would also be necessary to regulate interstate transactions which might otherwise defeat the action of the State Boards. The Federal Board should also have the responsibility of distributing the deficiency payments to the growers on an Australian basis.

It is considered that a majority of the members of these boards should be growers' representatives and that representation of merchants, co-operative pools, millers, and consumers should also be provided for.

Most of the Australian systems of marketing or local price stabilisation are made legally effective by the provision of a quota according to which participation in the privileges of the local market carries with it a liability to share proportionately in the responsibilities of export. It is not certain whether this is due to the stages of evolution through which the systems have grown or to a real necessity which arises from the limits of the constitution or merely to a political weakness for complicated and imposing fandangles. As far as mechanism is concerned Australian export quotas, provided they were negotiable like the English milling quotas, could be similarly applied to the Australian wheat trade. In themselves they would only mean restrictions and complications without any economic benefit to farmers, millers, or consumers. Unless the Constitution renders them essential there is no sound reason why they should be adopted for the wheat and flour industries.

CONCLUSION.

The most effectual and the most lasting relief to farmers is that which takes the form of reducing for them costs of production and of transport over which they have no control. The most onerous and the most universal of these are interest, taxation, rail freights, shipping charges, and the expense of farm requisites. Their incidence and the possibilities of its reduction have been discussed.

There are also a number of other problems of expense peculiar to certain States or certain types of farms. The prospects of economy through a change to bulk handling is one. The establishment of a more elaborate grading system, the best quality and size of cornsacks, and the standard of fertilisers are others. The scale of agents' fees and charges for lumping and handling are of appreciable importance. The safeguarding of property rights over wheat in storage becomes an acute problem at times. The scale of Crown rents and the method of assessment for land tax valuation are of serious importance to many farmers. There may be possibilities of cheaper tractor fuel by the use of producer gas in place of kerosene.

There are continuous questions always before those interested. The bad times have made them more alive and may speed up their solution. The Commission will no doubt hear about them and consider them.

Each of them is a fairly extensive technical question by itself.

The main task of the Commission is to advise upon the extent to which the problems general to the industry can be dealt with; upon the extent to which those costs affecting the major part of the industry can be reduced; whether the world price of wheat can be raised; and the best form and the extent of assistance needed, whether by provision of an Australian price or bounty, to enable the farmers to keep going during the period of reconstruction. Reasons have been given at length to show that the provision of a home price is the most equitable and the most effective.

TABLE E.—*Showing Comparative Values of Purchased Material Directly or Indirectly Concerned in the Growing of Wheat for 1913, 1918, 1925, 1930, and 1934.*

	1913	1918	1925	1930	1934
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
85 doz. cornsacks	27 12 6	42 10 0	55 6 8	45 13 9	34 0 0
20 balls binder twine	2 6 10½	4 10 0	3 5 0	3 0 1	2 18 0
10 balls bagging twine	0 9 9½	1 0 10	1 5 0	12 1	12 1
50 galls. kerosene	1 19 7	4 7 6	3 15 0	3 15 0	2 11 0
10 tons superphosphate	46 5 0	50 0 0	45 0 0	42 10 0	43 5 0
8 galls. lubricating oil .	1 0 0	1 8 0	1 10 8	1 12 0	1 12 0
2 doz. steel plough shares	3 6 0	4 10 0	4 16 0	4 4 0	4 3 0
2 doz. cultiv. shares ..	1 6 0	2 8 0	1 17 6	1 12 6	1 9 0
3 doz cast-iron shares	1 16 0	3 3 0	2 12 6	2 5 0	2 2 0
2 chaff-cutting knives	0 7 0	0 12 6	0 11 8	0 10 0	0 8 0
17lbs. bluestone	0 4 3	0 14 2	0 5 8	0 6 4½	0 5 0
Fencing material	5 0 0	11 3 5	9 3 10	7 7 1	7 8 0
	91 13 0	126 7 5	129 9 6	113 7 10½	100 13 1
Increase above 1913 in each year		37·9%	41·2%	23·72%	9·82%

TABLE E2.—*Showing Comparative Values of Essential Miscellaneous Tools in 1913, 1918, 1925, 1930, and 1934.*

	1913	1918	1925	1930	1934
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
2 8ft. hay forks.....	0 3 4	0 9 6	0 9 0	0 7 7	0 7 6
2 8ft. hay forks.....	0 4 10	0 13 0	0 13 0	0 10 11	0 10 0
5-prong manure fork	0 1 11	0 6 3	0 6 3	0 7 4	0 7 10
L.H.R.M. shovel.....	0 3 0	0 5 6	0 7 6	0 6 5	0 4 5
S.H.S.M. shovel	0 4 6	0 8 6	0 8 6	0 7 11	0 4 5
Spade	0 3 2	0 7 3	0 7 6	0 5 2	0 5 9
Digging fork	0 2 8	0 5 6	0 5 6	0 4 10	0 4 9
Pick and handle	0 3 0	0 7 2	0 7 2	0 4 0	0 3 6
Axe and handle	0 3 6	0 7 6	0 9 6	0 8 3	0 9 0
Fencing bars	0 6 0	0 13 6	0 13 6	0 5 4	0 3 4
Wire strainer	0 5 0	0 7 9	0 9 6	0 8 2	0 7 5
Ratchet brace	0 3 6	0 7 9	0 10 0	0 5 4	0 5 3
3 auger bits	0 3 3	0 7 6	0 7 6	0 5 8	0 6 9
3 files	0 1 5	0 5 3	0 5 3	0 2 6	0 3 0
Hammer	0 0 10	0 3 4	0 5 0	0 3 9	0 4 2
Screw wrench	0 5 2	0 9 0	0 9 0	0 5 6	0 5 0
Hand saw	0 4 11	0 12 6	0 12 6	0 6 1	0 5 5
Grindstone and fittings	0 9 3	1 9 0	1 9 0	0 18 4	1 0 0
	3 9 3	8 5 9	8 15 2	6 3 1	5 17 5
Increase above 1913 in each year	—	139.4%	164.5%	77.73%	40.67%

TABLE E3.—*Showing Values of Essential Farm Harness in 1913, 1918, 1925, 1930, and 1934.*

	1913.	1918.	1925.	1930.	1934.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
6 prs. blinkers	2 8 9	3 3 0	3 15 0	3 5 6	3 1 0
6 collars	4 7 0	6 15 0	8 5 0	7 9 0	7 5 0
6 hames	1 19 9	3 8 6	4 7 0	3 3 0	4 6 6
6 prs. plough chains...	2 3 6	3 1 0	3 14 8	1 7 1	1 11 0
4 prs. leading chains ..	1 9 0	3 1 0	4 17 2	1 15 4	1 17 4
4 spiders and belly-bands	2 3 4	3 6 0	3 10 0	3 9 8	3 1 0
2 wagon saddles and breeching	4 14 0	6 10 0	6 12 0	6 18 0	6 2 0
100ft. 1 inch rope ...	0 2 8	0 5 0	0 5 0	0 1 9	0 1 2
1 pr. double leading reins	0 13 0	1 4 0	1 4 0	1 1 3	1 6 0
1 pr. single dray reins	0 6 4	0 9 6	0 10 6	0 10 3	0 7 9
2 prs. pole straps	0 14 0	1 12 0	1 2 0	1 0 0	0 11 4
6 hame straps	0 4 0	0 5 0	0 5 0	0 6 2	0 5 6
2 back chains for wagon saddles	0 3 6	0 8 4	0 10 0	0 6 6	0 6 0
4 swivel tug chains ...	0 7 0	0 13 0	0 14 0	0 6 2	0 5 6
1 doz. spring snaphooks	0 0 11	0 1 6	0 2 0	0 2 0	0 1 10
	21 16 9	34 2 10	39 13 4	31 1 8	30 9 5
Increases above 1913 each year	—	56.3%	81.6%	42.34%	41.82%

TABLE E4.—*Showing Values of Essential Farm Machinery in 1913, 1918, 1925, 1930, and 1934.*

	1913.	1918.	1925.	1930.	1934.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
4-furrow plough	32 0 0	52 0 0	64 0 0	42 11 3	46 16 0
15-tine cultivator	39 0 0	66 5 0	80 15 0	76 9 9	(a) 63 15 0
16-hoe drill	43 10 0	54 10 0	70 0 0	67 17 6	60 9 0
6-leaf harrow and bar ..	9 0 0	12 5 0	13 10 0	10 12 1	11 0 0
Hay trolley	66 0 0	90 0 0	150 0 0	166 0 0	160 0 0
Tip dray	26 0 0	29 10 0	58 0 0	52 0 0	50 0 0
6 ft. harvester	104 0 0	130 0 0	136 0 0	119 9 9	116 10 0
5 ft. bag-lifter	1 15 0	2 7 6	2 15 0	2 2 6	1 7 6
No. 4 chaff-cutter	15 12 0	21 6 6	31 0 0	24 14 0	22 8 6
Binder	40 0 0	57 10 0	85 0 0	73 2 6	73 2 6
Oil Engine	142 0 0	192 0 0	210 0 0	192 0 0	120 0 0
	518 17 0	707 14 0	901 0 0	826 19 4	(a) 725 8 6
Increase above 1913 ..	—	36·4%	73·7%	59·38%	(a) 36·69%

(a) The original figures have been corrected as above since the evidence was given.

PRICES OF WHEAT—NEW SOUTH WALES, 1898-1931.

Year Ended Dec. 31.	Price of Wheat, Sydney (C) (D)			
	February.	March.	Average Value for Year. (B)	Estimated Net Return to Farmer. (E)
	Per Bushel. s. d.	Per Bushel. s. d.	Per Bushel. s. d.	Per Bushel. s. d.
1898.....	4 0	4 0	3 8	—
1899.....	2 7½	2 9	2 9	—
1900.....	2 9	2 8	2 8½	—
1901.....	2 7	2 7	2 8	—
1902.....	3 2	3 2½	4 5	—
1903.....	5 11½(A)	5 9½(A)	5 1½(A)	—
1904.....	3 0½	3 0½	3 2	—
1905.....	3 4½	3 3½	3 5	2 11
1906.....	3 1½	3 2½	3 3	2 10
1907.....	3 0½	3 1½	3 10	2 8
1908.....	4 4	4 5½	4 3½	4 0
1909.....	4 0½	4 6½	4 9	3 7
1910.....	4 1½	4 1	3 10	3 7
1911.....	3 5	3 3	3 6	3 1
1912.....	3 9½	3 8½	4 1	3 3
1913.....	3 6½	3 7	3 7½	3 3
1914.....	3 8	3 9½	4 1½	3 2
1915(C).....	5 6	5 6	5 5	5 1
1916.....	5 1½	5 0½	4 10	4 0
1917.....	4 9	4 9	4 9	2 10
1918.....	4 9	4 9	4 9	4 1
1919.....	5 0	5 0	5 1½	4 5
1920.....	8 5(A)	8 10(A)	8 7½(A)	7 6
1921.....	9 0	9 0	8 8	7 0
1922.....	5 2	5 11	5 8	4 8
1923.....	5 8	5 7	5 3½	4 3 a
1924.....	4 7½	4 7	5 5	4 3 a
1925.....	6 9½	6 3½	6 2½	5 7
1926.....	5 11½	5 8½	6 2	5 1
1927.....	5 1½	5 0½	5 5	4 6
1928.....	5 2	5 5½	5 1½	4 7
1929.....	4 8½	4 7½	4 10½	4 0
1930.....	4 8½	4 5	3 10½	3 2
1931.....	2 1½	2 1½	2 5½	1 7

NOTES.—(A) Imported wheat. (B) Unweighted average of daily quotes. (C) Price officially fixed on trucks Sydney of bagged wheat for flour for home consumption, 1915-1921. (D) As from 1922 shippers' and millers' prices bagged on trucks Sydney. (E) Weighted average price of wheat (harvested in season ending in year shown in first column) delivered at country railway sidings and elevators after deducting net cost of bags. a. Voluntary Pool price.

The Sydney prices quoted are per imperial bushel (60lb.) f.a.q. wheat in 3bush. bags. The bag is sold with the wheat and is included in the weight paid for as wheat. The monthly averages represent the mean of daily prices, and the annual average is the mean of the monthly averages. Formerly practically the whole of the wheat marketed was in buyers' hands before the end of March, but in recent years the practice of pooling, and more recently still the introduction of the wheat elevators and storage by farmers have extended the period of marketing.

Bureau of Statistics, Sydney, February 24th, 1932.

PARAFIELD POULTRY STATION.

NOW BOOKING ORDERS FOR SPRING, 1934.

EGGS FOR HATCHING AND DAY OLD CHICKENS

WHITE LEGHORNS.

EGGS.—7s. 6d. per Setting of 15 Eggs. Incubator Lots, £2 per 100.

DAY OLD CHICKENS.—15s. per dozen; £4 per 100.

BLACK MINORCAS.

EGGS.—7s. 6d. per Setting of 15 Eggs. Incubator Lots, £2 per 100.

DAY OLD CHICKENS.—15s. per dozen; £4 per 100.

**Free on Rail,
Salisbury.**

**DELIVERY.—CHICKS—July to September.
EGGS—July to September.**

Intending breeders should recognise the importance of establishing their flocks with only the very best of stock also, pay particular care to the size of the egg. The future of the poultry industry in South Australia is almost entirely dependent on the export trade; the size of the egg for export is of the greatest importance. The breeding stock at Parafield is carefully selected and every egg set or sold is of a minimum weight of 2ozs., and a large percentage considerably over.

All Eggs and Chickens sold from Parafield Poultry Station are guaranteed to be produced at Parafield.

EARLY BOOKING IS ADVISABLE.

Further particulars can be obtained from the Manager, Parafield Poultry Station, Salisbury, or Poultry Expert, Department of Agriculture, Flinders Street, Adelaide.

C. F. ANDERSON, Poultry Expert.

IRRIGATION WATERS FOR HORTICULTURAL PURPOSES IN SOUTH AUSTRALIA.

[Address Broadcasted from 5CL by GEO. QUINN, Chief Horticultural Instructor, on February 20th, 1934.]

These southern parts of Australia lie in what may be termed the warmer temperate belt of the continent wherein the yearly weather cycle consists of a cold and more or less rainy season, followed by a dry, hot summer period of fully six months' duration. The only summer rains which may fall consist of thundershowers received at intervals usually too widely separated to prove dependable.

It is during this long summer season that the need for an adequate supply of soil moisture becomes the dominant consideration in the successful production of horticultural crops, whether they be fruits, vegetables, or flowers.

It may be briefly stated here that water is essential to the wellbeing of growing plants inasmuch as it maintains the turgidity of the leaves and more tender shoots and tissues generally. It is also the great solvent of mineral salts in the soil, including those which go to form the necessary plant-building materials which the plants can procure from the soil only. Finally, water is the only medium whereby these solutions of mineral salts may enter the roots and traverse the sap stream to the leaves, and from thence as elaborated sap be passed throughout the plant and thus enable it to make accretions to its growths in both roots and branches.

Realising the above simple facts, it becomes evident that to obtain the maximum results from crops in our climate, at no time during the active growing period of these crops should the volume of soil moisture fall below that point which is sufficient to prevent the plants wilting and remaining in that state over any appreciable period of time. To achieve this desirable condition the command of an adequate supply of suitable irrigation water becomes a necessity for the effective growth of all garden crops during our long dry summer season.

The sources from which supplies of irrigation waters are obtained in this State consist of:—

1. Running streams.
2. Wells and bores.
3. Reservoirs and dams.

RUNNING STREAMS.

With the exception of the Murray River, this State can boast of no permanent streams as sources from whence large supplies of good irrigation water are available at all times in the summer season. This happy condition did not always exist even in the favored Murray Valley, as for many years prior to the locking of the stream the older irrigation settlements suffered from periods of scarcity of supply, combined with a dangerous degree of salinity in the small quantities available.

In the coastal country all of those streams which have their rise in the Ranges east of St. Vincent Gulf, and during the wet season discharge floodwaters into the Gulf at various points, as the summer advances shrink to mere trickles between widely separated waterholes. It is unfortunate that with this falling supply there also comes a rapid rise in the salinity of the water. In those streams which run into the sea not farther north than Adelaide this deterioration in the quality of the water does not extend beyond the tolerance displayed by most horticultural crops. The supplies in those streams, however, which during

the winter discharge floodwaters into the Spencer and St. Vincent Gulfs at points north of Adelaide, by mid-summer invariably reach a degree of salinity which renders their prolonged use highly dangerous to any other than the most salt-tolerant plants.

WELLS AND BORES.

The water supplies derivable from wells and shallow bores vary greatly, both in volume and suitability for garden purposes. Many of those sunk to depths of between 25ft. and 50ft. on the Plain which stretches from Adelaide northwards, frequently yield a sufficient volume of water to supply a good many acres of orchard or market garden. The greater number of these may be found on the Plain between Adelaide and its western and northern suburbs and the coast. On the eastern side between the city and the foothills of the Mount Lofty Ranges the wells and bores usually have to be sunk to a greater depth to obtain a desirable volume of water. In numerous instances, however, the water is more suitable for supporting plant life. This is particularly so when the supplies are found in the gravel strata which have been formed over the beds of long-obliterated water-courses which ran from the Ranges into the main outlets to the sea. On the western side of this Plain the water is found in the sands or deep clay belts which form the subsoil. Generally, waters obtained from deep bores—200 to 500 or more feet in depth—are less saline than those obtained in the wells or shallow bores. The source of the latter supplies would appear to be a more local one, such as from soakings of winter rains which have fallen on the Plain and percolated through the somewhat saline soil into the rifts below.

As far as investigation has proceeded in respect to the waters obtained from wells and bores sunk in the semi-arid and arid parts of the State, the further inland one goes usually the greater becomes the salinity of the average water. A few wells, however, have been found yielding waters peculiarly low in salts injurious to plants. Outside of those regions which receive from 25 inches and upwards of rain annually and then mostly falling during the winter months, few wells are found which yield irrigation waters highly suitable for permanent use on land devoted to garden crops.

RESERVOIRS AND DAMS.

The quality and quantity of the waters obtainable from reservoirs and dams depend on the extent of the rainfall and the nature of the soil over which the run-off takes place. The lower the rainfall the lesser usually is the volume of water that may be conserved, and almost without exception, the lower the rainfall the higher the saline content in the surface of the land off which the water is collected.

The public supplies reticulated from the Government reservoirs to the metropolitan areas and country districts for nearly a hundred miles northwards represent the purest forms of irrigation waters available throughout the year in this State. The waters in at least two of the large reservoirs in the more northern and western districts reveal, however, the very saline nature of the soil off which they are collected and in practical use they have proved very indifferent irrigation supplies for horticultural purposes.

In some hilly districts of good rainfall in the Lower North there are ample opportunities for individual horticulturists to conserve irrigation water in privately excavated surface dams—as has been demonstrated by some of the more enterprising settlers in those localities. At Doncaster, which is a large fruit-growing centre a few miles east of Melbourne, a splendid object-lesson has been given to Australia of what could be done by a vast number of individual settlers in providing themselves with a supply of irrigation water in this manner.

DEPARTMENTAL RESEARCH.

For upwards of twenty years the Officers of the Horticultural Branch of the S.A. Department of Agriculture have been constantly studying this question in conjunction with the practical horticulturists and aided by the skill of the staff of the Government Department of Chemistry. The qualities and quantities of the water used on the different crops, the nature of the soils and subsoils, and the methods of applying water to the land, have been duly taken into consideration, when noting the results in crop production under irrigation which has been in operation for many years.

In the course of this work a vast number of samples of irrigation waters have been analysed and their saline contents recorded. The results of these observations enable us to form a fairly accurate opinion of what will be the effect of irrigating any specific garden crop of vegetables or fruit trees growing in a soil of known character, under known rainfall conditions, and using a water, the salinity of which has been determined by analysis.

FORMS OF INJURIOUS SALTS.

The principal salts found in solution in the irrigation waters used in the chief gardening centres of this State consist of lime salts, such as the carbonate and sulphate—the latter commonly called gypsum. These, unless in excess—which is seldom the case—are not harmful and may under certain soil conditions often prove valuable.

The salts of sodium chiefly consist of the chloride or common salt and the sulphate or Glauber salts, whilst those of magnesium are the chloride known as Bittern, and the sulphate, which is the well-known Epsom salts. Of the salts of sodium and magnesium, the chlorides are frequently the most abundant, as well as being the most injurious to plant life. The sulphates are also undesirable, but to a much lesser degree than are the chlorides.

In the investigations previously referred to it has been ascertained that when used on soils permitting free percolation, and in a district receiving good rainfall—from which 12 to 15 inches fall during the cool winter season, thus assisting in cleansing the land—irrigation waters ranging as high as 82 grains of the injurious salts per gallon, 60 of which may be chlorides—may be used without unduly impregnating the soil in so far as the growing of most kinds of kitchen vegetables or fruit trees are concerned. This quantity of 82 grains per gallon represents 1lb. of the injurious salts in each 85 gallons of the water.

When the irrigation waters contained from 100 to 140 grains of these injurious forms of salts per gallon, even when used on fairly well-drained land, the growing of French beans and cucumbers became impossible, and citrus trees proved unthrifty and declined after a short period of years. These latter quantities are equivalent to 1lb. of the injurious salts dissolved in 69 and 51 gallons of these respective waters.

In conclusion, I wish to remind you that these more highly saline waters themselves would not injure the plants from their direct application to the crop, but when they have been applied for several years to the ground during the warm seasons, it is then that, in the words of Hilgard, the great Californian authority, "inevitable accumulation" begins in the upper layers due to the process of evaporation. That portion of the irrigation water which has not been absorbed by the crop and does not get away *via* the under-drainage, is drawn back by the sun's heat close to the surface, whence it passes off into the air as vapor, leaving the salts behind in a solid crystalline form in the land. When the accumulation of injurious salts has thus reached a stage when the rain or irrigation water may form from them a solution too concentrated for the crop then in occupation of the land to tolerate, the plants soon cease to function and death quickly ensues. They often appear to perish of thirst though standing in a soil showing abundance of moisture.

SHEEP IN THE DRIER MALLEE FARMING AREAS.

[By W. H. BROWNRIGG, H.D.A., Agricultural Instructor.]

With the extension of farming into the drier mallee areas of this State in recent years the importance of combining sheep with wheat farming is becoming more evident every day. The mallee farmer realises that the more uncertain the rainfall the more essential becomes firmly compacted fallow, and as it is unwise to overtax the land, either by overworking the machine or continuous cropping with wheat, sheep must be used to get the maximum returns from holdings. The cost of production is becoming one of the greatest problems of the farmer to-day, and whilst there are many outside agencies over which he has no control there are still many ways by which the man on the land can reduce his costs. By utilising stubble feed that would otherwise be wasted and practically enforcing a wider rotation the sheep is of paramount importance when connected with farming. It has been proved unwise to fallow the same land more often than once in four to five years in these dry areas of light textured soil, and as rent is paid every year on every acre some use must be made every year of every acre. This cannot be done without depasturing stock of some kind, and for the conditions prevailing in the Mallee areas of South Australia sheep have proved themselves the most suitable stock to raise.

CLIMATIC CONDITIONS GOVERN BREED.

A farmer intending to run sheep should carefully study the climatic conditions before deciding on which breed of sheep to keep, but for the most of the Mallee areas of South Australia the Merino has proved itself the most suitable, not only on account of its hardiness and adaptability, but because the farmer, owing to lack of markets and easy and rapid transport facilities, is forced to be mainly a wool producer.

TYPE OF MERINO.

The most suitable type of Merino for farming areas is the large, plain-bodied, robust sheep which boasts of that great essential "constitution," and a sheep which is common to this State, having been brought, by careful breeding by stud masters, to a state of excellence rarely found in other parts. This sheep carries a strong frame, well fleshed and symmetrical, and is covered with a fairly even type of strong wool, showing good character and length, yielding fairly well a profitable wool of 60's to 64's standard count.

BREEDING EWES.

Type was lightly touched upon in the previous paragraph, but some advice on what constitutes a good breeding ewe and a description of it is necessary.

When launching out into sheep breeding, or when a farmer wishes to replace his existing flock of small, unthrifty, unprofitable sheep, he should avail himself of those that are annually offering off-shears on the surrounding pastoral properties. He should endeavor to get a line of "cast for age" ewes. It is not necessary for him to rely wholly on his own judgment, because if the sheep carry the station ear and age mark he has the knowledge that they were on the station for three or four years. Carrying the station brand and ear mark is sufficient evidence that the sheep must be good mothers, strong of constitution, of suitable type carrying a profitable covering or they would not have survived the annual culling until they were full mouthed. A ewe cast for age is really not a cull in the true meaning of the word, and cannot be likened to young sheep that are annually culled on a station. The latter are culled as being unsuitable owing to some defect in either conformation, constitution, or covering, whilst the cast ewe has to make way for the suitable young sheep coming on. A profitable breeding

ewe should be large in size without coarseness or masculinity; with clean, alert face; good neck without over development; broad, deep chest; well-sprung ribs; even, broad top line; roomy abdomen; reasonable length between loin and tail; wide breech; an even udder without dummy teats, and should stand firmly on her feet with straight legs. The points touched upon are mainly to impress the importance of thrift and constitution, and a ewe possessing these qualifications will have this essential hardiness. The wool or covering should be the correct length for the time the sheep were shorn, and should be evenly distributed over the body, showing good character and evenness, realising, of course, that toward the breech a little stronger wool must be expected, but a great variation should not be accepted. The points should be well covered, wool coming to the knee in front and below the hock in the hind legs; the face should not be shut in with wool, but wool should grow on the head up to behind the eye and on the jaws. Body wrinkles should be absent from the shoulder back as the absence of tail and breech wrinkles is essential. Where possible, intending farmers should arrange to inspect the sheep in the wool with the idea of taking delivery off shears, and it is a good principle for farmers to join together and purchase a line of ewes with the idea of taking a "run" each of the number required by each individual.

THE TYPE OF RAM.

Having purchased suitable ewes the next essential is to purchase the most suitable ram for mating purposes and too much care cannot be exercised in this important branch of sheep breeding. It is a mistaken idea that the price paid for the ram is the guiding factor. Rams of the wrong type costing fifty guineas would not be nearly as suitable as rams of the correct type costing three. For general breeding in the Mallee areas the large framed, plain bodied South Australian Merino has no peer, and when a suitable ram from a breeder is purchased and a satisfactory improvement is seen in his progeny no introduction of new blood should be thought of except, after breeding for some time, a defect exhibiting itself, is to be overcome. Here again, farmers in a district can join together and buy a number of rams which could be exchanged among themselves, so preventing them going back on their own stock and thereby lengthening the usefulness of these rams. Briefly, the two main points to be looked for in purchasing rams, are suitability for the ewes to be joined and constitution. Because a man sees the farmer's wool in the saleroom, it does not follow that he can purchase the right type of ram for the ewes producing that wool, as many other essentials have to be considered. When buying rams farmers should keep in mind the following descriptive points:—*Head* nicely set on, carried well, face clean, nose showing masculinity without being bumpy, eyes large and alert, nostrils broad and open, mouth large, lips firm and teeth even, neither under nor overshot. *The horns*, thick and strong at the base, should curve evenly and slightly away from the head with an attractive sweep, good color and texture with even, broad ridging. (Fine, thin horns are signs of bad breeding, low vitality; and close horns interfere with shearing.) *The neck* not too short and cramped looking, carried well and evenly set on the shoulders with three well-balanced, well-carried folds, exhibiting character and breeding. *Shoulders* evenly placed for easy grace of movement with the blades not reaching too high at the withers. *The withers* broad and even, not unnecessarily high. *The back* short, broad with no tendency to dip. *The loins* broad, strong and level, joining evenly to the hind-quarters. *The hindquarters* should be even, of fair length from hips to tail, exhibiting no wrinkling about the tail and breech. *The legs* should be set well apart, giving plenty of room for width in both breech and chest. *The underline* should be even, neither exhibiting poddiness nor the reverse, i.e., greyhound appearance. *The chest* having a great depth and width for easy heart and lung action is always to be

looked for. *The covering* of a good Merino ram is of the utmost importance because although quite an amount of the good qualities in breeding go down the neck, Merino sheep are kept in the main for the return in wool that is expected. The sire's wool has a distinct masculine appearance and feel and should be of the correct strength to maintain the heavy cutting qualities of his progeny. The robust type of ram advocated carries a heavy fleece of fairly strong wool of somewhere in the region of 60's, standard count, which is evenly distributed over the body without too distinct a variation between the shoulder wool and that found on the hindquarters from the hip to the hock.

BREEDING.

Every farmer knows that the gestation period of a ewe is 150 days or approximately 5 months. This being so and with the knowledge of the vagaries of his particular district the farmer can calculate when the rams should be joined in order to have the lambs dropping at the most suitable time of the year, *i.e.*, when green grass should be plentiful. For example if rams were joined early in the second week of January, lambs should be expected during the first week in June. Ewes to be joined should be in a strong, healthy condition, not carrying an over-abundance of fat and, where possible, a fresh paddock or distinct change should be aimed at in order to encourage the ewes to come in season rapidly and ensure a fairly even drop of lambs. The rams in good, hard condition and in good heart—2 to every 100 ewes—should be left in with the ewes for a month or six weeks and then removed and placed in a good paddock by themselves and well tended until required next mating season. Quite a number of complaints are heard regarding rams which come from the studbreeders but as good flock-rams are generally purchased at the hogget or two-tooth stage farmers should realise that this is always the most difficult stage in the rearing of sheep and far better treatment should be meted out to them than they usually receive. Wherever possible, rams should be bought early, taken on to the farm and a little additional feed, such as oats, given until they recover from the shock of being transferred from the better conditions under which they may have been bred and become acclimatised to the conditions under which they are expected to work. As the sire is "half the flock" much more attention should be paid to this side of sheepfarming.

CARE OF THE PREGNANT EWE.

The ewe which is expected to nourish, give birth and feed a lamb must be looked after in order that she may do the work profitably. As it is necessary to keep her own strength of body above the constant drain caused by the lamb she is carrying, she must have enough to eat to maintain this condition. Where fodder can be grown cheaply, such as oats, no ewe should be allowed to get into low condition and with such labor saving devices as the Turretfield Automatic Feeders (particulars of which may be obtained from the Department of Agriculture) very little labor is required. Sheep will eat only what they require and at their own time without any jostling or knocking about. Pregnant ewes should be yarded, driven and worked amongst as little as possible but constant supervision such as riding through paddocks without dogs should be maintained. It is well to remember that a change of pasture now and then is very important with Merino ewes until they are transferred to the lambing paddock.

LAMB MARKING.

Lambs from ewes that have been well looked after should be reasonably strong and may be marked at any time from a few days old but preferably this should be done at from three weeks to a month. The operation is quite simple and consists of ear-marking, the castration of males, and docking, in that order. Suitable weather—that is, mild and not wintry—should be chosen and the work done early in the

day to enable the lambs to be mothered before nightfall. As many lambs are lost annually with tetanus, clean yards are very important and temporary yards erected in the lambing paddock reduce this risk. Cleanliness in the operation is very essential and all knives and earmarking pliers should be dipped periodically in a vessel such as a jam tin containing some disinfectant conveniently nailed to a post near the marking rail.

CASTRATION.

The lamb should be held firmly but not heavily on the marking rail by grasping the hind and fore legs on each side with the holder's two hands, the back of the lamb resting against the catcher's chest. There is nothing new in the operation, only to state that the top of the scrotum should be taken off with a firm cut, the thumb and forefingers of both hands being used to make the testicles protrude and both organs grasped firmly in the teeth and withdrawn. There are appliances on the market for withdrawing the testicles where a sheep man is unable or loath to do the operation with the teeth. There is another method, namely, bloodless castration, where properly constructed pincers are used which need not be described here.

DOCKING.

This is also done with a knife, and the tail taken off at about the second joint with one clean cut, the skin not being pulled tightly but preferably pushed toward the butt, so that it will cover the stump and assist healing. Some sheep men are in favor of dressings whilst others, where pastures are clean, do not consider them necessary.

MAINTENANCE OF TYPE.

A very important branch of sheep raising is to visualise an ideal sheep for the conditions, and to strive for that ideal. This is a natural gift to some people, and yet it is within the bounds of all if the practices of successful men are studied and carried out. It is not intended that this article should deal with stud breeding or blood lines except to impress on farmers not to make drastic changes in rams when new ones are required, but on obtaining a suitable type of ram from a certain stud breeder to adhere to that breeder's type. By this means evenness will be obtained both in the type of sheep and covering, making classing at shearing time a very easy matter. A critical eye should be cast over the young sheep that are to be kept as breeders, preferably at the two-tooth stage, and all young ewes should be discarded that are lacking in:—

Size, i.e., not making suitable growth for the conditions under which they were raised.

Constitution, which could be bracketed with the former. Lack of this essential is shown by under or overshot mouth, narrow wasty chest, grippy behind the shoulders, swamp back, narrow breech, drawn-up abdomen, and very fine bone or crooked legs.

Type.—The Merino is a highly bred animal evolved from poor type of sheep, and Nature plays peculiar pranks at times. Even in very good flocks "throw-backs" will appear, and these should always be discarded.

Wrinkles.—The aim of the South Australian breeder has been to produce a plain bodied, clean faced sheep, and any sheep showing heavy body wrinkles, especially about the tail or breech, or a woolly face should be discarded.

Covering.—As it is the main aim under Mallee farming conditions to produce wool, a careful examination of the fleece is necessary. Strong-woolled Merinos are not expected to have the density of the fine-woolled type, but a certain degree should be aimed at, and the fleece must comprise wool of length and character. Strong wools have to attain a certain length for their quality to be of the correct type, and character is denoted by crimps or waves on the wool fibres. Crimps are of great importance, and a wool exhibiting them from the skin to the tip is

termed a well-bred wool, and a straight wool is known as a badly-bred one. When examining the fleece on the sheep see that it is reasonably even in quality, not hairy around the breech nor wasty on the belly, and not lacking in the points.

Sheep that are lacking in the preceding points should be discarded and used for ration sheep or sold for that purpose.

HEALTH OF THE ANIMALS.

Disabilities and common ailments which can be controlled or lessened by the sheepowner are of great importance, and should, as far as possible, be prevented. Fortunately, our drier areas are very free from disease, and can easily be termed sound country, but even in the soundest areas certain ailments occur, the most important being:—

Blowfly Strike, which, although not absolutely preventible, can certainly be held in check by earnest endeavor. The sheep recommended in this article suffer least of all Merino types on account of lack of tail and crutch wrinkles. Again, sheep that are kept in a thriving and healthy condition are said not to expel foetid excreta so attractive to the flies. All female sheep should be crutched every year, not when the fly has started and the ewes are lambing, but as close up to lambing as it is safe, and to make one job of it the hoggets should be done at the same time. The method of crutching generally seen is very expensive as it is absolutely useless, and is expending energy and money to gain no end. The correct method to crutch sheep is to clean the wool from the back of the udder, clean out the breech, straight up the hamstring, over the tail, and down the other leg. When this method is used and the work done with machines the crutchings, if looked after, will pay for the work. A very good practice is to swab the crutch and tail with 1 per cent. arsenic solution, rubbing the mixture in well with the hand. This swabbing, if done correctly, will render the sheep practically immune for about four weeks. Another and more effective method, namely "jetting", necessitates the purchase of a plant, and is probably out of the realm of single farmers, but one could be purchased and used on a community basis.

Every farmer should have at least two fly traps, and all animal carcasses should be burned. The poisoning of rabbits over ground will always assist the fly menace. Sheepowners are advised to regard crutching and swabbing as of the greatest importance. Sheep should be kept in good health, and not yarded for lengthy periods. Further, a general and keen supervision should be maintained over the flock.

Worms.—There are many types of worms affecting sheep, especially from the lamb stage to the four-tooth period, and the main symptoms are unthriftiness, general wasting, in some cases profuse scouring, and finally dying of exhaustion. As the worm in the egg stage is taken into the alimentary tract off the grass and hatches out in the stomach, working into the bowels where it does the damage, a poison has to be administered in order to kill the parasite and prevent it reaching maturity, passing through the animal, and continuing to keep the country affected. The modern treatment for killing the worm is (1) carbon tetrachloride administered in gelatine capsules, 1 cubic centimetre for lambs and twice that dose for grown sheep, or the same drug in four times its quantity of liquid paraffin given by means of a syringe containing the correct dose inserted in the sheep's mouth, pushed over the tongue, and the syringe emptied steadily. Copper sulphate is used also, the strength being 2 per cent. solution and administered as a drench of $\frac{1}{2}$ oz. for lambs up to six months, increasing the dose by $\frac{1}{2}$ oz. for every six months until the adult stage is reached, when 2 ozs. or the maximum is used. Sheep should preferably be drenched in a standing position, and as a precaution drench two or three sheep with the mixture a day before the main lot is treated and note the result. The foregoing specifics tend to kill the worm, but good feed

and plenty of it will help the sheep to overcome and outgrow the ravages of the worm. Under our conditions the worm appears most seriously after a good season similar to 1932-33, when rank grass grew which was very poor in feed value. After such seasons and where sheep have been known to be affected as much grass as can be spared should be burned.

Contagious Ophthalmia or "pink eye" often leads to serious results. All animals noticed with one or both eyes running, if the trouble is not grass seed, should be isolated, and although it generally runs its course of seven to 10 days, recovery is hastened by dropping certain solutions into the eye twice daily. An effective solution is made by adding 5 grains of sulphate of zinc to 1oz. of distilled water.

Sheep Louse and Sheep Tick.—Both of these insects are to be found in the Mallee areas, and although not of very serious dimensions sheepowners are advised not to neglect the prevention of spreading, and should dip their flocks annually. The aim of dipping is to kill by poison the living insect on the sheep's body, and most poison dips contain arsenic in some form. A slowly dissolving dip has a more lasting effect than a quick dissolving one, and so has a better chance of remaining effective long enough to kill the tick or lice which hatch out of the eggs after dipping. Although not the best principle it is suggested that community dips be built and flocks can be run through easily because there will be plenty of labor available. When mixing dips do not rely on guesswork, but use a measure and stick strictly to the directions of the maker, as the requisite strength has been arrived at scientifically and is not improved by stronger or weaker mixtures. Use the softest water available, preferably rain water, and mix the solution carefully and steadily. Sheep should be dipped about a month to six weeks after shearing when sufficient wool has grown to ensure of the solution being held on the body. The sheep should not be overheated before being dipped, neither should dipping be done during extremely hot or cold bleak weather. With the bath kept well stirred the flock may be put through steadily, each sheep being pushed under at least once in the 25ft. swim.

On emerging from the dip sheep should stand in the draining pens till properly drained before turning out on to the pasture paddocks, and there is less danger from scald if the animals are dried in the shade.

Shearing Facilities.—Unnecessary time spent in doing any work adds to its cost, and as shearing is an annual business some thought should be given to certain essentials that will speed up and facilitate the operation. It is not suggested that owners of small farm flocks should build a separate shed for shearing, but the machinery shed or barn can be quite easily transformed and worked effectively. As the one objective is to obtain a wool harvest, and the more attractive the wool the better the price, farmers are advised to make a batten grating for one or two pens instead of the ordinary floor or ground which collects all excreta and becomes foul. It is usually necessary to have some sheep under cover every night, not only when rain is feared, but sufficient to keep the shearers occupied until the dew dries off the paddocked sheep. Any sheep left in overnight become dirty if not standing on grating. This grating can be made in sections so that it can be taken up and packed against a wall under cover when not in use. The pens can be made of cheaply but strongly constructed hurdles, which being also movable can be stacked away. The shearing board should be constructed of flooring boards and so placed that the catching pens are opposite the stands and the escape shute immediately behind, as it is easier to carry a woolly sheep across the board from the pen than scruff the sheep when shorn across to the shute. Light is an essential both over the board and wool table.

The general furnishings of a shed are simple, but should be so placed to give room, minimum of travelling, and effectiveness. The wool table may be placed at one end of the board, and should be 10ft. x 5ft. x 3ft. 3in. high, so placed that

it can be worked all round and not nailed on to one side of the wall. This facilitates the skirting of the fleece, as the parts to be taken off can be seen. Opposite the wool table four wool bins should be constructed 2ft. 6in. wide by 5ft. deep and at least 6ft. high. These may be constructed on a framework, using galvanized iron or washed super bags for partitions. Another bin, 5ft. x 5ft., may be constructed within easy throwing distance from the wool table to receive the skirtings, which can be looked through before baling. It is usual for farmers to use a skeleton or box press, which may easily be constructed by a handy man taking the size of the wool pack as a pattern.

Handling the Wool.—As about 25 per cent. of the wool grown in this State is made up of farmers' clips a serious move should be made in the direction of getting these clips up in a more attractive condition. Overseas buyers purchase wool on two main points, namely, quality and yield, and as freights to Europe are costly wools yielding less than 40 per cent. cannot be economically shipped. The meaning of "yield" is the amount of clean wool that can be obtained from a given quantity of greasy wool. For example, a wool of 46 per cent. yield would mean that from 100lbs. of this wool 54lbs. would be by-products and waste such as dirt, grease, &c. It can, therefore, be easily followed that overseas buyers cannot assess the yield of unclassified farmer's clips with sufficient accuracy to risk in buying, and in most cases they are bought at below their value by dealers who class them and resell them to a great advantage. It has been estimated that by not getting their wool up to better advantage farmers are losing from £1 to £1 5s. a bale.

Classing the Clip.—The average farmer imagines that this branch is far beyond him, whereas it is one of the simplest items of the wool harvest. There is no need to have a knowledge of spinning qualities, character, crimp, or elasticity as in big sheds; the farmer should separate the good, clean wool from the dirty and perished wool, and separate the heavy conditioned or yellow, gummy fleeces from the light, bright ones.

Skirting the Fleece.—The fleece should be thrown on to the table so that it spreads evenly with the shorn side down. All that is necessary in skirting is to remove the dirty portions around the breech, the hairy wool from the hook down, the black sweaty portions from the front and back flanks and, if seedy, the cheek pieces. This is done on both sides, remembering not to skirt deeply into the good wool as it is not necessary, and it robs the fleece wool.

Backing the Fleece.—In all Mallee areas, when sheep are run in connection with farming, the top or back of the sheep gathers and retains a certain amount of dirt which militates against the yolk, making the fibre fluffy, dry, parched looking, and in many cases tender. This wool must be separated from the bright portion of the fleece, and is taken out in the same manner as is used in skirting, being careful to remove all of the deteriorated wool. This leaves the two portions of good, bright, clean wool which, when tested with the fingers and thumb to see that it is not weak, is put in the bin to be used for the main or top line. Years ago it was thought that the fleece had to be kept intact, but under present-day conditions this is not necessary. If farmers called at their wool brokers and saw their wool that had been pressed backs and all they would not recognise it as the dirt has gone right through the wool, and it gives an appearance of a dingy, unattractive, low-yielding commodity.

The Backs can go with one lot which may also contain any tender fleece of the same type of wool. These should be branded "Backs."

Pieces.—The wool that is taken off in the process of skirting is picked over, and the dirty and stained portions separated from the cleaner and more attractive wool which can be placed in a bale by itself. The dirty portion should be dried in the sun if necessary, and mixed with the floor locks and baled separately. The

table locks will often contain a great deal of sand, and if so the present freight charges and price render them almost valueless, but can be spread in sheep yards to make a surface which is less dusty or boggy.

Bellies.—In small clips it is not necessary to make more than one line of belly wool, but all bellies should be skirted to remove dirty, draggy wool, and those from wethers and rams should be "pizzle rung," *i.e.*, taking the stained portion from the centre.

Classing the Fleeces.—The classing of the fleeces of the farmer's wool clip may be described as making the top line of the brightest, lightest, and most attractive wool and branding it for the sake of distinction AA. The second line will be made up of heavy-conditioned fleeces, which are usually shorter, and contain gummy yolk and have a yellow, unattractive, appearance, the short wool that could not go into the top line, and possibly the few other unattractive fleeces that are often found in farmers' clips. This line could be branded A.

Mixed Wools.—There will always be small amounts of wool which by themselves would not make a bale, and should form what is known as a mixed or composite bale, and a separating paper or bag placed between the different sorts.

Baling.—In the absence of a mechanical press an ordinary box press can be used, and is filled by tramping. Distorted and unattractive bales are to be avoided, and quite a good bale can be turned out by tramping, with a spade to assist in working down the sides and corners. An endeavor should be made to have the bales of fleece wool weighing about 300 pounds, and so apportion the wool that a "star" lot, *i.e.*, three bales and under, is avoided.

Branding.—The branding of the bale should be done neatly with ink, and not with paint or oily substance. A stencil plate should be used, which can be easily cut out of sheet tin or the sides of petrol tins, and once made will last for years. Freehand drawing with a paint brush usually makes a very unattractive job. The bale should be branded with the name or initials of the owner over the name of the farm, or the name of the farm is sufficient. The contents of the bale should be shown as AA or A or Pieces, &c., and it is not necessary to show it as Merino (usually shown as MO), as all wool is termed Merino unless marked otherwise. The number should then be placed on the bale. The relative positions of this branding are very essential, as certain places are to be used for buyer's brands. The bale is branded on the front and top, beginning with the farm name about the centre of the bale, the description of contents immediately below, and the number in a position about 8 in. from the side and bottom of the bale. Similar marking should be placed on the top of the bale or front flap. An excellent practice is to brand the bales immediately they come from the press, and enter in a book the number of the bale and contents.

Consigning Wool.—When consigning wool the broker should be advised stating the number of each bale, its brands, and contents, such as:—Bales numbered 1 to 7 contain the brightest and best wool; Nos. 8 to 12 the wool not considered suitable for the top line; Nos. 13 to 17 backs; No. 18 bellies; and No. 19 a mixed bale containing locks, stains, &c.; and Nos. 20 to 21 the best pieces. In this way the broker can handle the wool to full advantage, and bag lots or composite bales can be bulked with others farmers' bag lots, &c., and a line made which can be sold at better prices.

This article was written as a guide to farmers running sheep in connection with wheat. Many farmers are carried away with the price per pound obtained for wool, but should realise that the return per sheep is a greater guide. Briefly summing up, farmers should run sheep of the most suitable type; breed, feed, and cull with judgment, and exercise ordinary commonsense methods of placing the wool on the market in an attractive manner.

PAPERS READ AT CONFERENCES.

YORKE PENINSULA BRANCHES, PORT VICTORIA, MARCH 7th.

WOOL CLASSING.

[By R. O. CASTINE, Wauraltee.]

The present low price of farm produce makes farmers look about to find where they can save on cost of production, but for many years they have literally thrown money away through not making the most of what they have produced. When wool sales are in progress we hear that the farmers' clips—for the most part—are badly classed, and consequently, values are lower than would have been the case if care had been taken to match the wool before consigning it to the bale.

Wool classing means wool matching, and the art is to put similar fleeces together—that is, with the smallest amount of variation. Most farmers do their own classing, and a good many do not class at all. It is to these that I address this paper.

In the trade, wool is spoken of as 60s, 64s, 70s, 58s or whatever the case might be. This means that a 60's wool would spin 60 hanks of yarn each hank measuring 460 yards long, from 1lb. of scoured wool, free from noil.

The job in hand is to put the various counts into their correct classes, and to do this satisfactorily takes some practice. Wool is judged by crimp, length of staple, strength of staple, lightness, brightness, and boldness; in short, character.

Prepare for shearing in plenty of time. Clean out the shed thoroughly, as chaff and other foreign matter mixed with wool will always be looked at with disfavor by the wool buyer.

Have a good wool table, it can be made cheaply, and will greatly facilitate skirting fleeces. Make it sufficiently large so that the fleece spreads out well when it is thrown. Bins should also be provided to assist in matching the fleeces. Plenty of light and plenty of space is necessary to make the most of the work.

Procedure.—When the fleece is thrown on the table, skirt it lightly, taking care to take out only the sweaty edges, unless the fleece is very burry, then skirt deeper. Take care that fleece wool is not put into the pieces, or the pieces will not then be true pieces, but will consist of fleece and pieces. This may bring a fairly good price, but someone else will reap the benefit of having that fleece wool mixed in with the pieces.

Take out the back completely; the spindly back will show why this is necessary when in a bin alongside a bin of side wool. The side wool is the best, usually being shafty bright wool full of character, as compared with the wool from the back. Do not label the backs as such. Many buyers will not waste time in inspecting "backs," so, if a fine wool, simply brand it A, or, if a coarse wool, B. The side wools then may be branded AA if fine, or, if coarse, BB.

The top line of wool should carry the AA and comprise all the longest, lightest, brightest, and boldest fleeces of fine quality, free from breaks, and the BB consist of the longest, lightest, brightest, and boldest fleeces of coarse quality, free from breaks.

Make a cast line, or if the size of the flock warrants it, make more lines, but for general purposes, one cast line will carry fleeces with excessive yolk, tender, &c. Do not allow black wool to become mixed with the white, and always remember when classing that the buyer is out to see what mistakes have been made, and for every mistake the farmer makes he will base the price that he is prepared to offer accordingly.

If a wool-press is available, so much the better; if not, the old foot-press makes a fair job. Do not be frightened to tear the wool about, but make sure that each bale contains 250lbs. This is the recognised weight of a bale of wool, and anything over 300 is viewed with suspicion, and allowances are made for sand, &c.

Take notice of the brokers; they will keep you informed as to what the trade requires, and it is up to you to see that the trade gets what it requires. The brokers are out to make as much in commission as they possibly can, and it stands to reason that the more commission they obtain, the better the price is for the grower, so they will look after your interest, as it is surely their interest.

Brand bales neatly. Appearance means a lot, and the cost of a few stencil plates is comparatively trifling.

Summarised, I would advocate:—

1. Clean sheds, well drained, or gratings.
2. Plenty of light and wool-room.
3. A good wool table.
4. Skirt lightly; make one line of pieces.
5. Take out backs.
6. Brand fine side wools AA.
7. Brand coarse side wools BB.
8. Brand fine back wools A.
9. Brand coarse back wools B.
10. Make a cast lot and brand C.
11. Fasten bales securely.
12. Brand bales distinctly and use stencil plates.
13. Consign to some reputable wool-brokers, as their experts will give you some medium of protection on their valuation.

TRANSPORTATION OF SHEEP.

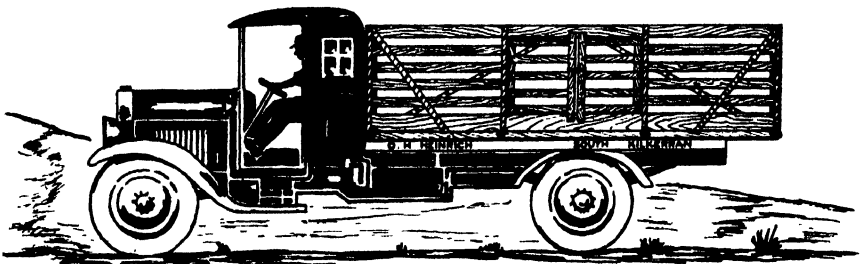
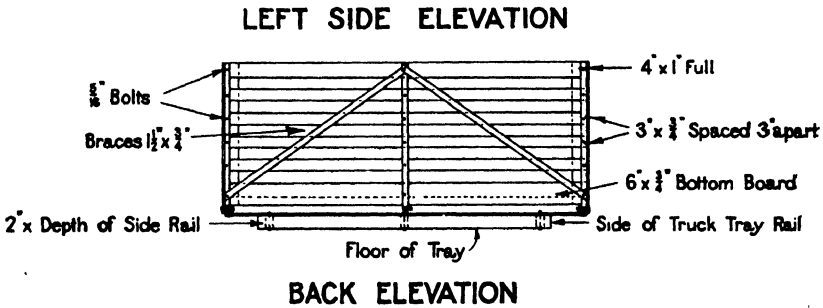
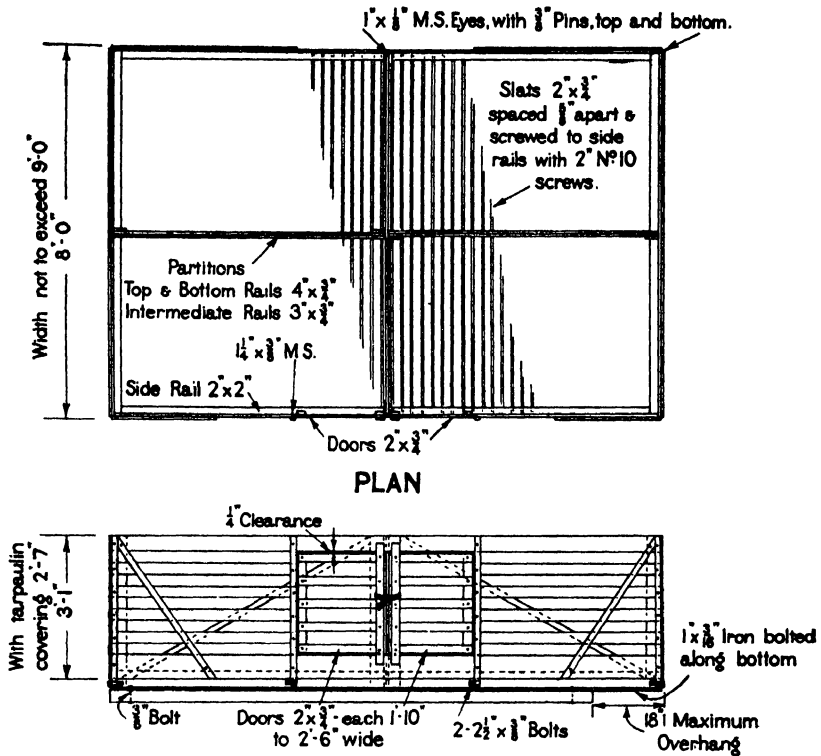
[By O. H. HEINRICH, South Kilkerran.]

Of the various means of transporting sheep, it is proposed to deal only with transport by motor truck.

The first to deal with, then, is the frame for the truck, and these again are divided into: (a) single floor frames; (b) double-deckers. The first thing to consider in any frame is the timber to use for its construction. All timber should be planed all round. Oregon is to be preferred to VDL—it is lighter, equally strong, and much nicer to work. Moreover, it will not twist like VDL and only costs 30s. to £2 more for a large frame, which is not a considerable amount when spread over the many years that a well-constructed frame will give service. If, however, it is going to be a rough frame, not painted, and left out in the open when not in use, it would be better to use VDL.

When making a single floor frame one looks for as large a space as possible. The width depends upon the size and type of truck to be used, but should not exceed 9ft., for over that one may meet with complications in reference to traffic. The length of the frame should not exceed double the distance from the rear axle line to the back of the cab.

The floor frame may be made of 3in. x 2in. on edge, and if the tray of the truck is flat it may be placed lengthways unless it is intended to extend the floor more than 15in. beyond the truck tray. Where side rails are fitted on the tray and it is not desired to extend the frame more than 18in. behind the back end of the truck tray, the floor slats may be mounted straight across and the floor frame need only consist of three timbers 2in. wide and the depth of the side rail on the tray. These timbers to run the full length of the tray and be evenly spaced. The slats for the floor should be 2in. x $\frac{1}{2}$ in., and when nailing on may be spaced with a matchbox on edge. It is a good plan to run the plane along the top edges to prevent the sheep hoofs from splintering the edges.



TRANSPORTATION OF SHEEP
SINGLE FLOOR FRAME FOR MOTOR TRUCK

The side rails should be of 2in. x 2in., and if the slats are mounted across the tray, they should be screwed to the side rails with 2in. No. 10 screws, and to finish properly a piece of 1in. x 3/16th in. iron should be bolted along the bottom. Bolt the complete frame to the lorry tray with two or four 3/4in. bolts.

Next it will be necessary to have eyes for the upright standards for the sides and ends. These can be simply and effectively made by taking a piece of 2in. x 1/2in. mild steel and curling one end, and fixing with two bolts 2 1/2in. x 3/4in. The upright standards to be made of 1 1/2in. x 5/16th in. or 3/4in. The end should be rounded down to about 3/4in. to fit through the eyes and left long enough to drill a small hole at the bottom for a piece of wire or cotter pin. A better job is to cut a thread and fit a 3/4in. nut. On a frame 10ft. long three uprights should be sufficient, but for longer frames four are necessary, 9ft. wide front and back need three, for less than 7ft. two are sufficient.

The bottom board for the side hurdles is made of at least 6in. x 3/4in., to keep the sheep from putting their legs through the frame. The top board should be full 1in. x 4in. The four remaining boards should be 3in. x 3/4in., spaced with approximately 3in. between. These should be bolted to the uprights with 5/16th in. bolts. This will give a total frame height of 37in. If one is prepared to use a tarpaulin over the top, one of the centre boards can be eliminated, and thus bring the height down to 31in.

DIVISIONS AND DOORS.

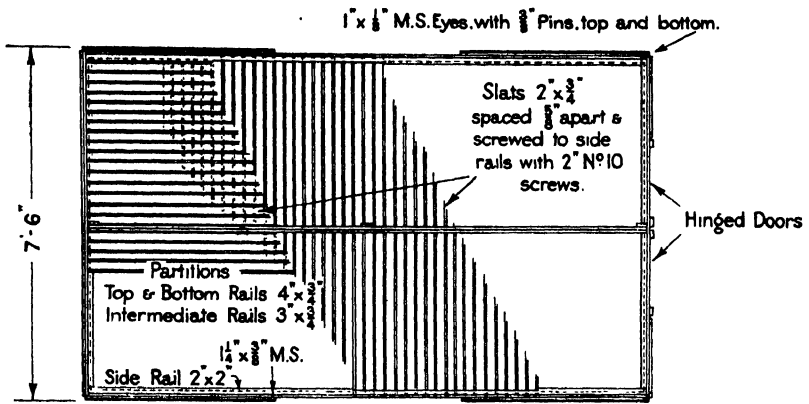
The yard should be divided across the middle first of all, and then each of the two yards should be divided lengthways, making four yards in all. These divisions may be made of 4in. x 3/4in. for the top and bottom rails and 3in. x 3/4in. between. All these divisions should be securely strutted, as should also be the sides and end hurdles. The divisions are held in place by fixing plain eyes of 1in. x 3/4in. mild steel top and bottom, and held together by a 3/4in. pin. The corners are held the same way, only the bottom eye should be fixed just under half-way up in the corners.

The most suitable place to fit the doors is the centre of the left side. This allows one to drive straight in beside the unloading ramp at the Abattoirs. They can be constructed between the two centre standards, and each door should have an opening of not less than 1ft. 10ins. and not more than 2ft. 6ins. When loading, the pins from the centre division and the front and back division are pulled out, allowing the front and back divisions to be swung over to the gates. The right side yards are then loaded first, the divisions closed, and then the left yard may be filled.

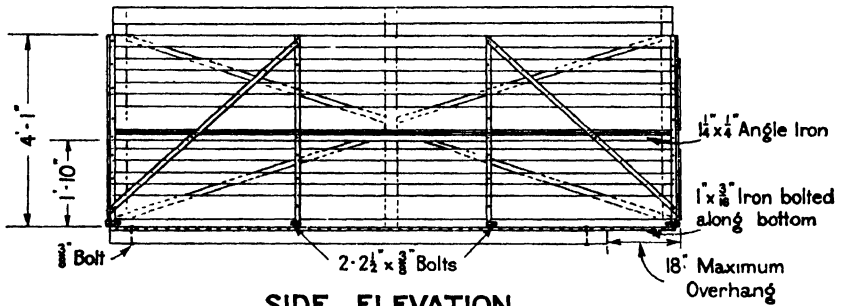
The most effective and least obstructive door is the sliding type. It is simple to construct, cannot fall off, and may be opened anywhere beside the ramp. The middle boards only are cut out of the side hurdle, the top and bottom boards remaining. The upright, inside and out on that end of the gate which meets the other gate, is left extending over and below the two remaining boards in the side hurdle, which then acts as a guide for the doors. Make the doors of 2in. x 3/4in.; do not fit them tight. One strap around the middle will keep the two doors closed. The bottom rail of the door should rest on the bottom rail of the hurdle and the top one should be 3in. below the top rail, and the others evenly spaced between the boards of the side hurdles.

When making a double-decker, the main floor should be 7ft. 6in. wide and again should not be longer than twice the distance from the rear axle line to the rear of cab. If possible, it is preferable to put the slats across the tray, more particularly on a double-decker, as height is one of the chief considerations, and slats across give the lowest loading position.

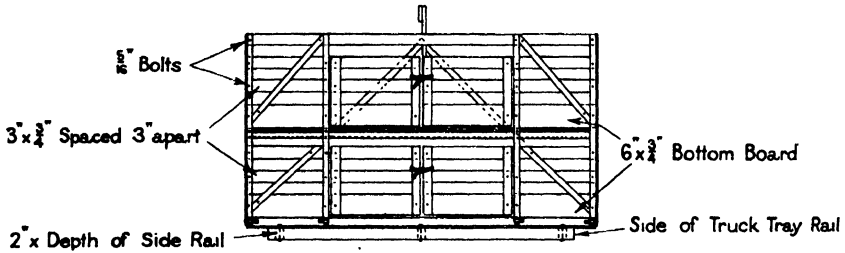
The lower deck should have a total height clearance of 22in. With the aforementioned width, viz., 7ft. 6in., and the yard divided lengthways, will give each inside yard an inside width of 3ft. 7in. That is the correct width for three grown sheep or four lambs, if it is desirable to tie them down. The 22in. height gives ample head clearance for a sheep sitting down, and even if they are not tied down, immediately they find they cannot stand, they will go down in their natural position.



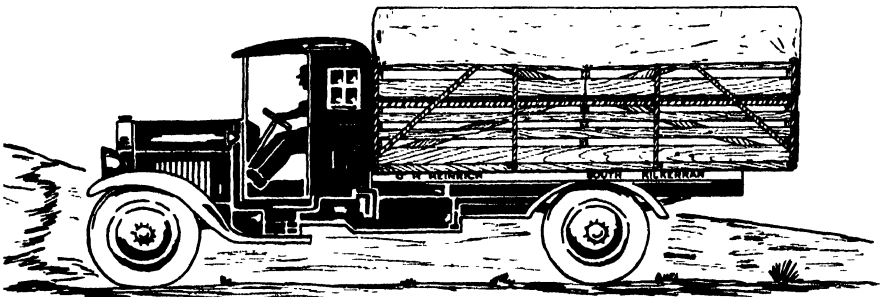
PLAN



SIDE ELEVATION



BACK ELEVATION



TRANSPORTATION OF SHEEP DOUBLE DECKER FRAME FOR MOTOR TRUCK

For the sides, the bottom board should again be 6in. x $\frac{1}{2}$ in., placed on top of the side rail, which is 2in. x 2in. Two more boards—3in. x $\frac{1}{2}$ in. given 3in. space—completes the side for the lower deck, leaving 2in. opening under bottom of second floor.

The rests for the second floor are made of angle iron $1\frac{1}{2}$ in. x $\frac{1}{2}$ in. running along each side hurdle and on each side of the middle hurdle. These angles should be securely bolted to the side-members with $\frac{1}{2}$ in. bolts, the top of angle being 22in. from the top of the lower floor.

The cross pieces for the top floor should be 2in. x 2in., and the slats placed lengthways. Each side floor should be made in two parts to facilitate fixing and removing for back loading, &c. After the floor is constructed, 24-gauge galvanized iron should be fixed from the top of inside slat down around the bottom to outside edge of cross piece. This iron should also be brought up to the top of slats in front of each section of floor, so that the urine will drain to the sides and not run forward with the natural tilt of the lorry and be blown back over the sheep.

To continue the timbering of the sides, the first board on the level of the second floor should be a 6in. board, with three more 3in. x $\frac{1}{2}$ in. spaced 3in. apart. This gives a total clearance on the second floor of 24in. This extra 2in. allows for the use of a tarpaulin cover, which is necessary to prevent the sheep jumping out. It is preferable to make a removable piece on the centre division to hold the tarpaulin up in the centre for better draining of water and better ventilation for the stock on top.

Gates.—In a double-decker of this sort, it is more difficult to fit gates in the side, but if a trailer is to be used, this will help considerably when loading and unloading. For solo work, however, the most suitable place is in the back of frame.

Whilst assembling the frame, have a tin of paint handy and put a little paint between all joints. In commercial practice of to-day that sort of thing is not done, one reason probably being that prices are cut to the bone; nevertheless, it was an old trade practice and one well worth while. After the frame is completed, it should receive at least two coats of first-quality paint in some suitable color, such as red or dark green.

In a frame of this sort a maximum loading space is obtained without excessive width or height, and a full load can be carried without side sway. The total height only amounts to 4ft. 1in.

The tying-down method of transport was evolved by Sir Edward Mitchell, of Victoria, and particulars of it appeared in the *Stock and Station Journal* some years ago. Briefly, it is done as follows:—The yard must be from 3ft. 6in. to 3ft. 9in. wide. Across the front is laid a bolster of some kind. I used a round bag filled with chaff about 1ft. to 15in. in diameter. Three sheep are then put down side by side, with their chests against the bolster. The legs are put under the sheep—as a sheep lying in the field. A canvas strap 18in. wide, with a leather strap in each corner, is then fastened to the hurdle on each side and stretched across the sheep's back. The sheep rises back end first. When it discovers that it cannot get its back up it will sit down again. The next three are then put down with their chests up against the rumps of the front sheep. In a frame 12ft. 6in. long one can get five lots of three medium-sized sheep. When loading lambs, four are placed across, so that, roughly speaking, a double-decker 7ft. 6in. x 12ft. 6in. will give a carrying capacity of from 48 large-framed fat wethers to 80 sucker lambs. A frame measuring 7ft. x 10ft. on a 1-ton truck will carry 36 large sheep to 46 sucker lambs.

The one serious objection to this method is the time taken to load. It takes two men on the lorry with one other loading, at least an hour to load 60 sheep. However, they carry exceedingly well, and give no bother on the road. I have personally taken lambs to the freezers this way, and I have never had more than one reject in a load; that is, from load bruises, and not counting hand grips in the wool.

As time went on we discontinued tying down. We merely load the lambs in the frame, and when they find they cannot stand comfortably, they sit of their own accord.

One has to sacrifice some of his load this way, so that instead of carrying approximately 80 lambs, one may have to reduce to about 65. I have now both a single-floor and a double-decker in use, and I am quite convinced that the low clearance double-decker is the better, and also the more humane method of transport.

LOADING.

When loading sheep, and lambs in particular, handle them carefully. Dogs that bite should be chained up or muzzled whilst yarding sheep for loading, and the sheep should be taken very quietly to prevent them rushing about the yards, where they might also bruise. There is, however, a phase in the loading process which few people seem to bother about—how to raise the sheep and lambs to the necessary height. On some farms, one finds well-constructed ramps, or a raised yard, say, 3ft. 6in. to 4ft. high, with a sloping yard up to it. Such a yard should be approximately 10ft. x 10ft., and the sloping yard should be the same width, as it may have a rise of about 1 in 3½. Cement concrete is the best method of construction. Another point of importance about the elevated yard is the exit gate. This should be placed in such a position that the lorry has a clear drive past. The gate itself should be made to slide sideways, or drop between two guides, and be suspended by a rope over a pulley, with counterweights to balance.

Such a method of loading will immediately commend itself. Unfortunately it is not practical for the small lamb raiser, because it is rather expensive, and for the larger breeder it is not portable. Then, from the point of view of the driver of the lorry, the question of loading becomes very important, and also a very vexed one. We have tried making light loading races, varying from 8ft. to 16ft. in length, but so far have met with no success, as the sheep try to jump over the side or baulk, and then the handling necessary is worse than lifting straight up. In a double-decker the height to the second floor is considerable. Another method tried was to put a platform across the corner of the yard on top of the fence, and then put the sheep up there, and from there to the lorry. Then, again, some yards have not got a fence substantial enough to carry such a platform, and which in itself is not a very convenient thing to carry.

An elevator made to load sheep similar to one used for loading wheat seems somewhat far fetched; but if it could be worked it is what we are looking for. So far we have come to a deadlock in this business, and still have to revert to the old style of handing up.

There, again, various methods may be adopted, but the way we usually load where no elevated yard is available is for one to catch the sheep, and two others join hands and lift under the brisket, while taking hold of the back legs below the hock, with the free hand, and the one who caught the sheep assists with open hands at the back. The sheep is then raised, and its front legs put on the floor and then gently pushed forward until its hind feet can be put on the floor as well. There is always the danger that if the sheep struggles violently it will drag its back legs over the edge and bruise from the stifle joint down.

DRIVING.

A bad driver can do nearly as much damage to lambs as those who load them. Always attempt to keep the lorry on an even road, and not drive on the camber of the road; this tends to throw the sheep over one side. It is also well to drive as straight as possible; swerving also tends to throw sheep from one side to the other. This applies more particularly when sheep are standing. Quick starts and sudden stops are also bad. The lorry should be driven at a speed in accordance with the road conditions. On a good bitumen road a careful driver might easily drive 40 miles per hour and give his sheep a good ride; and on the other hand, a 10 miles per hour speed may be much too fast on other roads, particularly where one has to drive in deep wheel tracks or a deep track cut in sand where there is a good deal of side

sway. It is under these conditions that large single-floor or high double-deckers are difficult to handle, and knock the sheep about much more than a low clearance double-decker does.

Drive with consideration for other people on the road. Remember you have a big vehicle on the road, perhaps not quite as bad as a trolley load of hay, but much faster. So far the traffic laws have not interfered with drivers with sheep frames, and I am inclined to think that while drivers exercise every care, and do not make themselves a nuisance, no action will be taken. If, on the other hand, they do make a menace of the vehicles under their control, something that we will not like may be done, and the innocent will have to suffer along with the guilty. Anything that can be done to truck sheep, and more particularly lambs, speedily and with less damage, will go a long way to solve the very vexed question of reject carcasses caused through transport.

BULK HANDLING OF WHEAT.

[By M. D. WRIGHT, Boors' Plains.]

It is not easy to estimate how long it will take the wheat industry of Australia to recover from the harassing period of depression and world's low prices which it has encountered in the past two seasons. Periodically, hopes of obtaining increased prices for cereals are raised by rumors of a bounty or some form of Government assistance. Recently, it was hoped that some agreement would be arrived at in connection with the limitation of exports at the World's Economic Conference in London. It was felt that wheatgrowers were entitled to some arrangement whereby the prices of wheat could be increased, but unfortunately that matter is still unsettled.

If previous periods of depression can be taken as a guide, wheatgrowers may be confronted by the prospects of slowly improving prices for their wheat, once the accumulated world's stocks are reduced. The position depends mainly on the extent of the Northern Hemisphere crops this year. So far, both the United States and Canada show a material decrease compared with last year. For Australia to discontinue growing wheat—particularly in surest districts—would be a calamity, mainly because wheatgrowing in Australia has proved its national worth. In other periods of commercial and financial depression, it has been one of the nerve centres, from which financial experts have extracted a ray of hope in solving the problems that confronted them. South Australian wheatgrowers have shown the way in the past for making wheatgrowing profitable, by adopting proper fallowing and advanced cultivation methods. The acknowledged fact that the average yield has greatly improved, proves beyond doubt the great national value of advanced methods. In certain parts of New South Wales it is an acknowledged fact that South Australian farmers introduced farming methods which were responsible for those centres producing the large quantity and high acreage average that they are doing to-day. Farmers realise more than ever to-day the necessity for reducing the cost of production; every farmer in some way has endeavored to reduce his costs; in some cases large amounts have been saved, in others the difference is barely noticeable, but in the majority of cases the trend has been to reduce costs of production. Therefore, farmers are endeavoring to produce their products at the lowest possible cost. On the other hand, the value of products is lessened because of handling charges, rail, transport, and shipping costs; therefore, it is equally essential that these charges should be reduced to meet the low prices offering for wheat and to give an opportunity of making a living—if not a small profit—from our holdings. In bulk handling there are possibilities whereby these outside costs may be eventually reduced to a minimum.

All those who have interested themselves in this subject are aware that the S.A. Farmers' Co-operative Union and the S.A. Co-operative Wheat Pools Limited have carefully investigated every phase of bulk handling in Canada and Australia, as well as methods of handling wheat in countries where Australian wheat is exported. The Canadian system can be ruled out, climatic conditions being totally different in Canada

and Australia. Australian wheat is sold under one grade, Canadian is sold under many grades, and care has to be taken on account of the greater danger of wheat heating in Canada.

BULK HANDLING IN NEW SOUTH WALES.

The system adopted in New South Wales at its inception was largely on the lines of that of Canada, more particularly with regard to the construction of silos, which were far too costly, and meant high capital cost, on which interest had to be paid as well as some amount allowed for depreciation. Latterly, however, the management of the New South Wales silos has arranged a country silo which can be erected for about £7,000 fully equipped; 14 units holding 90,000bush. is its capacity. In South Australia there are 300 receiving stations where 90,000bush. or more are delivered. If provision is to be made for receiving two-thirds of the wheat, the capital cost would be too great; therefore, some less expensive method of storage is desirable. In this connection, the Westralian Farmers' Co-operative Company has been successfully experimenting during the past two years with bulk sheds similar to the present wheat sheds at railway stations in South Australia. A damp-proof floor is provided, the walls of the shed are of double corrugated galvanized iron, curved to add additional strength, with sufficient strong upright wooden posts to keep the iron in position. The walls of this container are 10ft., and a further 4ft. or 5ft. single iron high, and are well stayed to prevent the sides or ends being forced out, the structure being roofed in the ordinary way.

The method of placing wheat into these sheds is by a portable elevator bucket or slat type, on which is provided a bin, into which the wheat is tipped by the farmer. The wheat is elevated to the height of 30ft., from whence it will gravitate to the position in the shed required or into railway trucks, if so desired.

The method of emptying the shed is by the same elevator, provision having been made in the walls of the shed for the wheat to run out in the bin of the elevator; when it ceases to run out the elevator can be put inside the shed and moved up to the wheat required, a Clark shovel being used to assist in filling the elevator.

The Westralian Farmers Limited system is efficient, and may be described as a collective storage of wheat at country railway sidings, with facilities for quick movement to shipping points. This State has certain disabilities in that it has six main shipping points—three with long jetties; but, on the other hand, its railway system will permit the expeditious despatch of grain from the country to seaboard.

The great advantage of the portable elevator is that it can be moved up to the wheat when loading railway trucks from the shed; the power is supplied to these 30ft. elevators by 4½ h.p. engines; crude oil would appear the most economical fuel. One man only is required to attend the elevators when receiving wheat from the farmer; the capacity of the elevator is 1 ton or 37bush. per minute, 700 bags per hour; cost of elevator £300. No wheat lumpers are required for putting wheat into stack as at present.

Quite a large number of the present railway trucks are quite suitable for conveying wheat in bulk. A ridge pole along the centre of the truck so that the wheat could be covered in case of rain is all that is required. Railway trucks will carry as much bulk wheat as bagged. Very little storage capacity will be required at sea ports, the idea being to load wheat direct from truck into overseas vessels and eliminate double handling as far as possible.

As regards loading from trucks into ships: at present the Stevedoring Company finds all plant required, and is agreeable to provide plant to load from truck to ship at no additional cost. One thousand tons of bulk wheat must be loaded per day, whereas only 500 tons of bagged are required. Overseas freight is 2s. 6d. per ton less on bulk wheat than bagged; the price obtained for bagged wheat a few years ago was about 1½d. per bushel better, but to-day the difference in freight more than pays the difference in price received.

When comparing the respective cost per bushel for handling wheat under the present bag system, and under the proposed bulk system, the following items must be carefully considered:—

(1) Cost of bags; (2) handling charges at country stations; (3) rent of sites, provision for dunnage and roofing material at country stations; (4) rail charges; (5) seaboard charges, including stevedoring charges; (6) despatch money; (7) ocean freight; (8) value of bagged and bulk wheat; (9) sundry other handling charges, including administrative charges.

Throughout these considerations, conservative figures are taken of the bulk benefits in contrast to those of bagged benefits. After a close analysis of these factors it is seen that the bulk system shows an advantage of 2½d. per bushel, made up as follows:—

Estimated savings under bulk handling:—

Cost of bags at 9s. per dozen	d.	3
Country agent's commission	1½	
Dunnage, roofing, curtaining, re-conditioning, loss by mice, weather, etc., rent and depreciation of sheds	½	
Seaboard charges	¼	
Ocean freight	¼	
Slinging and superintending discharge	¼	
Sewing bags and twine	½	
	—	6½
Deduct—		
Value of bags sold as wheat	½	
Bags required to deliver wheat (¼ usual number for two years) . .	¼	
Difference in value bagged and bulk wheat	¼	
Buying agent's commission	¼	
Operating costs	¼	
Sinking fund to cover interest and capital depreciation, 10 per cent.	1½	
	—	3½
Net saving		2½d.

MODES OF DELIVERING WHEAT.

From inquiries made it is found that in Western Australia three methods are commonly used. A farmer with a motor truck stands the bags upright on same, leaning them together and against the cabin without sewing them up. Others have a bin on their waggon or trolley and load the wheat with the ordinary Perkins loader, having fitted plain galvanised iron where the bag is placed, the horse pulls the bag up in the usual way, and the bag empties itself into the bin. Other farmers fix the top of their bags with two wire skewers which can be easily removed prior to tipping. The best proof of the popularity of the bulk system compared with bagged is that farmers do not mind carting their wheat an additional 10 or 15 miles to avail themselves of the bulk methods.

One important factor in connection with bulk handling is the saving of time. All are aware of the time it takes to sew a waggon or lorry load of wheat. Compare, then, this method with that of the bulk system, where a boy can fasten a load up in an hour with skewers made from fencing wire. Under this system that laborious and weary job of ramming, dumping, and sewing of bags can be done away with. The saving of time again plays its part when the wheat is delivered. A statement in support of this assertion comes from Benjabbering, Western Australia. There was no long waiting at the siding as with bagged wheat. The waggon was weighed in, unloaded, and weighed out. In 15 minutes the job was finished. Though nearly twice as much wheat was handled at Benjabbering last harvest than ever before, no team was held up. Another report in reference to the saving of time comes from a farmer who has had some experience with bulk handling methods and who states that he delivered 12,400bush. in the season 1931-32 with a 4-ton tabletop trolley with a bin built on it capable of holding 140bush. The time taken to unload the 140bush. was seven to eight minutes. He further states that he is considerably over £100 in pocket, and

claims that bulk handling is the only genuine effort that has been made to decrease the cost of production, and so keep the farmer on the land. Not only does the farmer save time with this system, but the merchant does also. Bulked wheat is easier to truck and easier to load on ships. Five hundred tons of bagged wheat are required a day, whereas 1,000 tons of bulk are required. In May last a vessel commenced loading bulk wheat at White Bay—the New South Wales terminal—at 8 a.m. At 10 p.m. it was completely loaded with 7,500 tons, or 535 tons an hour. The same vessel when loaded with bagged wheat at Port Lincoln on a previous trip required 16 days. As pointed out earlier, wharfage charges, harbor dues, and stevedoring fees are all deducted from the price before it is quoted to the farmer. Therefore, the New South Wales seller was 15 days' worth of charges better off than Port Lincoln farmers who still labor under bagged wheat methods. Strong support for bulk handling of wheat was expressed by Mr. H. W. Lyons, M.P., during his speech on the Address-in-Reply in the Assembly. He stated that "there is no doubt that bulk handling would be beneficial to the primary producers of South Australia." Mr. Lyons, before making this statement, had gone into the matter of bulk handling with the Director of Agriculture in Western Australia (Mr. G. L. Sutton). In his address to the Assembly he pointed out the advantages to be gained by the farmer under this system, the saving of time and expense in shipping, and the lower freight rates.

There is one point to bear in mind, and one that Mr. Lyons pointed out in his speech, and that is:—"Almost all ports in Britain and on the Continent are equipped to deal with wheat in bulk. This proposed system of dealing with our wheat is not a new idea; it is one that has a solid foundation in many parts, one that has been proved to be efficient and a success. Certain firms in the other States, and also one in South Australia, have made trial shipments of bulk handling by having the bags cut open after delivery on the vessels, with the result that even after handling, &c., a profit was made. Firms do not take those steps unless a profit is to be made. It must be profitable for them to ship in bulk, otherwise they would not do it. If we instal this system we shall keep within our own country the enormous sums sent away every year for cornsacks."

The average quality of our wheat will be improved by adopting this system of handling; the improvement of our quality is necessary if we wish to maintain our overseas markets.

Bulk handling holds unlimited possibilities for us as wheat-growers. We are passing through a period of low prices and depression, and the future holds no ray of light for an improvement. Therefore, it behoves us to grasp at every opportunity that presents itself to lower costs of production. In bulk handling there are possibilities of reducing costs that will never present themselves under the present system. As farmers, as a community, as a State, we should view this proposed system with unbiased minds. The financial stability of the country depends largely on the primary producers. As individuals we have a responsibility to our State, and in a question such as this our thoughts should be national and unbiased, so that a fair and honest decision may be arrived at.

PIGFEEDING.

[By A. F. ROBERTSON, Wauralte.]

The main object sought in the feeding of pigs is to produce a suitable carcass (if for market requirements) in as short a time as possible with a minimum of food cost. There are several factors which contribute to this end that must be taken into account. These are:—(a) The type of pig required for present-day market requirements; and, (b) the best type suited for breeding purposes.

The class of pig best suited to our market is one that does not carry an undue proportion of fat to lean; the overfat pig is undesirable and difficult to sell profitably. Then, again, the undeveloped animal is also unprofitable. It should, therefore, be

the aim of the pigraiser to produce a line that makes a ready sale and a quick turnover in as short time as is possible, consistent with trade requirements. In order to obtain the desired results he must feed correctly and with the understanding, right from the beginning, that it is not profitable to stunt the young pigs if good baconers are required later on, say, when the pigs are from 5½ to 6 months of age.

As with all growing animals, the pig requires certain constituents in its food to maintain its daily needs to develop flesh and bone, &c. Experiments have shown that the pig requires a definite proportion of protein to make good growth and lean meat, and this protein may be obtained from many sources. Farmers who have plenty of separated milk only need cereals, such as barley meal, middlings, or pollard, to obtain best results. Where a limited supply of separated milk is to be had, the young pigs should have the preference. The man with any large number of pigs will find it will pay him to mix his own meal. The best method of efficiency and management is the number of pounds of meal to feed to 1lb. of live weight in the pig. In order to obtain this result it is necessary to work on the basis of about 4lbs. of meal to give 1lb. increase. Good feeders know that this could be obtained and even bettered. The balanced ration will give a better grade carcass with less fat.

Scientific feeding carried out systematically will pay—unless market prices are very low. The man who feeds systematically will always produce a better quality animal than the man who feeds haphazardly. The better way may not always be the cheaper, and the amount of profit shown will depend upon market rates. Feeding a balanced ration is an all-important matter in order to produce the very best type of animal.

It is difficult to find a suitable situation of really ideal conditions, as it is always necessary to supplement pasture grazing with some method of hand feeding. In all the agricultural areas of this State there is always to be had an ample supply of cereals, which are the staple food of the pig. Cereals are not sufficient by themselves, whether fed whole, crushed, or cooked, as they are lacking in certain minerals. It is, therefore, necessary that the proportion of mineral needed should be added.

It should always be borne in mind that the young weaned pig will require much more protein than that of bacon weight, which means that at suitable periods during the animal's development—say, about every six weeks—a variation of the mixture is necessary, gradually reducing the protein and mineral mixture to suit the requirements of the pig.

As there is nearly always a certain amount of inferior quality grain on many farms, the feeding of this to pigs and farm stock in general may possibly be turned to profitable account, although best results are obtained from best quality grain.

SHEEP VERSUS WHEAT ON OUR POORER COUNTRY.

[By M. NEWBOLD, Wauralteë.]

My intention with this paper is to bring under your notice for consideration whether it would not be better to increase our sheep flocks and grow less wheat where we are now growing wheat on a considerable amount of our poorer limestone country near the coast and within two and three miles of it on the western side of Yorke Peninsula more particularly. My remarks are not intended to apply to our better class country.

There is very little, if anything, but hard work in wheat growing at present, even where yields are up around the 20bush. to 25bush. per acre mark, and consequently much less so where the yield is round about 10bush. to 12bush. per acre. A rather remarkable thing about this poorer country is that with an occasional dressing of superphosphate when cropped it grows wonderful feed.

I have taken as a basis of calculation 500 acres of country, of which 300 acres are cropped each year, 200 acres of wheat on fallow and 100 acres of barley on stubble. The following are the main items in connection with both sides.

GRAIN.

	£	s.	d.
200 acres wheat at 12bush. = 2,400bush at 2s. bush.	240	0	0
100 acres barley at 15bush. = 1,500bush. at 1s. 9d. bush.	131	5	0
Gross income	£371	5	0

EXPENSES.

	£	s.	d.
280bush. seed wheat at 2s.	28	0	0
120bush. seed barley at 1s. 9d.	10	0	0
12 tons super at £5 7s. per ton	64	4	0
200 acres fallow at 2s. 6d. acre	25	0	0
100 acres stubble at 1s. acre	5	0	0
Harvesting 300 acres at 1s. acre	15	0	0
108 doz. cornsacks at 7s. 6d. dozen	40	12	6
Additional labor, 12 weeks at £2 week	24	0	0
Repairs to plant and sundry expenses	10	0	0
	221	16	6
Net income	£149	8	6

SHEEP.

500 acres would carry 250 sheep.

	£	s.	d.
250 ewes cut 10lbs. wool each = 2,500lbs. at 1s. lb.	125	0	0
Breed 100 lambs at 8s. per head	40	0	0
Sell 75 sheep at 8s. per head	30	0	0
Gross income	£195	0	0

EXPENSES.

	£	s.	d.
Shearing 275 sheep at 33s. 4d. per 100	4	11	8
8 wool packs at 5s. 6d.	2	4	0
	6	15	8
Net income	£188	4	4

Carting of produce to market has not been reckoned in, but this would also result in favor of the sheep. On paper the sheep look to be the thing at the present time, taking wool at 1s. lb., which is a fair price. Even with wool at a lower figure it looks as though sheep are the better proposition.

If a man has no sheep and has to buy, it would be wisest, at present, to buy a few good quality young ewes and gradually breed up a flock. With the man who has a fair flock of sheep it would not be a very hard matter to increase his flock to cope with the situation.

SOUTH-EASTERN CONFERENCE, WOLSELEY, MARCH 21st, 1934.

SOMETHING ABOUT MALTING BARLEY.

[By H. BOND, Tatiara.]

After a farmer has sown enough oats to meet his requirements, and as much wheat as he can afford to, it is a fair investment to put in a patch of malting barley. Barley has not been widely grown in this district, but at the present time it is as good a proposition as anything else.

“Malting” is very closely associated with the word melting, and in this case means soaking barley in water until it grows, when the starch in the grain becomes softened and later is converted into a sugary matter. Malt is the broad term covering this product, which is principally used in beer, whisky, yeast, vinegar, gin, malt extract, and several compounds used in baking.

Barley can be most economically grown on the loam and the light and sandy soils of this district. The rich, heavy land will also grow it well, but there is more risk in getting it away to a good start. Barley does well on wheat stubble—a deficiency of nitrogen in the land for wheat being an asset to barley.

The best time to commence seeding is from the middle of June to the end of July. Sowing may also be continued during August, but the chances of getting malting quality are lessened, although the farmer may reap many bags per acre.

It is very difficult to distinguish the different qualities in malting barley. Mr. A. G. Barrett, of Barrett Bros., maltsters, says:—"It is only after long experience that a maltster can select his lines; that it is impossible to explain how one recognises type; and no chemical formula has yet been devised which will replace visual judgment." With that in mind, it is hardly worth while for a farmer to become an authority on the various grades of barley, although there are a few principles he can follow which may help him evade loss. It is unwise to thresh barley too thoroughly; it is better to leave some beards on than to knock them all off. Hard threshing results in broken jackets, and the barley either rots or moulds during malting, thereby spoiling the product. More than 5 per cent. of damaged grain will disqualify a good line, and this means up to 6d. a bushel loss to the grower.

Barley in this district is at its best when used as a utility crop. It is at least six or seven weeks shorter-lived than wheat or oats. It is not advisable to sow barley too thickly. There is plenty of grain in 40lbs. of good seed to grow a 30bush. crop. Many experts believe that few crops over 25bush. to the acre produce the best grain.

So far I have always believed that Prior barley was the best for local conditions, but last season I sowed a bag of Californian Cape Malting. It has a six-row head and is the type with which the United States captured the British trade. Four acres reaped 50 bags. Samples were sent to several maltsters, who informed their agents that it was high-class malting, and to buy all they could of it. This barley was grown on very light land, and will, when sown on the good loam of the district, produce excellent yields. The present Prior is good and reliable and farmers should not pay extravagant prices for any new varieties.

Pickle with a bluestone solution a couple of months before sowing. Apply as much superphosphate as finances will permit—anything up to a bag to the acre—particularly if on light land. And, last but not least, have the ground clean when the barley is sown.

HOW I FALLOW.

[By G. D. BUTLER, Wolseley.]

This paper embodies the results of observations, investigations, and experiments of recent years, which have led me to adopt the system hereinafter outlined. Those parts of the Wimmera that have clayey soils are blessed with a milder winter, and farmers do not run so many sheep. In other countries clay soils are universally condemned as hardly fit for farming, and commended only for grazing. Indeed, were it not for the long, dry summer, which aerates and divides the soil by cracking, successful farming under any system would be a very doubtful undertaking.

I fallow two paddocks: No. 1 on wheat stubble; No. 2 has been under grass for two, three, or four years. Paddock No. 1: The burning of this stubble is left as late as possible. Should good March or April rains fall, these ensure a growth of self-sown wheat and weeds. The fire kills these off, thus saving a cultivation. This paddock is not touched until about the middle or end of May. When the ground is too wet to sow wheat or oats, the land is worked with a scarifier lin. to 1½ in. deep. This job is completed by June 21st; if left later the ground becomes too tough to be scarified. All dates are given as a general guide; in practice, the condition of the ground and the weather is taken into consideration, and not the calendar. The job

is intermittent, for until all seeding is finished, it is only carried on with when seeding is impossible or inadvisable. In all my paddocks there is a small area of wet and/or shallow soil, which does not respond well to the scarifier. This area, together with any of the better land which was not scarified early enough, is left for a few weeks and then ploughed as shallow as possible. The object in waiting is to permit a growth of grass, the roots of which bind a sod that the plough can turn over.

The ploughed part is harrowed twice as circumstances permit, but the other is left until the middle of August. Weeds are kept down with sheep, but the sheep are not allowed to pug the soil. Between August 21st and September 7th I again scarify the scarified fallow, going just a little deeper. It is particularly important to get this second working done at this time.

The whole paddock is subsequently worked, as rainfall and other circumstances permit, with the scarifier until Christmas, with the combine afterwards.

Thistles, &c., are kept down by sheep, knife-bar, and hand-hoe. The sheep have access to the fallow all through summer and they walk over it every day. They find next to nothing to eat, but their walking about fills in the cracks and is as good as a working.

As soon as the first paddock is finished, No. 2 is worked, using a skeleton mould-board plough fitted with L.P.W. shares, ploughing about 2in. deep. At this depth the ordinary P. or L.P. share will neither completely cut nor invert the 8in. to 8½in. furrow slice, but the extra width of the L.P.W. does the trick. This combination is not the best that can be achieved. A set plough, cutting narrower furrows, say, 6in., and with a correspondingly shorter lead, may eventually be found more suitable for our soils.

Except for small areas of very dirty, black ground I have discarded the practice of summer fallowing, because the early winter is usually too wet to give it the necessary working; the few fine days in June are needed to finish off seeding. I endeavor

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to finish paddock No. 2 by the end of July; early August is often the best time for harrowing. I harrow at least twice, as and when I can. The first harrowing, if done at right angles to the ploughing, turns back too much of the unrotted furrow slice; harrowing with the ploughing has too little effect. Harrowing at an angle of 25 to 30 degrees from the direction of ploughing gives a maximum of break with a minimum of undesirable turnover. The second harrowing is done at right angles to the first. The direction of the third stroke—if done—depends on circumstances prevailing at the time. I use medium weight harrows, weighted when necessary with an old post.

One of the advantages of shallow ploughing is that harrowing can be done effectively much earlier in the season than with deeper ploughing, thus getting a fairly fine division of the surface soil while the underlayers are still wet enough to be consolidated by the tramping of the horses. This finer division encourages germination of weed seeds and weeds are easier to kill in September and October than they are in May and June. This fallow is usually scarified about 1½ in. deep as soon as possible after finishing the second working of No. 1. The repeated harrowing and late rains set the fallow too tight for it to be turned up by any implement other than the scarifier, and because it will shear through the unbroken furrow slice that a combine would simply turn over or jump over. In some years it is advisable to use the combine first, but on those occasions it was necessary to scarify it a month later. From now on this paddock receives the same treatment as No. 1, and is worked as circumstances permit.

No one reading the foregoing can help noticing the importance of the scarifier. Up-to-date and payable farming is impossible on unlevelled ground, and it is most essential to rid the land of stumps to a depth of 4 in. to 5 in. Only set harrows are of any use, and they are only useful when the tines are sharp and straight; a few stumps will soon reduce the effectiveness of a set of harrows by 50 per cent.

My method of de-stumping is simple. During what is expected to be the last spring working I carry a number of wooden pegs. One of these is driven in near every stump that the machine bumps over. Later, the dirt is grubbed from around these stumps to a depth of 4 in. or 5 in., and when the soil is very dry the stump is burnt out with the aid of spoiled chaff or dry stable manure. Hundreds of old bull-oak stumps did not need a fire; they were split and levered out with a crowbar.

I am not in favor of working the land after harvest rains; if the fallow is in good order I do not touch it. If the cultivating season has not been good, and clods are prevalent, they can be broken down with the harrows upside down and weighted, used preferably after a light rain. Clods serve no useful purpose, and are full of weed seeds that do not germinate until it is too late to destroy them.

A fine shallow mulch is better than a deeper and cloddier mulch, for after the frequent heavy May-June rains it dries out to a workable condition much quicker than the latter. Indeed, if the latter becomes waterlogged it remains so until spring, unless the winter is dry. My best crops of recent years were grown on fallow that was set so tight at seeding time that it became necessary to use a rigid-tine combine.

No doubt this method may seem difficult and complicated to those used to the older and simpler method, but examination will show that it is really much easier to accomplish. More important, the yields are better than could be obtained under the old system without a lot more effort. All the earlier workings are easier and quicker, and the soil is more often in a workable condition.

The shallow ploughing of No. 2 is especially easy on the team, just at the time when it is hardly fit for a heavy job, and there is no need for the spiked log.

I remove several tines from the scarifier for the earlier breaks; indeed, if the machine was the right load for the team in winter, it stands to reason that it is too light and small for the earlier spring workings. Fixed scrapers on the rear wheels are indispensable.

MID-NORTH CONFERENCE, LAURA, MARCH 14th, 1934.**BUSH FIRE LEGISLATION.**

[R. J. ROSE, Laura.]

Prior to the Bush Fires Act, 1913, being assented to, district councils under the provision of section 234, District Councils Act, 1887, had conferred upon them powers to deal with outbreaks of fires within their respective areas. This clause was, however, repealed, and there was enacted in lieu of this The Bush Fires Act of 1913, followed by amending Acts in 1916, 1926, and two in 1931.

The Northern Fire-fighting Association in 1916 submitted to the then Minister of Agriculture a series of recommendations for amending and new legislation, practically the whole of which were incorporated in the 1916 Act; also at a later date recommendations were incorporated in the 1926 and 1931 Acts.

Consolidating Act.—The legislation now in force is contained in the Bush Fires Act of 1933, assented to on December 7th of that year, and the specific object of this paper is to submit in a concise form a summary of existing legislation. In addition to the request that a Consolidating Act should be passed, a deputation appointed by a Conference of Fire-fighting Associations which met at Clare in March, 1933, which consisted of Messrs. G. H. C. Warren (President Barossa Association), Norman Brookman (Hills Association), and R. J. Rose (Hon. Secretary of Northern Association), waited upon the Minister of Agriculture (Hon. A. P. Blesing), and submitted a series of recommendations for amending and additional legislation, these requests being supported by the Stockowners' Association of South Australia and several Parliamentarians representing districts in which Fire-fighting and Fire-prevention Associations were functioning.

In delivering judgment at a County Magistrate's Court in a case where a landowner was charged with a breach of the Bush Fires Act, the presiding Magistrate said:—"It is the responsibility of every landowner to make himself familiar with the Acts of Parliament which affect him," and to impart some information regarding legislation which affect every man on the land is the objective of this paper.

Bush Fires Act, 1933.—The Bush Fires Act of 1933 consists of 36 sections, its objective being designed in the preamble as "An Act to make better provision for the better control of Bush Fires and other Fires and for other purposes."

Scrub and Stubble Burning.—Sections 4 to 8 inclusive deal with stubble and scrub burning, and for the most part re-enact legislation formerly on the Statute Book of the State. Included in these sections are, however, some new provisions. Persons who intend to burn stubble, *i.e.*, "stubble, hay, straw, grass and herbage, whether alive or not alive, and whether standing or not standing," are now required to give notice to adjoining owners or occupiers not less than *six hours'* notice (former legislation required that not less than *twelve hours'* notice should be given). Notice now must, as aforesaid, be also given to the clerk of the council of the area in which the land is situated, or to the nearest fire-control officer. No stubble burning is to commence before *two o'clock* in the afternoon; former legislation permitted such fires to be lighted at *nine o'clock* in the forenoon. Scrub burning must not be commenced before *twelve noon*. Former legislation is re-enacted governing the clearing of space immediately adjoining, and the presence of at least four persons at the fire from the time it is lighted until thoroughly extinguished. Councils may under defined conditions burn off "stubble" in streets, roads, and reserves without complying with conditions that apply to ordinary stubble burning. Former legislation is also re-enacted for the burning of stubble in or on irrigation channels or lucerne fields. The Minister is empowered to grant permission to councils to alter the periods and the hours for burning, also distances.

Section 6 provides that with the consent of a Fire Control Officer a firerake may be used to burn stubble, provided that before the fire is lighted a space of 12ft. is cleared around the land or a space the width of 6ft. is ploughed.

No alteration of distances, however, shall be approved by the Minister unless the councils of all the areas adjoining such first-mentioned area agree to such alteration.

Since the Act was assented to the question has been raised as to the period that any of the above alterations shall remain in force. This has been submitted to the Minister for a ruling.

Sunday Fires, &c.—Fires for scrub, stubble, charcoal or lime burning must not be lighted on Sundays. Between October 1st and May 1st camp fires, &c., must not be lighted unless space the width of 12ft. has been previously cleared of all inflammable material.

Steam and Internal Combustion Engines.—Section 15 is new, providing that every stationary steam engine (other than a steam engine enclosed on four sides with non-inflammable material) must be placed so that there is a cleared space of a width of at least 12ft., and the same applies to stationary internal combustion engines.

Section 17 provides that all internal combustion engines used in harvesting operations must be fitted with an effective spark arrester; that when used the whole length of the area to be harvested must be ploughed or cleared of all inflammable material to a width of 12ft. If on such engines there is a water-spray of the knapsack pattern fully charged with water, ploughing or clearing to a width of 6ft. is all that is required.

Beekeepers and Smokers.—Beekeepers by the provision of section 16 are required, between the 31st day of October and the following 1st day of May, when taking honey with the aid of smokers or lights or maintaining a fire in a honey house, to have a space around the beehive, honey house, or apiary cleared to a width of 12ft., or a space ploughed to the width of 6ft.

Cigarettes and Cigars.—Section 19 fixes a penalty of not less than £2 nor more than £20 upon any person who between October 31st and 1st day of the following May, while being conveyed in any moving vehicle in any part of the State, outside a municipality or a town, throws out a lighted cigarette or cigar.

Clearing Roads.—Section 26 empowers councils to grant occupiers of land to clear roads of scrub for purpose of making firebreaks.

Inquests on Fires.—Section 27 is practically a copy of West Australian legislation, and provides that, except where a fire is confined to a building or other premises, an inquest on any fire shall be held, when a request in writing is made to the police officer in charge of the Police Station nearest to the fire, within three days of the outbreak by the owner of the area in which the fire occurred, or by any owner or occupier of property who suffered loss by reason of the fire.

Council May Expend Rates.—Section 28 empowers councils to spend rates in clearing roads of stubble and the purchase of fire-prevention apparatus, &c.

Fire Control Officers.—Since 1913 municipal and district councils have been empowered to appoint fire control officers, who are vested as far as practicable with all the duties and powers of the chief officer of Fire Brigades. In 1926, by an Amending Act, councils were empowered to increase the maximum number of such officers to 15. In 1931 further amendments were made to this phase of bush fires legislation, including the provision for the appointment of fire control officers, in areas not included in municipal or district council areas. In the 1933 Act additional legislation of an important character relating to fire control officers has been incorporated. Clause 2 of section 29 provides that if the Minister is satisfied that any council has not appointed fire control officers sufficient for its area, he may appoint officers for such area. Clause 7 of the same section confers upon gazetted fire control officers power to act as such in an adjacent area, if a fire occurs and no fire control officer

appointed for the area is present. Clause 9 of the same section provides that in addition to every forester and assistant forester employed in the Woods and Forest Department in the State, every foreman in charge of any Government forest shall, *ex officio*, be deemed to be a fire control officer.

Copies of the Bush Fires Act, 1933, may be obtained from the Government Printer, Adelaide; price 1s., plus postage 1d.

GROWING AND HARVESTING A LUCERNE CROP FOR SEED.


[H. K. MOORE, Jamestown.]

It is assumed that the lucerne, a good upright variety known as Broad-leaf Hunter River or Australian, has already been established in the field for several years, and the owner wishes to reserve some or the whole of it for seed.

Take all stock off the field during the last two weeks in August and September, to give the lucerne and other undergrowth a chance to grow sufficiently high to get a good clean cut with the mower. This ensures a good clean second growth, which is essential to get seed free from weeds.

In the Belalie district the second growth is fed off until the middle of December or a little later, according to season. Then take off all stock and allow the crop to grow; it should be in full flower by the end of January, and if nothing hinders it, should be ready to take off about the middle of March.

The best seed is obtained from comparatively thin stands of lucerne, the plants being further apart allows plenty of sunlight to penetrate around the leaves and flowers, giving it a better chance to mature good seed. A thick stand seldom produces much seed. In the early spring the lucerne flea does a lot of harm, but usually disappears after heavy grazing after the first cut and warm dry weather sets in.



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If frequent thunderstorms occur during summer it creates favorable conditions for the hatching of the boll worm, which does a lot of harm by eating off the flower of the lucerne plant, thus rendering it useless for seed.

This season practically all the lucerne in the district reserved for seed was spoiled and had to be fed off. Some stands have since grown and flowered and are setting fairly well, but the yields will be light on account of the dry spell and late ripening.

The seed should be left to ripen until most of the pods are dark-brown or nearly black in color. There will always be some green pods owing to late flowers. Harvest when the weather is warm and dry to ensure good threshing. The method of harvesting is similar to other grains; the stripper, harvester and header are used, with a few alterations to combs, sieves, &c. The header and harvester clean the seed in the one operation, but with the stripper it is dumped in heaps on tarpaulins and cleaned with the ordinary winnower or grader.

With the stripper care must be taken not to make a big heap, or leave it more than a few hours before cleaning or turning, because the green leaves and stems get very hot and soon ruin the seed. All seed—whether reaped by header, harvester, or stripper—should be thoroughly dry before it is bagged and put away, otherwise it will develop mould, which spoils its germinating powers.

After cleaning the seed there will be a quantity of unthreshed pods which contain a lot of good seed; these can be put through the harvesting machine again until most of the seed has been removed.

Keep the stand of lucerne reserved for seed perfectly free from foreign weeds, to prevent them being distributed all over the country. If raising seed for sale put it on the market clean and attractive, and in good bags. Our Northern seed has the reputation of having the best germinating properties of any in the State. Keep it so. As a sideline to help in these difficult times I advise any farmer who has suitable country to grow some seed on the lines laid out in this short paper.

Much depends on seasonable conditions, control of pests, and good judgment on the success achieved, but given normal conditions it should prove profitable.

When the boll worm was at its worst this season thousands of starlings appeared in the paddocks infested, and in a few days the pest had disappeared.

INCREASING SHEEP NUMBERS ON SMALL FARMS.

[M. J. CRONIN, Bundaleer Springs.]

With a 20in. rainfall, on a 400-acre farm, it should be possible to keep 200 ewes to lamb, and on an average about 100 dry sheep. Where possible, lucerne should be sown to secure best results. Having 50 acres planted provides most of their feed, the balance of the farm being devoted to wheat growing. During these years of low wheat prices I advocate the three-year wheat rotation, and the sowing of oats, &c., after wheat, then fed to sheep during the autumn and winter months, with chaff in self-feeders, will help to increase the carrying capacity of our farms. In fact, hand-feeding of sheep is absolutely essential on small farms in any year. and during the present period it will pay handsomely to cut at least half the wheat crop for sheep. The growing of fodder crops is also very necessary.

As to the most suitable type of ewe and ram to use: I have been using a good class large-framed pure-bred Merino ewe, mating with the Dorset Horn and Southdown ram. Results have been very satisfactory. A more valuable lamb is obtained from one of the crossbred mothers, but then that is rather a debatable question on account of the extra value of the pure-bred Merino ewe's wool. During the past two years I have tried a line of Southdown-Merino cross ewes mated with Dorset Horn and Southdown rams, and the results have been very good from an export point of view; but here again, with the present high prices ruling for Merino wool, coupled with the difficulty that confronts the average farmer in procuring the suitable crossbred

ewe, also taking into account one of the most important points—the netting of fences—the farmer, for the present at least, would be well advised to secure the large-framed pure Merino ewe to mate with either one of the pure British breeds, or with the pure Merino ram.

Fat Lamb Raising.—The greatest problem, the selection of the ewe being decided, the farmer is then confronted with the choosing of the most suitable ram. As most of the British breeds suitable for fat lamb raising are available in Australia, it is a matter of opinion which breed to select. Here again a great diversity of view arises. With the experience gained, I find the Dorset Horn lambs grow and mature earlier than the Southdown, but when both are “finished” the Down cross appears to be the most suitable for the export trade.

Pasture Development.—If raising for the export trade is the object, then the importance of good pasture cannot be over-estimated. Failure is bound to follow any attempt to “finish” at the correct weight, without an abundance of good pasture being established.

Rapid strides are being made in the heavier rainfall areas of South Australia in this direction, mainly through top-dressing, and the sowing of various clovers and grasses, &c. I experimented with Subterranean Clover, but found that the northern summers are too severe for it to grow successfully. Therefore, the only alternative lies in the establishment of the best of all fodders—lucerne—which thrives and grows well with reasonable treatment, in almost all the northern districts, and I strongly recommend its planting, even if only on a small scale.

LOWER SOUTH-EAST BRANCHES, TANTANOOLA, APRIL 11th, 1934.

MIXED FARMING IN THE SOUTH-EAST.

[R. A. HATELEY, Millicent.]

In many cases during the past few years it has proved impossible for a farmer to carry on and to pay 20 shillings in the pound while growing cereal crops alone, and for that reason I strongly advocate mixed farming. All of the optional lines to which reference will be made do not apply to each and every farm. That is not reasonable; but there are many farms in and around our district which could be successfully worked by means of mixed farming pursuits, and this applies particularly to cases where a man has sons to help him and would not be greatly concerned by additional labor costs. The following lines are all worth consideration, and, where reduced returns have rendered wheat and barley growing unprofitable, could be brought into use in conjunction with a reduction of the area previously under grain of, say, 75 per cent.:—Sheep, cattle, pigs, potatoes, poultry, and breeding of draught stock. The drawback in production of grain appears to be the problem of marketing, so I would suggest only growing a small amount, and ensuring that what is grown is the best class of the most suitable grain. If the grain is very low in price, it could be utilised with advantage for fattening sheep.

Sheep make a good and profitable line, pleasing results being obtained both for fat lamb raising as well as for fine-woolled stock. In breeding fat lambs, good-sized Comeback ewes and Border Leicester or any other ram approved for the production of fat lambs are recommended. The ewe cuts a fair fleece and produces good marketable lambs. Good results have been secured with fine wools this year. Merino lambs have sold in the local market at 15s. per head. Very often it would be of advantage to keep wethers until they are two or three years old. Along with the process of fattening it may pay to consider the growing of peas or chow moellier. The former represents a good feed which can be grown without super, although it is necessary to have the land worked well. Chow moellier is a fine winter fodder. A self-feeder with barley will work well with root crops at that time of the year.

Keeping of a few dairy cows is another line which is well worth while, and brings in ready cash. One important point is that of going in for only a well-bred class of stock. I have a preference for the Milking Shorthorn—a good milker as well as a breed suitable for the butcher. At present it may be said that it does not pay to milk cows, in view of the low price of butter; but better returns will come again, and calves often bring in a fair sum, while pigs ensure that there is no waste of the skim milk.

Pigs may also be exploited profitably. As in the case of the cow, a good breed is essential. The Large White is the best proposition for present requirements. Keep only enough pigs to use the surplus skim milk and other food which is not suitable for poultry or stock. They can be topped off with grain, up to two or three bushels per pig being recommended. One of its advantages is the fact that the pig can be bred and reared fairly quickly.

The breeding of a few draught horses will provide satisfactory returns. A good mare from the team will breed and rear a foal as well as do a considerable amount of work.

If a farmer has land which will grow potatoes he will be well advised to put in a few acres every year. They can be cultivated with little expense apart from that of digging. A man can keep his own seed for several years. No farm is complete without its quota of fowls. A good laying strain should be kept.

MOTOR TAX FROM THE PRIMARY PRODUCER'S POINT OF VIEW.

[W. M. LASLETT, Allandale East.]

At this particular time of the year when motor taxation is agitating the minds and touching the pockets of motorists throughout South Australia, we can profitably consider the question from the primary producer's point of view.

When motor taxation was increased by practically 100 per cent. it was understood the revenue derived therefrom would be used in road construction. Certainly most of it was, but chiefly in and around the city. The man on the land did not derive much benefit from the policy, for most of the produce was, and still is, carried over district roads maintained or otherwise by district councils from revenue supplied by rate-payers. Since then, and during the period of depression, motor taxation for the purpose of road construction (in itself something definite at least) has lapsed. Motor tax has now become a part of the general revenue, and although the tax is still the same, there is no guarantee that road conditions will be improved or the revenue used in that direction.

Primary producers require a means of quick transport, situated, as they are in most cases, miles from a township, and the benefits and advantages attached thereto. The man on the land realised this, and saw in the motor car the means of satisfying a long-felt want, and purchased his car when his income justified the outlay. Now he finds his income reduced by quite 50 per cent. on account of the low prices for all primary products, and his motor tax increased by 100 per cent. since he purchased his car. He is therefore faced with the necessity of paying an amount of taxation which he can ill afford, or leave his car in the shed, where it will depreciate in value, and thus deprive himself and his family of the use of a vehicle which he has purchased in order to counteract some of the hardships of a producer's lot.

It is time the primary producers throughout the State entered a united and emphatic protest against such an unjust means of collecting revenue. If the motorist is called on to make up that amount of revenue it would be a more reasonable way to collect the revenue from the road user by means of a petrol tax instead of the system now in operation which compels one to pay before he takes the vehicle on the road.

IS MIXED FARMING SCIENTIFICALLY AND ECONOMICALLY UNSOUND?

[By A. A. SASSANOWSKY (Mount Gambier.)]

The prosperity of a country or nation depends on the prosperity of the farming community. If they are only making a bare living, so will the rest of the people, for out of the land comes the wealth of the nation. It is a citizen's duty to see that the cultivating of the soil is made to pay its way.

The question is—Does the capital outlay of the farm warrant it? By mixed farming is meant cultivating the land for cereals and root crops in conjunction with dairying and sheep. The subject is not being treated as cultivation against stock. Most of the farms are worked by the owner himself, so that he has to be either in the field or with his stock.

The capital outlay can now be examined; the size of the buildings required depends on the size of the farm, but each different one has to be there, whether large or small.

For agricultural practices the following are necessary:—A horse stable, chaff shed, barn, and implement shed; these are all the large buildings required; but when stock is added in conjunction with agriculture, additional structures, such as cow shed and yards, piggery, shearing shed, and sheep yards must be provided. It may be said that the same building can be used to serve a dual purpose, but this is not so; the only building that can be used in this way is the barn and shearing shed, but the change over is a yearly cost of time and work. Having to erect the duplicate of buildings for mixed farming, they are usually of a temporary nature, to save capital, in the hopes of improving them in later years—which hopes are not always realised—so that depreciation on them is great, and the cost of repairs uses up a fair amount of profit every year, whereas if agriculture or stocks is the farmer's business, better buildings are erected and depreciation is far less. Having all these buildings for mixed farming, are they being used to the fullest extent. I say not, so that 50 per cent. of the capital is lying idle and depreciating all the time.

Implement.—For agriculture the following plant will be required:—Plough, harrows, drill, binder, harvester, waggon, grader, engine, chaffcutter, &c., and horses. For livestock, the addition of a grass mower, horserake, trolley or spring cart. These implements all cost money, and it is better to wear them out than allow them to rust out, which can easily happen in mixed farming. Take another item, fencing. What amount of fencing is required for agriculture? The boundary fence, and one paddock for the horses. It is not necessary to fence the oats from barley or potatoes. One also gains land, because about 6ft. of land is lost at each fence. With the addition of livestock the farm has to be divided into paddocks, which should be securely fenced. Too often this is not done.

For agriculture, one well or bore at the homestead is sufficient, but with the addition of livestock every paddock has to have a supply, either by windmill or pipes laid to it; if not, the stock suffer and results in a loss to the farmer.

Loss of Time.—Dairying and agriculture offer the best example. While milking, field operations are held up, and the horses are standing idle in the stable. The danger is that the farmer slurs either the milking or the ploughing, because he is always in a hurry to get to either the milking or working the horses. Not having sufficient work for his horses all the year round, as he has to save grass for his cows, the horses "are eating their heads off," and taking feed from the cows. So that the cost of growing the crop is very expensive.

The loss from a scientific point of view is that the farmer has neglected to plough the land at the right time because he wanted to save the feed for the stock. The farmer becomes unsettled in his methods; he knows he should plough, but being short of feed he does not, and the following crop is not up to the best, and results in a severe loss through trying to do two jobs.

In growing cereals and root crops there is a fixed rotation of cropping and land resting. During the time of rest, the land can be allowed to grow as much grass

and rubbish as possible, and this can be ploughed under during spring to increase the humus in the land, which is necessary to keep the land in good heart, whereas if livestock is combined with agriculture the farmer does not.

Another point of the scientific side is that in mixed operations, the farmer does not become expert on either agriculture or stock handling, whereas if he specialises on one line, he becomes more proficient as his mind is on one subject, and he seeks information on that line. Just to give one illustration of what it means for a farmer or a country to specialise. Take Denmark, for instance. During the middle of last century Denmark was in financial difficulties, but to-day it is strong, just through specialising in dairying and becoming perfect in all its methods.

The social side of the question is that mixed farming work is never finished. Life becomes a drudgery instead of a pleasure, whereas specialising either in agriculture or livestock, the producer is master of his subject, and seems to have more time to enjoy life.

Our present method of mixed farming is scientifically and economically unsound.

SORE SHOULDERS.

[By J. CARTHEW (Tantanoola).]

This paper is compiled largely from knowledge gained by experience covering a period of 18 years as a teamster, and many years of farm work. Every good horse-master takes a keen interest in the condition of the team that has to work constantly. Naturally, he will not tolerate sore shoulders, though to avoid slight sores at all times may be difficult and perhaps impossible.

In a team of horses that is well cared for, coats sleek, and well harnessed, sore shoulders are seldom found. A team in poor condition, coats sticking up, and harness curling up from being over-dried in the sun, added to other indications of negligence, nine times out of ten, investigations reveal sore shoulders.

The two cases cited rely on the two following reasons:—The man in charge of the first-mentioned team, being careful about condition of horses, harness, and other details, will be equally attentive to sores, and cure them before they become stubborn. The owner of the other team is very often neglectful about everything, and the painful results are often found under the collar.

The beginning of winter is a bad time for working horses' shoulders, owing to the fact that their coats get heavy and perspiration is increased, and as horses have to work until nearly sunset, the collars keep damp, which is bad for shoulders. Horses brought in fresh and put to work very easily scald, which is another cause of the trouble. The sagging of chains in swingle-tree work causes sores on some horses. Another cause is the use of pole strap, the collar is held too firm to the pole and chafes the shoulder.

PRECAUTIONS THAT ASSIST IN THE PREVENTION OF SORES.

Keep the collars dry by hanging them in a draught overnight and dry as much as possible during the week-end, also keep them clean and frequently soften the stuffing, using an ale bottle or hammer to hit the collar. Strike from outside, driving the stuffing towards where the collar touches the neck of the horse. This softens the collar and improves the shape. Collars doing heavy work always push outward and flatten where the most contact comes, while the shape should be slightly convex.

When working in swingle-trees, the use of a backband eases the tendency for the sagging of chains, and when in leading harness have a strong bellyband, so that it will stand tightening to an extent that will make the draught slightly down, thereby bringing the pressure evenly balanced on the shoulder.

When first working horses that have been spelling, wash the shoulders at midday and night while still warm from work, and if a horse is thin-skinned and the skin threatens to break, always make a practice of washing.

A horse that has to do hard work should be kept in hard condition. Backbands, bellybands, and collar stuffing are important, but feeding must not be neglected, which should be ample and good,

The following is a successful remedy for most shoulders that have broken open from chafe, scald, or bruises. Wash the wound immediately on ceasing work, sufficiently to thoroughly clean the sore part. In the morning, before harnessing, repeat the washing, leaving a good lather of soap on the shoulder; this has a cleansing and soothing effect, and after a few days the scar begins to heal. Be sure that the collar is not projecting on the wound; if so, it requires easing. Horses with very bad shoulders have been cured by washing at the trough dinner time and night with water only, but the use of soap is an improvement on water only.

Gall cure is a very good remedy for small wounds, on the shoulders or back. It should be applied before and after work each day. Keep the collar scraped clean when using gall cure, but do not use any water on the wound with this remedy. A false collar reduces friction and is a good thing for a thin-skinned horse that is chafing. It is claimed that a tanned sheepskin makes an excellent false collar; this prevents the collar from absorbing perspiration, besides preventing chafing, providing it is kept soft and pliable.

As horses have to be given a drink at dinner time and evening, there is no inconvenience in having to dip out a bowl of water and wash the shoulders with a cloth with water from the trough. In some cases shoulder trouble is due to the horse being too free for the rest of the team. In such a case lengthen the chains sufficiently to steady him; when he is in front the couplings have a check on him, and he will cool down to steady work in most cases.

Experience proves that the remedies mentioned in this article effect a more permanent cure if the horse is kept at work, and for this reason I am opposed to spelling the horse, which will generally break out in the shoulders when put to work again.

NARRUNG HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR FEBRUARY, 1934.

Herd 2 No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during February.	Per Cow during February.	Per Cow October to February.	Per Herd during February.	Per Cow during February.	Per Cow October to February.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
5/C ..	33	17-57	7,805	236-51	2,557-11	414-88	12-57	130-20	5-32
5/D ..	34-07	23-14	7,808†	229-19	2,495-07	421-56	12-37	134-03	5-40
5/E ..	36-64	24-25	13,254	360-77	2,302-79	701-42	19-10	121-00	5-40
5/P ..	36	26-82	17,024†	486-86	3,251-99	781-29	21-71	152-37	4-48
5/R ..	61	47-82	12,217†	200-29	2,075-29	530-08	8-69	86-94	4-34
5/S ..	13	7-07	3,374†	259-57	2,468-51	162-30	12-48	120-81	4-81
5/EE ..	17	16	8,344	490-82	3,252-55	405-34	23-84	157-75	4-86
5/GG ..	18-07	15-29	5,463	302-32	2,007-93	272-57	15-08	96-45	4-99
5/KK ..	20	17-88	10,050	502-50	2,840-35	474-56	23-73	131-65	4-72
5/NN ..	15	11-25	4,036	269-07	2,572-02	200-16	13-34	126-48	4-96
5/QQ ..	16	9-75	3,390†	211-91	2,099-93	181-28	11-33	105-06	5-35
5/EE ..	21	9-29	3,490	166-19	1,569-73	161-99	7-71	84-81	4-64
5/SS ..	17	10-29	3,328	195-76	2,194-37	172-45	10-14	105-25	5-18
5/TT ..	12	11-39	5,989†	499-12	3,340-36	299-63	24-97	163-52	5-00
5/VV ..	14	2-43	692	49-43	1,960-89	39-18	2-80	90-82	5-66
5/WW ..	23	11-32	4,680†	203-50	1,968-19	203-00	8-83	91-70	4-34
5/XX ..	18	15	5,306	294-78	2,503-46	257-53	14-31	122-75	4-85
5/YY ..	14	12-11	4,122	294-43	1,998-25	192-26	13-73	98-54	4-66
					Nov.-Feb.			Nov.-Feb.	
5/ZZ ..	30	28-64	14,006	468-87	2,360-05	522-53	17-43	87-23	3-74
5/AAA ..	19	17-46	6,293	331-21	1,973-75	322-49	16-97	97-97	5-12
5/BBB ..	17	15-64	4,486	263-88	1,611-58	230-11	13-54	80-57	5-13
					Jan.-Feb.			Jan.-Feb.	
5/CCC ..	13	8-11	1,513†	116-42	316-73	85-49	6-58	17-03	5-65
Means	22-63	16-30	668-97	295-66	2,401-12	319-64	14-13	114-93	4-78

LAKE ALBERT HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR FEBRUARY, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during February.	Per Cow during February.	Per Cow December to February.	Per Herd during February.	Per Cow during February.	Per Cow December to February.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
6/B ..	17-39	15-75	5,181	297-93	1,476-79	282-35	16-24	73-81	5-45
6/C ..	20-86	18-46	9,616	460-97	1,334-92	417-75	20-03	77-16	4-34
6/H ..	23	14-39	5,572	242-26	1,373-73	277-91	12-08	71-29	4-99
6/Y ..	15	14	7,238	482-53	1,673-21	318-22	21-21	72-46	4-40
6/I ..	24-18	22-32	18,496½	764-95	2,390-15	751-32	31-07	102-02	4-06
6/LL ..	24	19-43	10,851	452-14	1,841-83	448-10	18-67	71-79	4-13
6/O ..	20-32	18-32	12,973	638-43	2,284-54	582-57	28-67	105-85	4-49
6/PP ..	15	13-36	8,745½	583-03	1,989-61	445-15	29-68	98-80	5-09
6/RR ..	29	28-50	25,501	879-34	2,789-75	1,070-04	36-90	114-21	4-20
6/TT ..	18	14-86	12,306½	683-77	2,293-86	528-81	29-38	101-14	4-30
6/XX ..	25-32	23-39	17,060	673-77	2,374-99	778-00	30-73	103-86	4-56
6/Z ..	29	25-39	16,028	552-69	1,991-24	756-48	26-09	93-57	4-72
6/BBB ..	25-43	21-32	14,613	574-63	2,072-07	674-44	26-52	91-37	4-62
6/CCC ..	21	16-57	11,468	546-09	1,770-22	474-81	22-61	77-35	4-14
6/DDD ..	19-93	17-93	12,938	649-17	2,232-76	578-58	29-03	94-11	4-47
6/EEE ..	24-71	18-11	15,284½	618-55	2,335-02	633-94	25-65	93-54	4-15
6/FFF ..	22	20	16,800	763-63	2,521-89	711-84	32-36	106-10	4-24
6/GGG ..	26-54	24-54	26,401	995-72	2,535-12	999-89	37-70	100-74	3-77
6/HHH ..	17-43	16-68	9,408½	539-78	1,925-40	474-01	27-19	88-80	5-04
6/II ..	22-57	21-86	18,155½	804-41	2,612-95	742-64	32-90	106-86	4-09
6/JJJ ..	24-93	22-43	13,564½	544-10	1,873-47	663-47	26-61	89-38	4-89
6/KKK ..	39	36-75	30,791½	787-68	2,614-84	1,171-77	30-05	102-12	3-81
6/LLL ..	21-43	17-43	11,164½	520-97	1,629-04	538-35	25-12	74-72	4-82
Means	22-87	20-08	14,351-57	627-49	2,142-48	622-63	27-22	92-61	4-34

THE HILLS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR FEBRUARY, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during February.	Per Cow during February.	Per Cow July to February.	Per Herd during February.	Per Cow during February.	Per Cow July to February.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
7/E ..	29	23-89	12,254	422-55	4,023-95	470-72	16-23	157-98	3-84
7/H ..	7	6-82	3,173½	453-36	4,534-23	144-34	20-62	213-73	4-55
7/L ..	36-14	33-82	15,112	418-15	4,330-44	666-13	18-43	200-26	4-41
7/P ..	25-21	21-14	6,869	272-47	5,172-20	346-41	13-74	242-74	5-04
7/T ..	17	14-64	5,182	304-82	3,333-83	236-45	13-91	145-31	4-56
7/Y ..	27-82	18-82	6,700	240-83	4,149-84	269-60	9-69	181-29	4-02
7/AA ..	13-96	11-57	3,409	244-20	3,992-02	164-24	11-76	172-44	4-82
7/KK ..	23	20-43	11,342	493-13	5,970-30	457-09	19-87	244-36	4-03
7/MM ..	40	30-36	13,381½	334-54	5,131-34	509-70	12-75	193-65	3-81
7/PP ..	20-61	16-89	8,844	429-11	4,598-61	398-10	19-22	231-54	4-48
7/TT ..	16-64	14-61	7,522½	452-07	4,747-27	289-48	17-40	196-81	3-85
7/U ..	21	17-21	6,842	325-81	3,441-36	303-24	14-44	156-84	4-43
7/V ..	18-86	17-25	9,425½	490-76	5,851-29	398-73	21-14	284-58	4-23
7/XX ..	19-57	17-07	10,672	545-82	5,347-38	576-91	29-47	279-20	5-40
7/YY ..	24-82	19-39	5,151	207-53	2,712-80	228-68	9-21	118-88	4-44
7/BBB ..	72-11	56	23,806	330-13	4,178-49	1,065-11	14-77	189-62	4-47
7/CCC ..	22-60	19	6,985½	310-91	4,361-81	300-21	13-34	196-63	4-29
7/DDD ..	13	10-46	4,126	317-88	4,451-39	192-66	14-82	207-71	4-67
7/EEE ..	12	9-75	4,767	397-25	3,683-20	247-15	20-60	178-52	5-18
7/FFF ..	21	12-57	5,246	249-81	2,458-21	223-48	10-64	108-95	4-26
7/GGG ..	17	14-46	4,116	242-12	1,556-64	197-01	11-59	74-05	4-79
Means	23-73	19-34	833-17	351-11	4,409-62	365-87	15-42	195-14	4-39

A SCARAB BEETLE (*Aphodius tasmaniae* Hope.)*

DESTRUCTIVE TO PASTURES IN THE SOUTH-EAST OF SOUTH AUSTRALIA.

[By D. C. SWAN, B.Sc., Waite Agricultural Research Institute, University of Adelaide.]

INTRODUCTION.

The agricultural development of the South-East portion of South Australia has resulted in the increase of areas under permanent pasture and their improvement by top-dressing with appropriate artificial fertilisers. This has made it possible

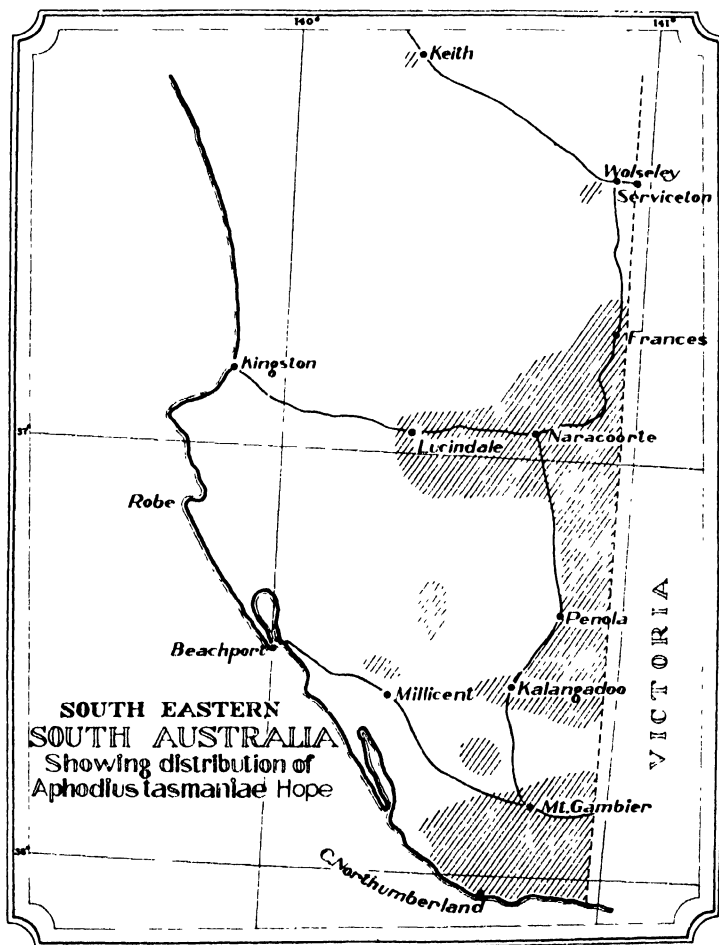


Fig. I. Showing general distribution of *Aphodius tasmaniae* in South Australia. (From information supplied by Mr. E. S. Alcock.)

*Specimens obtained from Mount Gambier district in February, 1932, were identified by the late Mr. A. M. Lea as *Aphodius howitti* Hope (vide Davidson, *Journ. Agric. Sth. Australia*, October, 1933, p. 286). *A. tasmaniae* is referred to as a pest of lawns and pastures in the Sixth Annual Report, C'wealth C.S.I.R. 1932, p. 23. Dr. A. J. Nicholson, Acting Chief, Division of Economic Entomology, informs us that the synonymy given in the collection of the division is as follows:—

- Aphodius tasmaniae* Hope
- = *A. howitti* Hope
- = *A. andersoni* Blkb.

to carry an increased number of sheep to the acre (2½-4). It is well known that a marked increase in the stock-carrying capacity of an area introduces new problems. For example, the degree of infestation of sheep with intestinal (worm) parasites may increase; the botanical composition of the pasture is changed, which influences the kinds and numbers of insects associated with it.

The scarab beetle *Aphodius tasmaniae* is a native insect and presumably has always been present in the South-East. It appears to have increased in numbers during recent years, and at the present time its larvae (grubs) are a pest in pastures in certain districts (Fig. 1).

In a letter dated September 30th, 1930, the Secretary of the Stockowners' Association of South Australia drew the attention of the Australian Pastoral Research Trust Ltd. to the importance of the matter and the desirability of an investigation of the problem being carried out. This letter was referred to the Commonwealth Council for Scientific and Industrial Research, which body referred the matter to the Waite Institute.

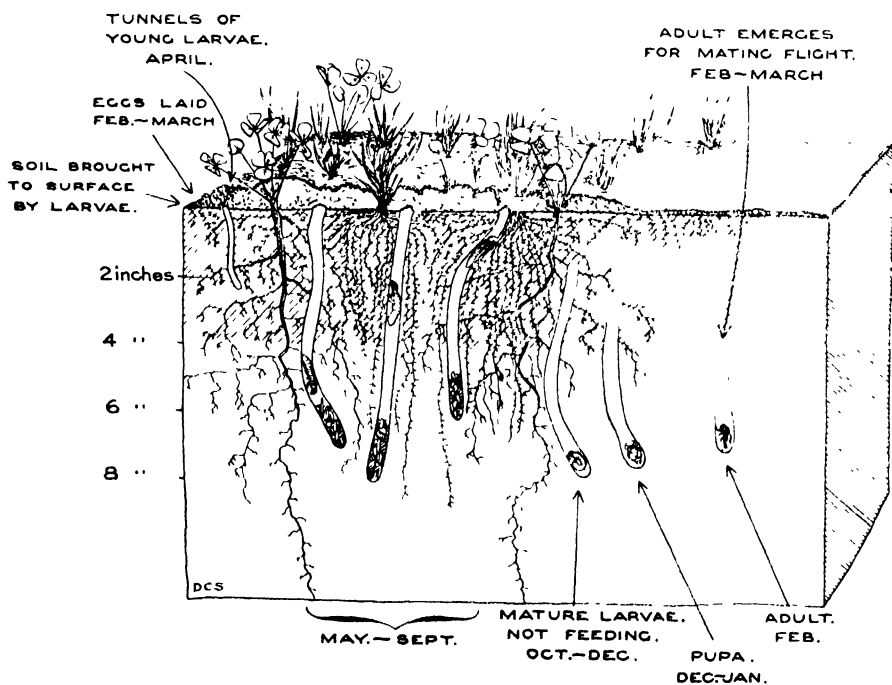


Fig. II. Showing habits of *Aphodius tasmaniae* in pasture.

Owing to several inquiries being received about this time, a short general article on "White Grubs" was written (Davidson, J., *Journal Agric.*, S. Australia, Vol. 34, 224-227).

In a letter dated July 28th, 1933, the Secretary of the Stockowners' Association of South Australia stated that the council had been again discussing the matter, as a result of inquiries which had been received by them.

The observations which are embodied in this paper show the present position regarding the investigations on the problem.

Aphodius belongs to a large family of beetles (Fam. Scarabaeidae) which includes scarabs, cockchafers, June beetles, &c. Their larvae are characteristic stout, whitish grubs, usually curled in repose, and often referred to as "white grubs." They live in the soil, feeding on the roots of plants. Adult scarabs often occur in large numbers on foliage, to which they may do considerable damage.

In the case of the true cockchafer the larvae work beneath the soil surface. In the species under discussion the larva lives in a vertical burrow up to 8 in. in depth, but at night it emerges and moves about at the surface. Portions of leaves of the pasture plants are bitten off, and carried down to the bottom of the tunnel, where they are apparently consumed at leisure. By day the larvae are found in the tunnels. The soil that is excavated in making the burrows is spread in a crumbly pile at the mouth of the burrows. In areas where the degree of infestation of the pasture is high, a large amount of soil may be thrown out of the burrows; it may be sufficient completely to cover the young growth of the pasture. The soil surface, in effect, may be covered by a loose mulch nearly 1 in. in depth. If this occurs in the winter, when growth of the pasture is slow, the regeneration of pasture already damaged by the feeding activity of the grubs may be prevented, resulting in bare patches. The part of the State where this insect has been observed is indicated in the map (Fig. 1). The first examination of the area was made in April, 1933, by Dr. J. Davidson, when the biological details given above were made out. At the time of his visit, the number of burrows in a square foot of soil surface in a local area, was estimated at 150.

LIFE HISTORY.

The development of the beetle from egg to adult apparently takes one year. No data are available in regard to the eggs or oviposition. The adult beetles, after emerging from the pupae in the soil, remain quiescent for a period of some days, during which the chitin hardens and the maturation of the eggs takes place. Dr. Davidson obtained adults in the field in February, 1934. They were kept in the laboratory in damp soil for a fortnight, during which period no signs of oviposition could be detected; the males mated freely with the females. At the end of a fortnight the ovaries of some females were dissected out. Each ovary consisted of six ovarioles. Each ovariole contained one large egg, and one about half as large, but neither egg seemed ready for oviposition. This suggests that a small number (about 20) eggs are laid by each female. The stimulus to leave the soil on the mating flight is doubtless associated with definite weather conditions; the flights always take place during warm, humid nights. The first flight in the Mount Gambier district in 1934 took place on February 21st, with a smaller flight on March 7th. These flights which are later than usual were observed by Mr. E. S. Alcock. The summer was exceptionally hot and dry. The mean annual rainfall and temperature for Mount Gambier are given in Figure 3, together with the same data for the year 1933-34.

Mr. Alcock has supplied the following details of past flights:—

1931	February 12	Very numerous
1932	February 9 and 12	Very numerous
1933	February 9 and 30	Very numerous
1934	February 21	Numerous
	March 7	Small flight

These flights involve great numbers and the beetles are attracted to lights. They may be so thick as to make car driving through them at night a difficult matter.

Species of *Aphodius* and its relatives are known in many parts of the world, and are, in general, dung feeders. It is the opinion of some farmers in the South-East that females of *Aphodius tasmaniae* select areas of pasture specially rich in dung whereon to oviposit. Thus heavy infestations of larvae may occur near fences. Sheep tend to congregate at fixed spots at night, especially on rises and hill slopes, and the sites of these "sheep camps" may be favored. The affected pastures which have been examined consist of subterranean clover (*Trifolium subterraneum*) which may comprise up to 80 per cent. of the pasture, the remainder being chiefly annual grasses. The soil of the region is sandy, with

some areas of volcanic origin, and in these soils burrowing by the larvae is an easy matter. The rainfall of Mount Gambier (Fig. 3) is typical of the places in which *Aphodius* is present.

THE LARVAE.*

These appear in the field in the autumn, and their effect on the pastures becomes apparent about April. They are active, with well developed legs (Figure 4). They crawl in the normal upright position. The head is broad and is used to push the excavated soil out of the burrow. They feed throughout the winter, and reach the last instar in early spring. The writer visited the South-East in late September, by which time feeding was completed. The larvae were found at the

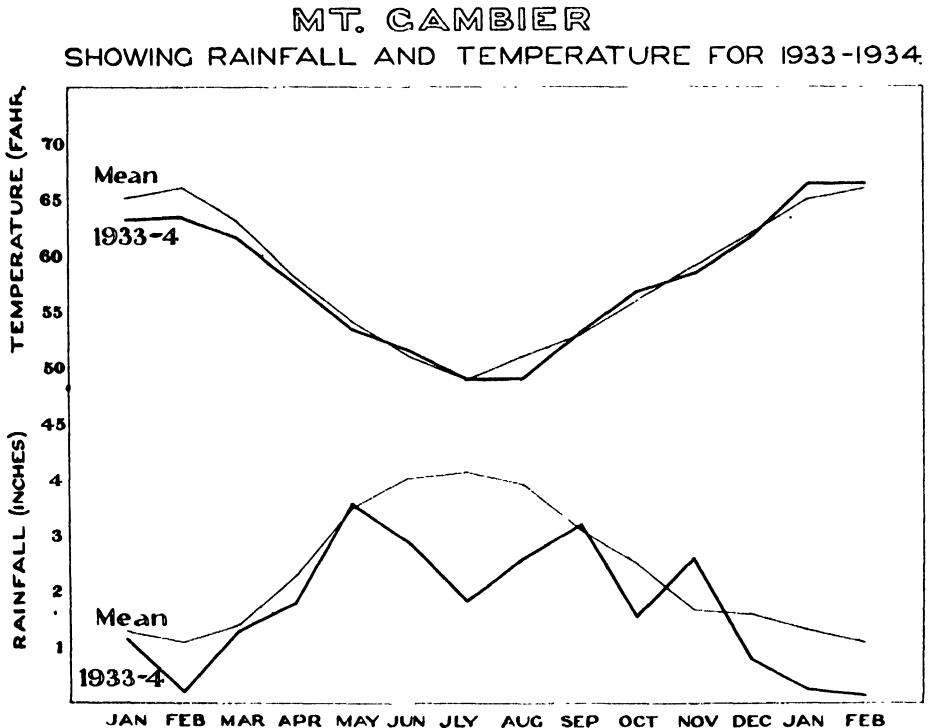


Fig. III. Rainfall and Temperature for Mount Gambier, 1933-34. It will be seen that the rainfall was considerably below normal, which may account for the smaller and later flight of beetles in February, 1934.

bottom of their burrows, mostly at a depth of about 6in. Only in a small proportion of burrows were small pieces of leaves found. The grubs were then a creamy-yellow color, the usual dark abdominal contents having been digested. They were quiescent, awaiting pupation. The habit of casting earth from the burrows was not in evidence at that time, but numerous larvae were found in the soil in bare patches in the paddock, which were almost denuded of pasture. Larvae were found in burrows that were many yards from any growing plants. In feeding, it is presumed that the larvae extend outwards, digging new burrows as needed, since the damage occurs mostly in definite patches, which gradually increase in area. Their damage to the pasture results from two effects, directly as a result of biting off the upper parts of the plants, and secondly by burying with soil many of the young seedlings.

* Vide also Report, Waite Agric. Res. Inst., 1925/32, page 60.

It may be noted that no natural enemy of importance was seen in the field. In some places a proportion of 5-20 per cent. of the mature larvae were found killed by a fungus; they were pink in colour.

DISTRIBUTION OF LARVAE IN THE FIELD.

As well as being found in association with subterranean clover pastures, the larvae may occur in areas newly planted with a cereals crop. They are troublesome in the greens of the Mount Gaubier golf links. Larvae are usually not

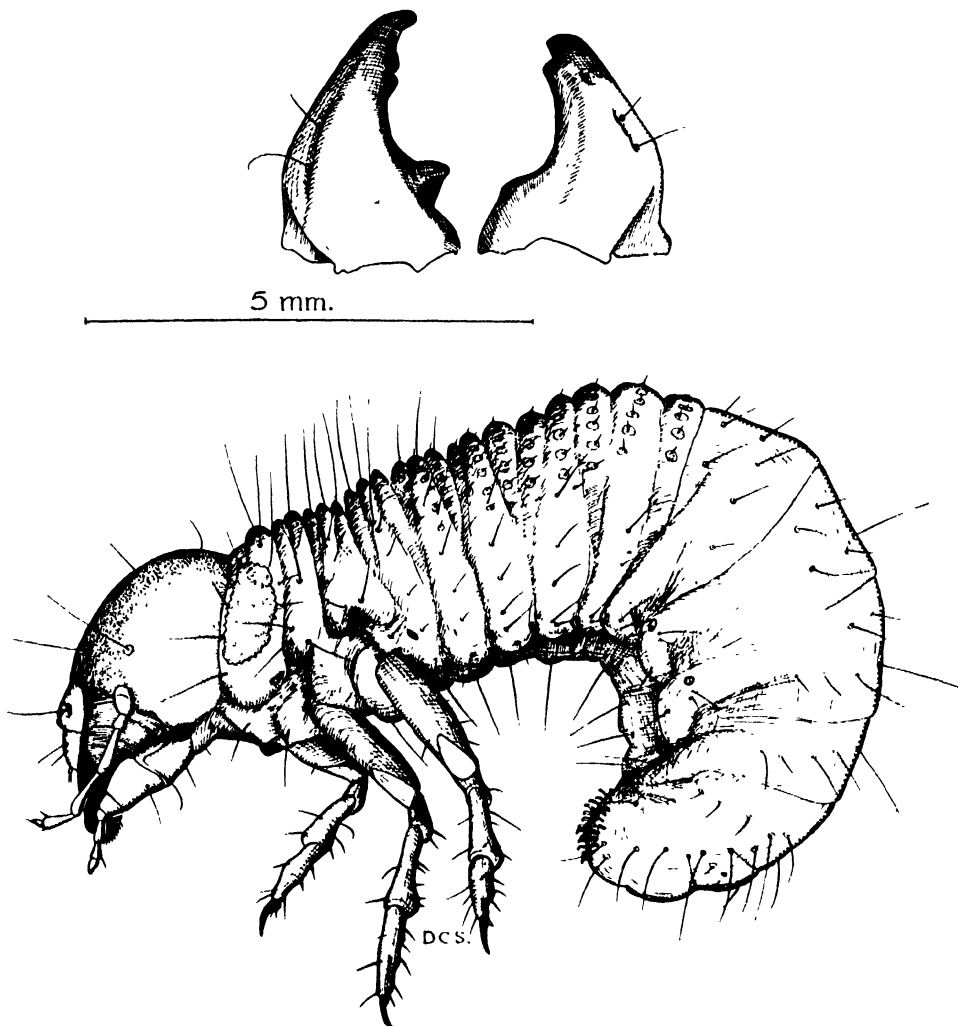


Fig. IV. *Aphodius tasmanicus* larva, and detail of mandibles.

present in the same situation in two consecutive years; an interval of several years may intervene between successive infestations. It has been noted by some farmers that the thorough turning over of soil, as a result of the tunnelling of this beetle, improves the fertility of the soil in the year following its presence.

THE PUPA (Figure 5).

From October until mid-December no change in the larvae takes place. The first pupae were found at the beginning of January, 1934. They are found at the bottom of the larvae tunnels, each pupa lying in a terminal rounded cell (Figure 3).

THE ADULT.

The first adults in 1934 were taken on January 15th, but the bulk of them generally emerge early in February, if conditions are favorable. They remain, as previously described, *in situ* in the soil for some time. The complete life-cycle, as far as it can be reconstructed, is shown schematically in Figure 2. The adult is a rather slender scarab about 10 mm. (0.4in.) long (Figure 6). The dorsal surface is glabrous, and dark-brown in color. The mouthparts are concealed by the shovel-like clypeus. The eyes are inconspicuous, the greatest surface being ventral. The legs are strong and spurred, the forelegs specially so. Males and females are similar, but in the former the pronotum is somewhat wider than the after body. In the female (Figure 6) it is the same width. The adults burrow readily. In an open petri-dish in the laboratory, they crawled actively, but showed no desire to fly, and died in two days (average temperature 73°F., average R.H. 79). The mouth-parts are weakly developed, and it would seem that if the adults

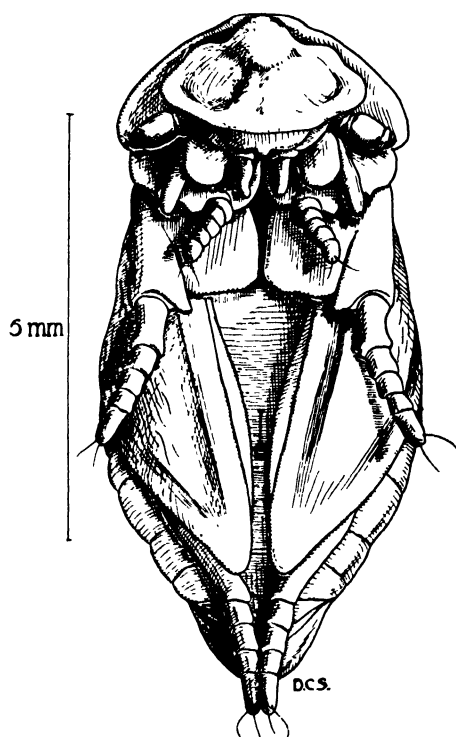


Fig. V. *Aphodius tasmaniae*, pupa.

feed at all, their diet must consist of liquid food. The mandibles are slightly chitinised, with a small molar area and a large flattened upper lobe, and are altogether unsuitable for chewing vegetable food.

As mentioned above, the adults leave the soil and a mass flight takes place. The eggs laid by the female apparently hatch after the onset of the autumn rains, when the moisture content of the soil has become adequate.

CONTROL MEASURES.

In common with other field pests which occur over wide areas, the economical control of this insect is difficult. Measures should be concentrated upon local areas where a heavy infestation is present. A spray of 7lbs. lead arsenate to 100galls. of water was found to be an effective control of the pest in the golf

greens at Mount Gambier. In the field, two objections to this method exist, first, the expense, and second, the delay before the treated pasture can be used for grazing. Such areas could be fenced and the method tried if the saving of the pasture justifies the expense. The most promising control of such areas appears to lie in judicious cultivation. Some farmers already employ this with success, and therefore do not regard the pest as serious. It will be seen from the diagram of the life-cycle (Figure 2) that the mature larvae and pupae lie in the soil until

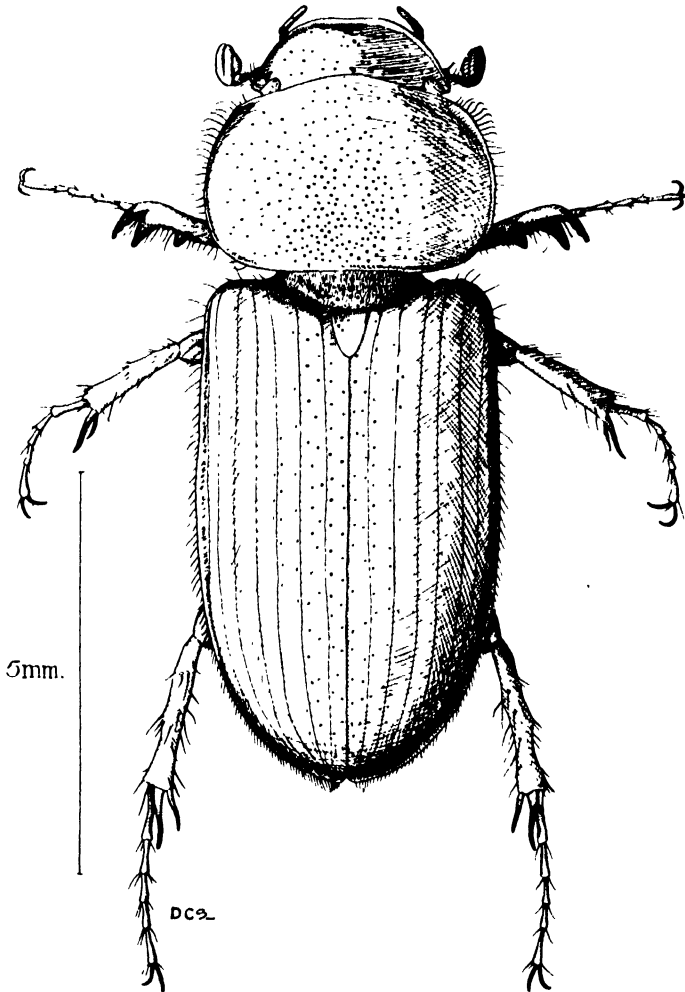


Fig. VI. *Aphodius tasmaniae*, adult female.

early January. These stages are susceptible to heat and dryness. In the laboratory in summer, the larvae died in two days when exposed in open dishes, and the pupae are less resistant. Deep cultivation in early summer should therefore cause a big mortality in these stages. Similar treatment of infested pasture in the early stages of attack should do much to rid it of the young larvae, if carried out in dry hot weather in autumn. It is probable that this is a better time for such treatment than early summer, as the pest is dealt with before the damage is done. The summer treatment will not have much effect on the ultimate number of adults in the countryside, owing to the many areas of slight infestation that will not be treated.

ACKNOWLEDGMENTS.

Much of the preliminary knowledge of *Aphodius tasmaniae* was obtained by Dr. Davidson in the course of two visits to the South-East, and the facts he obtained are embodied in this paper. He has greatly assisted the author by discussing all phases of the problem, and by making many useful suggestions. It also gives him pleasure to acknowledge the interest and assistance of Mr. E. S. Alecock, of Mount Gambier, Agricultural Instructor of the Department of Agriculture. Mr. Alecock has been the personal conductor of both Dr. Davidson and the author on the various visits made to the South East, and his knowledge of the district was most helpful. Further, Mr. Alecock kept a close watch on the progress of the larvae in the field, and the specimens sent by him from time to time have made it possible to place many points in the duration of the life-cycle. Dr. J. G. Davies, Agrostologist at the Waite Institute, has kindly supplied information relating to the pastures. Finally, a number of farmers, particularly Mr. A. A. Sassanowsky, of Mount Gambier, have rendered assistance and information during visits to their districts.

SUMMARY.

1. The problem of the "Scarab Grass-grub" (*Aphodius tasmaniae*) in the South East of South Australia is discussed.
2. It is suggested that its numbers have increased following improvement and increased stocking of the permanent pastures of the district.
3. The life-cycle of the beetle is discussed.
4. Some suggestions are made regarding control measures.

RED COMB EGG ASSOCIATION.

OFFICIAL EGG-LAYING COMPETITION, 1933-34.

Conducted at the Parafield Poultry Station under the supervision of the Department of Agriculture.

FINAL LEADING SCORES. - FIRST GRADE EGGS ONLY.

WHITE LEGHORNS.

	Eggs Laid.	Bird No.
<i>Singles—</i>		
F. F. Welford	184	130
L. A. G. Pitt	181	92
H. H. Hefford	180	67
A. G. Dawes	180	136
<i>Trios—</i>		
A. G. Dawes	461	136-138
L. A. G. Pitt	460	91-93
B. Cooke	453	19-21
T. Duhring	453	43-45
<i>Teams—</i>		
L. A. G. Pitt	879	88-93
W. A. Carter	874	13-18
B. Rowe	844	103-108

MINORCAS.

<i>Singles—</i>		
V. F. Gameau	156	139
M. O. and C. A. Roberts	111	143
<i>BLACK ORPINGTONS.</i>		
<i>Singles—</i>		
N. F. Richardson	214	205
A. G. Dawes	213	176
H. H. Hefford	206	171
<i>Trios—</i>		
N. F. Richardson	532	205-207
H. J. Mills	520	187-189
H. J. Mills	507	184-186

	Eggs Laid.	Bird No.
<i>Teams—</i>		
H. J. Mills	1,027	184-189
L. H. Crawford	743	{ only 5 birds }
S. E. Reedman	713	
		151-156
		192-198
ANY OTHER HEAVY BREEDS.		
<i>Rhode Island Reds.</i>		
<i>Singles—</i>		
H. J. Mills	170	229
B. Rowe (Barnevelders)	159	238
V. F. Gameau	153	228
<i>Trios—</i>		
H. J. Mills	388	229-231
V. F. Gameau	381	223-225
W. R. Williams	299	232-234
<i>Teams—</i>		
V. F. Gameau	629	{ only 5 birds }
W. R. Williams	593	
		223-228
		232-237

EXPERIMENTAL FEEDING TESTS CONDUCTED AT PARAFIELD POULTRY STATION.

[By C. F. ANDERSON, Poultry Expert.]

A series of feeding tests are being conducted at Parafield Poultry Station with a view to ascertaining if suitable foods which are obtainable on the majority of our farms can be satisfactorily fed to poultry. The tests are each of 50 White Leghorn pullets, and commenced on April 1st, 1933.

The feeding is as follows:—

No. 1 Test.—Morning—Wet mash composed of 1 part crushed barley, 3 parts wholemeal (by weight), $\frac{1}{2}$ lb. meat meal, 50 per cent. chaffed greenfeed.

Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 2 Test.—Dry mash composed of same proportions as No. 1 Test.

Midday—Greenfeed. Evening—Wheat.

No. 3 Test.—Morning—Wet mash composed of 1 part bran, 2 parts pollard (by weight), $\frac{1}{2}$ lb. meat meal, 50 per cent. chaffed greenfeed.

Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 4 Test.—Morning—Wet mash composed of 1 part bran, 2 parts wholemeal (by weight), $\frac{1}{2}$ lb. meat meal, 50 per cent. chaffed greenfeed.

Midday—1oz. wheat per bird. Night—1oz. wheat per bird.

No. 5 Test.—Morning—1 $\frac{1}{2}$ ozs. wheat per bird.

Evening—1 $\frac{1}{2}$ ozs. wheat per bird. Greenfeed in season.

The following are the numbers of eggs laid by each pen from April 1st, 1933, to March 31st, 1934.

Definite conclusions, however, cannot be given at this juncture with regard to the various methods of feeding. It is necessary for the tests to complete the 12 months before any satisfactory opinions can be formed.

No. of Test.	No. Eggs Laid April 1st to February 28th.	No. Eggs Laid Month March.	Total Eggs Laid April 1st to March 31st.
No. 1	6,928	459	7,387
No. 2	6,532	388	6,920
No. 3	5,973	460	6,433
No. 4	7,144	666	7,810
No. 5	3,152	202	3,354

RED COMB EGG ASSOCIATION.

OFFICIAL SINGLE TEST.

EGG-LAYING COMPETITION, 1933-34.

SECTION I.—WHITE LEGHORNS.

Competitor.	Address.	Score to Month ending March 31st, 1934.			
		Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Totals
E. F. Ashmeade	398, Magill Road, Ken- sington Park	(1) 150	(2) 76	(3) 168	394
L. R. Badcock	77, Findon Rd., Woodville	(4) 131	(5) 164	(6) 131	426
C. J. C. Burton	Mallala	(7) 105	(8) 150	(9) 75	330
C. J. C. Burton	Mallala	(10) 111	(11) 87	(12) 159	337
W. A. Carter	2, Grosvenor St., Glandore	(13) 142	(14) 167	(15) 122	431
W. A. Carter	2, Grosvenor St., Glandore	(16) 146	(17) 173	(18) 124	443
B. Cooke	Kanmantoo	(19) 162	(20) 161	(21) 130	453
H. F. Cox	Samson Road, Glanville Blocks	(22) 85	(23) *	(24) 26	111
H. F. Cox	Samson Road, Glanville Blocks	(25) 120	(26) 95	(27) 174	389
L. H. Crawford	Military Road, Grange ..	(28) 71	(29) 168	(30) 148	387
L. H. Crawford	Military Road, Grange ..	(31) 77	(32) 16	(33) 95	188
R. C. Crittenden	William Street, Kilkenny North	(34) 129	(35) 162	(36) 94	385
Chas. H. Day	Box 28, Salisbury	(37) 175	(38) 112	(39) 130	417
J. H. Dowling	Glossop	(40) 133	(41) 140	(42) 125	398
T. Duhring	Mallala	(43) 152	(44) 138	(45) 163	453
T. Duhring	Mallala	(46) 154	(47) 97	(48) 115	366
H. Fidge	313, Cross Roads, Clarence Park	(49) 131	(50) 78	(51) 104	313
V. F. Gameau	Findon Road, Woodville .	(52) 108	(53) 147	(54) 143	398
W. Chas. Slape	Magill Road, Magill	(55) 164	(56) 165	(57) *	329
G. C. Gavin	Salisbury	(58) 129	(59) 98	(60) 175	402
G. C. Gavin	Salisbury	(61) 150	(62) 103	(63) 127	380
H. H. Hefford	McHenry St., Murray Bdge.	(64) 78	(65) 84	(66) 13	175
H. H. Hefford	McHenry Street, Murray Bridge	(67) 180	(68) 120	(69) 71	371
W. H. A. Hodgson ..	Commercial Rd., Salisbury	(70) 135	(71) 158	(72) 109	402
W. H. A. Hodgson ..	Commercial Rd., Salisbury	(73) 118	(74) 115	(75) 117	350
E. A. Lamerton	Cross Roads, Edwardstown	(76) 128	(77) 46	(78) 167	341
C. H. Lines, jun. ...	Box 75, Gladstone	(79) 134	(80) 157	(81) 48	339
C. H. Lines, jun. ...	Box 75, Gladstone	(82) 143	(83) 151	(84) 143	437
V. F. Gameau	Findon Road, Woodville .	(85) 137	(86) 93	(87) 77	307
L. A. G. Pitt	24, John Street, Payneham	(88) 175	(89) 124	(90) 120	419
L. A. G. Pitt	24, John Street, P ayneham	(91) 133	(92) 181	(93) 146	460
H. A. Rasmussen ...	Swan Terrace, Ethelton .	(94) 38	(95) 160	(96) 116	314
H. A. Rasmussen ...	Swan Terrace, Ethelton .	(97) 148	(98) *	(99) 50	198
S. E. Reedman	51, Gilbert Street, Gilberton	(100) 93	(101) 142	(102) 79	314
Bruce Rowe	" St. Kevern," Two Wells	(103) 128	(104) 146	(105) 177	451
Bruce Rowe	" St. Kevern," Two Wells	(106) 156	(107) 110	(108) 127	393
H. J. Stacey	Uraidla	(109) 112	(110) 146	(111) 158	416
H. J. Stacey	Uraidla	(112) 156	(113) 137	(114) 44	337
Thomas & Elson ...	53, Clifton Street, Hawt horn	(115) 25	(116) 57	(117) 149	231
Thomas & Elson ...	53, Clifton Street, Hawthorn	(118) 121	(119) 155	(120) 145	421
H. L. Twartz	Gawler	(121) 83	(122) 166	(123) 160	409
H. L. Twartz	Gawler	(124) 117	(125) 77	(126) 149	343
F. F. Welford	1, Ludgate Circus, Colonel Light Gardens	(127) 141	(128) 140	(129) 76	357
F. F. Welford	1, Ludgate Circus, Colonel Light Gardens	(130) 184	(131) 172	(132) 42	398

EGG-LAYING COMPETITION—SECTION 1—WHITE LEGHORNS—*continued*.

Competitor.	Address.	Score to Month ending March 31st, 1934.			
		Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Bird No.— 1st Grade Eggs.	Totals
A. P. Urlwin	Box 80, Balaklava	(133) 98	(134) 178	(135) 170	446
A. W. Dawes	230, Portrush Road, Glenunga Gardens	(136) 180	(137) 138	(138) 146	464
Total—Section 1					16,823
SECTION 2—ANY OTHER LIGHT BREEDS.					
V. F. Gameau	Findon Road, Woodville (Minorcas)	(139) 156	(140) 91	(141) 84	331
M. O. and C. A. Roberts	Torrens Road, Kilkenny (Minorcas)	(142) 62	(143) 111	(144) 77	250
Total—Section 2					581
SECTION 3—BLACK ORPINGTONS.					
Arthur Cook ..	187, Goodwood Road, Colonel Light Gardens	(145) 148	(146) *	(147) *	148
B. Cooke	Kanmantoo	(148) 35	(149) 11	(150) 71	117
L. H. Crawford	Military Road, Grange ..	(151) 118	(152) 111	(153) 159	388
L. H. Crawford	Military Road, Grange ..	(154) 176	(155) 179	(156) *	355
Les. Darcy	Mypolonga	(157) 173	(158) 119	(159) *	292
Les. Darcy	Mypolonga	(160) 77	(161) 126	(162) 60	263
J. H. Dowling	Glossop	(163) 93	(164) 56	(165) 23	172
H. Fidge	313, Cross Rds., Clarence Pk.	(166) *	(167) 70	(168) 76	146
H. H. Hefford	McHenry Street, Murray Bridge	(169) 100	(170) *	(171) 206	306
F. J. Hudson	54, Willcox Av., Prospect	(172) 83	(173) 149	(174) 38	270
A. G. Dawes	230, Portrush Road, Glenunga Gardens	(175) *	(176) 213	(177) 77	290
C. H. Lines, jun.	Box 75, Gladstone	(178) 117	(179) *	(180) 127	244
C. H. Lines, jun.	Box 75, Gladstone	(181) 109	(182) 81	(183) 141	331
H. J. Mills	Edward St., Edwardstown	(184) 168	(185) 187	(186) 152	507
H. J. Mills	Edward St., Edwardstown	(187) 178	(188) 167	(189) 175	520
J. Rawe	Honeyton St., Seaton Pk.	(190) 173	(191) 83	(192) *	256
S. E. Reedman	51, Gilbert St., Gilberton.	(193) 130	(194) 87	(195) 125	342
S. E. Reedman	51, Gilbert St., Gilberton.	(196) 81	(197) 158	(198) 132	371
H. L. Twartz	Gawler	(199) 47	(200) 125	(201) 125	297
A. G. Dawes	230, Portrush Road, Glenunga Gardens	(202) 182	(203) 144	(204) *	326
N. F. Richardson ...	60, Beaufort St., Wood- ville Park, Kilkenny	(205) 214	(206) 166	(207) 152	532
W. H. L. Wittenberg	3, Rushton St., Goodwood	(208) 128	(209) 41	(210) 62	231
W. H. L. Wittenberg	3, Rushton St., Goodwood	(211) 76	(212) 135	(213) 174	385
W. Woodley	Tailem Bend	(214) 24	(215) *	(216) 116	140
W. Woodley	Tailem Bend	(217) 167	(218) 155	(219) *	322
Total—Section 3					7,551
SECTION 4—ANY OTHER HEAVY BREEDS.					
H. Fidge	313, Cross Roads, Clarence Park (Rhode Is. Reds)	(220) 51	(221) 62	(222) 54	167
V. F. Gameau	Findon Road, Woodville (Rhode Island Reds)	(223) 146	(224) 109	(225) 126	381
V. F. Gameau	Findon Road, Woodville (Rhode Island Reds)	(226) 95	(227) *	(228) 153	248
H. J. Mills	Edward St., Edwardstown (Rhode Island Reds)	(229) 170	(230) 129	(231) 89	388
W. R. Williams	28, Avenue Rd., Frewville (Rhode Island Reds)	(232) 91	(233) 108	(234) 100	299
W. R. Williams	28, Avenue Rd., Frewville (Rhode Island Reds)	(235) 108	(236) 42	(237) 144	294
Bruce Rowe	"St. Kevern," Two Wells (Barnevelders)	(238) 159	(239) 131	(240) *	290
Bruce Rowe	"St. Kevern," Two Wells (Welsumers)	(241) 37	(242) 134	(243) —	171
Total—Section 4					2,238

*Dead.

NOTE.—Only first grade eggs are shown above.

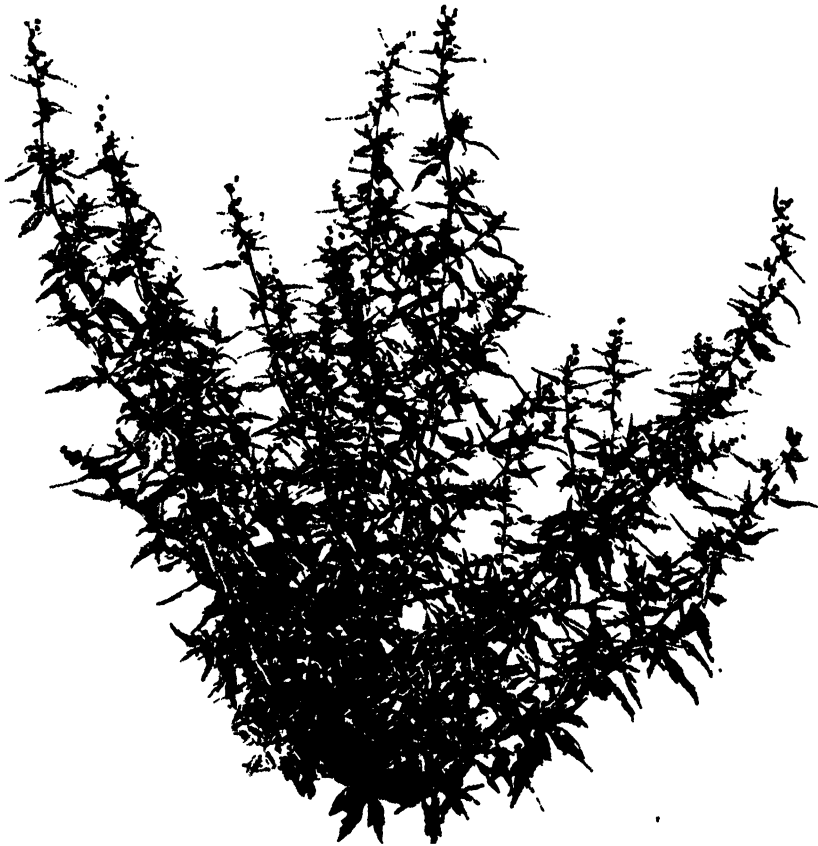
IMPORTANT WEEDS OF SOUTH AUSTRALIA.

[By G. H. CLARKE, B.Sc., Botanist at the Roseworthy Agricultural College.]

No. 5.—BATHURST BURR.

(*Xanthium spinosum*, L.)

Xanthium spinosum was introduced into Australia in the forties, and is believed to have originated from burrs carried in the tails of horses imported from Valparaiso, South America. Within a few years it had spread to Bathurst, New South Wales, and the plant has come to be known throughout Australia as Bathurst Burr. It is a noxious weed in all of the States, and is objectionable



Bathurst Burr, showing general habit. (See colored plate opposite.)

mainly on account of the burrs, large numbers of which are formed on each plant. The burrs, which are egg-shaped and about $\frac{1}{4}$ - $\frac{1}{2}$ in. long, are covered with hooked spines by means of which they cling very tenaciously to clothing and to the coats and tails of animals. They are especially troublesome in wool, and the value of wool may be depreciated thereby; in fact, the weed has been responsible in the past for considerable financial losses both in this country and in South Africa. Owing to the ease with which the seed-containing burrs are distributed, the plant has been unconsciously spread by man throughout most



BATHURST BURR.

(*Xanthium spinosum* L.)

A.—Leaf, showing the strong trifid spines (natural size).

B.—Fruiting head (Burr), covered with prickles (enlarged).

warm parts of the world, and to such an extent that there has been some doubt as to its native home. It is believed to have come originally from Chili in South America, but it now occurs extensively in Europe, Asia, Africa, America, and Australia.

The Bathurst Burr is easily recognisable by its erect much-branched habit of growth, its lanceolate mostly 3-5-lobed leaves which are dark-green and prominently veined above but greyish-white below, its three-branched yellow spines, and by the burrs which are clustered in the leaf-axils. All of these characters are well shown in the accompanying illustrations.

Botanical Name and Classification.—*Xanthium* (from the Greek, *xanthos*, yellow) is on account of a yellow coloring matter obtainable from certain species and said to have been used by the ancients for dyeing the hair; *spinosum* refers, of course, to the presence of spines. The plant is a member of the *Compositae* or Thistle family, but belongs to a different tribe from that including the thistles proper. Some peculiarities of this family were mentioned in the course of a description of the Star and Saffron thistles in the issue of the *Journal* of February last. It was pointed out there that the so-called "flower" of *Compositae* is really an aggregation of tiny flowers or florets, surrounded and protected by an involucre of bracts. Now the compositous nature of Bathurst Burr is not at first evident; it is difficult to recognise in the burr of *Xanthium* the structure of a compositous flower-head. Nevertheless the burr is such a flower-head; it consists of a pair of female florets—or of a pair of fruitlets derived from these—enclosed within a spiny covering made up of the fused involucre bracts. The compositous structure is, however, more clearly revealed if the uppermost leaf axils are examined with the aid of a magnifying glass. Here, in place of the burrs, are formed small heads of male florets of a more typically compositous pattern; the individual florets, though small, are numerous, and the surrounding involucre bracts are free from one another. Thus *Xanthium* is peculiar in having unisexual florets, the males and females being grouped in distinct heads with the former towards the tips of the branches, while the latter are situated lower down and develop, when ripe, into the characteristic burrs. The inconspicuous nature of the heads, both male and female, is associated with the fact that the *Xanthiums* are pollinated by wind and not by insect agency.

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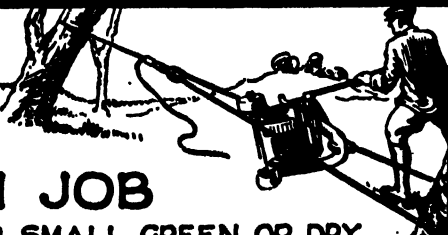
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The Genus.—There are several species of *Xanthium*, all of which are annual, and most of which belong to the Mediterranean region. The only other species present in this State is *Xanthium californicum*, Greene, a native of California and known as Californian Burr. It differs from *X. spinosum* in being devoid of spines on the stems and in having broader leaves and somewhat larger burrs, each of which bears two conspicuous incurved beaks at the end. The Noogoora Burr of the Eastern States is said, by some authorities, to be *X. strumarium*, L., a native of Europe, and by others is named *X. pungens*, Wallr., which belongs to eastern North America. Possibly both species occur there.

Botanical Description.—*X. spinosum* is a rigid much-branched annual of 1ft. to 2ft., studded with numerous strong trifid spines usually opposite, in pairs, or rarely solitary, divaricate, placed at the base of the leaves but rather within the petiole. Leaves lanceolate, trifid, with the central lobe much longer than the lateral ones, slightly scabrous above, white tomentose underneath. Flowerheads in axillary clusters or almost solitary, the upper ones male, the lower female; these are sessile, forming when in fruit oblong burrs about $\frac{1}{2}$ in. long covered with hooked prickles, the terminal conical beaks exceedingly short, often both reduced to mere tubercles or one only slightly elongated. Period of flowering: February to July.

Properties.—The Bathurst Burr is said to be poisonous, but owing to the spines is seldom eaten by stock. It is mainly on account of the burrs that the plant is so very serious a pest. Each burr contains two seeds, one of which germinates the following season while the other does not develop until the second or third year. The burrs represent an extremely efficient method of dispersal, and this is evidenced by the very wide distribution of the plant throughout the world. Thus its spread through Europe from the East has been described:—

“In 1828 it was brought into Wallachia by the Cossack horses whose manes and tails were covered with the burrs. It travelled in Hungarian wool, and in cattle from the same region to Regensburg, and on to Hamburg, appearing here and there on the way.”

While the spread of the plant is mainly by animal agency, the burrs may be carried by floodwaters, as is shown by the frequent occurrence of large numbers of plants along the banks of creeks.

As regards Bathurst Burr and its relation to wool, the writer is indebted, for the following remarks, to Mr. A. H. Codrington, Senior Lecturer in Wool-classing at the Adelaide School of Mines:—

Much of the Bathurst Burr is eliminated from wool during the scouring process, and removal of the remainder is effected either by the application to worsted carders, or by special devices for removing and crushing this impurity. Removal of the subdivided particles of crushed burrs is then a function of the combing machines. As regards the effect of Bathurst Burr on the value of combing wool, unless the quantity present in the fleece is sufficient to reduce the wool both in type and value to a considerable extent, the estimated price of grease wool is only lowered in proportion to the percentage or weight of the burr present, as such wool would not undergo the carbonizing process, which would mean a considerable expense. The Bathurst Burr is not such a serious impurity in wool as Burr Trefoil, because the latter may in some cases require to be removed by carbonization.

Eradication.—The weed is an annual, and spreads entirely by seed. It is easily kept under by cultivation methods, and so is not a serious pest on agricultural land. It is in pastoral country that the weed is so formidable, and the only sure method of eradication is to prevent the plants from developing seeds. Where possible, therefore, the plants should be cut down and burned before the burrs have ripened. Sheep pastured on burr country should not be transferred to clean lands without being shorn.

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IMPROVING THE BUTTERFAT STANDARD OF OUR DAIRY HERDS.

[Paper read by W. H. DOWNES, H.D.A., Dairy Instructor, at the Conference of Lower South-East Branches of the Agricultural Bureau, Tantanoola, April 11th.]

In view of the very depressed condition of the dairy produce market at the present time, it may appear to be the wrong time to preach the gospel of improvement, especially along lines which tend to create increased production in a commodity with which the world already seems to be too well supplied.

The present lot of the dairy farmer is not an enviable one; he has to work just as hard, or even harder, than before for an income so low that it is ridiculously out of all proportion for his labor, and besides representing less than a poor living wage will not enable him to meet ordinary farm expenses in most instances. While our sympathies are with those who are experiencing extreme hardships in this industry just now, in reviewing the past it must be admitted that the position has not always been so hopeless. Many past seasons have proved the advisability or necessity of including dairying among other mixed farming pursuits to augment the general farm revenue. Indeed, it is very doubtful whether many of those engaged in agricultural pursuits would have survived the depression without some assistance from dairying. The very fact that a regular income has been derived from this source—small though it may have been—has undoubtedly enabled a great majority to carry on. The principal factor on which the future progress and success of dairying depends is not so much increased production, but economic production, on the soundest lines, and in the truest sense of all that it implies.

Probably there has never been a time when improvement along these lines has been more vitally necessary than to-day. For the present, such improvement should naturally take place along avenues of the least possible expenditure. One of the first steps in this laudable direction will, however, involve a fair expenditure, but the farmer who carries it will be more than amply compensated for his first outlay.

THE USE OF A PURE-BRED HERD SIRE.

I refer to the improvement of the dairy herd through the introduction of a well-bred sire of recognised quality descended from ancestors of noted butterfat production. During past years this matter did not receive the attention it certainly deserved, with the result that district herds, generally speaking, are nothing to be proud of, neither as regards their general appearance nor their capacity to produce. In addition, it is true that many farmers failed to embrace the opportunity to improve their herds by this means when dairy prices were better than they are to-day.

The small number of high-class bulls purchased in a district of this size is disappointing, and will need to be greatly augmented before much in the way of general herd improvement can be achieved. The type or strain of bull used counts considerably. It has frequently been proved that the merits of a fine-quality bull have never been appreciated fully until after the animal has been disposed of. The qualities of most highly-bred animals are usually very firmly fixed, far reaching, and readily transmissible to many generations of their progeny. There are many instances which could be quoted in support of this statement, but I will merely quote one:—In the year 1919 a World's Champion Jersey Cow, "Wagga Gladys," was born, and her production figures will easily bear repeating. During the year 1927, as an 8-year old, she established a world's record for the breed by yielding 1,149lbs. of butterfat in a lactation period of 365 days. For five consecutive periods her production averaged well over 800lbs. of butterfat. Her

sire, "Goddington Noble XV.," was an imported bull from the famous stud of that name. This bull was the sire of a long line of heavy producers, and the fact that 19 of his daughters averaged 566lbs. of butterfat in lactation periods of 273 days should require no further recommendation. "Posey V. of Richmond," a granddaughter of "Gladys" and a great-granddaughter of "Goddington Noble," created a new record for the breed with 800lbs. of butterfat as a 3-year-old in an ordinary lactation period. "Richmond Fox," a son of "Gladys" and the sire of "Posey V.," is in use at the Hawkesbury College stud, and besides possessing exceptionally fine outward qualities is proving very satisfactory as a begetter of heavy producers. These facts serve to indicate how deeply and strongly seated are the production qualities in well-bred animals, and further, the ability and ease with which they transmit these characteristics to their progeny. Dairymen in this State have the added advantage of the Bull Subsidy Scheme to assist them in purchasing the right class of animal with which to uplift the quality of their herds, and they should utilise it to the fullest extent. In making the purchase of a bull, a personal inspection is strongly recommended if possible. A buyer can then determine whether the bull is suitable, or the type required, and may also satisfy himself with regard to details relative to breeding, butterfat production, etc.

THE SELECTION OF A HERD SIRE.

The buyer, if making his selection personally—with a number of animals from which to choose—will do well to observe the following points:—The bull should be well grown for his age, and possess a well-balanced conformation. A predominance of masculinity with an absence of viciousness should be noticed. There should be a fairly massive appearance throughout, without running to undue fleshiness or fat. A nice head appearance, a massive neck, and a roomy, well-sprung barrel, supported on strong, straight legs. The bull should walk with an active carriage, and the skin should be soft and smoothly coated—all points which usually denote good health. In studying the pedigree it should be apparent that the bull is descended from a strain of heavy-producing ancestors on both sides. As the breeding up of better producers takes some considerable time, the purchase of a quality bull is of foremost importance. Other important factors to be considered in reaching the desired goal of increased herd production obviously include feeding and management.

FEEDING.

Improvement in feeding methods can be carried out in two directions, viz.: (1) better facilities for pasture, and (2) improved methods of fodder conservation. Pasture really represents the dairyman's main crop, and as such its improvement should receive early consideration. One of the first essentials towards the better management of pasture is the subdivision of large paddocks into smaller plots, and provided that posts are available, and the farmer has the time at his disposal to carry out the work, this should not prove a very costly item. The advantages of having a greater number of small paddocks available should at once be apparent. It facilitates rotational grazing or regular change of pasture for stock, which is far more preferable, and will prove of greater benefit than if they are permitted to graze over a large area. The nature or quality of the pasture can be more easily improved as the farmer can usually concentrate on the smaller area, and the proper treatment of pastures after being grazed can be more easily accomplished. When time and money permits, each paddock can be sown down eventually with a suitable mixture of certified seed, and later subjected to a proper system of top-dressing. During seasons of pasture scarcity and lack of cultivated green crops, the milk supply will rapidly fall unless supplemented by food in some other form. It is for this reason that dairymen are urged to conserve fodder for lean periods, and though hay seems to be fairly popular as a means for keeping cows full and in good condition, owing to its dry nature it cannot be strongly recommended as a milk-producing food.

ENSILAGE.

Ensilage is becoming increasingly popular in this State as a fodder, principally for cows and, by reason of its succulent nature when properly made, provides the best substitute for grass or greenfeed. Where a small herd is concerned, the cost of erecting a suitable silo would be a prohibitive item, but there is nothing to prevent the building of an ensilage stack. Most cereals are excellently suited for the making of silage, but in addition these grass and various other fodder crops may be utilised with satisfactory results. In building a silage stack, bear in mind that a fair percentage of the sides and top of the stack will be waste material. On this account it is advisable to make stacks of large size, because the proportion of wastage will be less on one large stack than on two half the size. Most fodders should be cut for ensilage at a stage just after flowering, when the grain is in the milky or doughy stage. It is important when stacking the material to compress it very thoroughly, especially round the sides. In this way the stack is more or less sealed from the ingress of air likely to cause delayed fermentation and a greater percentage of mouldy fodder. Guide poles may be utilised to keep the stack straight whilst building and settlement is in progress. The quality of the silage depends on the quality of the crop ensiled, but many crops have a tendency to improve during the curing process, thereby proving far more palatable to stock. It is surprising how well cows maintain or even increase their production when fed with ensilage.

ADVANTAGES OF ENSILAGE.

Some of the chief reasons why ensilage should commend itself to dairymen as a fodder distinctly superior to hay or chaff are:—Ensilage on account of its succulent nature appeals to the palate of cows more readily, and tends to keep them in heavier production than any fodder of a drier nature. A much greater weight of fodder is secured as fully 80 per cent. of the original green weight is retained. A stack or silo of well-cured silage will remain in good condition for a number of years provided it is kept well sealed. Once properly cured the danger of fire is nil. It is not a very attractive fodder for the ravages of mice. During excessively dry seasons silage will keep cows in good laxative condition, thereby minimising losses caused by dry bible. Waste green material, such as thistles, may be used for making silage, and therefore converted into useful fodder. Weeds may be better kept in check by reason of the fact that they are harvested with the ensilage crop before their seeds have had an opportunity to ripen.

GENERAL MANAGEMENT.

Apart from the actual feeding, there are several other important points in connection with the successful care of the herd which are well worthy of consideration. Regular milking hours, proper resting periods for dry cows, the rearing of healthy calves, and a plentiful supply of good water may all be included. Cows are animals of regular habit, and respond much better to regular treatment. Milking should be carried out at regular hours, and each milking spaced to as near a 12-hour interval as convenient. Gentle treatment, and the absence of noise at all times, are factors which favor the best production. A rest of from two to three months between lactations is absolutely essential in order that the cows may produce well during subsequent lactation periods. The work of milk production is a heavy drain on an animal's system, and a cow that does not receive this rest usually has not had sufficient time to replenish her system, and she comes into milk again in such a poor condition as to be totally unfitted for a period of sustained heavy production. Dry cows should be pastured on medium feed so that they may obtain sufficient exercise whilst securing their food to maintain them in good muscular condition. They should be under continual observation during this period so that on the first sign of any calving trouble, immediate attention may be given.

REARING THE CALVES.

The healthy heifer calves from the best cows should receive first consideration, but if there is still a surplus of milk it will probably pay to rear even more of them, particularly where land values are low. Careful feeding tends to minimise losses among young stock, and is productive of well grown, thrifty calves. Cleanliness, combined with regular feeding hours and a uniform ration of sweet milk at the correct temperature, are factors favoring this desirable result. The common danger of a greedy calf over-gorging, with the frequent result of sickness or death, may be avoided by using separate feeding vessels for each calf. A ration of 10lbs. to 12lbs. of whole milk, equally divided into two feeds per day is recommended during the first three weeks, and if possible the mother's milk or beastings provided during the first week of the young calf's life. During the fourth week a gradual change may be made to skim milk by breaking down the whole milk each day with a slightly increased quantity of skim. When the calves have been placed on a ration of skim milk, it will be advisable to add some fatty substitute to replace the food value of the cream removed. The addition of a quarter to half a pint of limewater to each feed is of great benefit to young calves, because it tends to induce better growth and bone development.

HERD TESTING.

This is the only practical means whereby a dairyman can check the individual production of his cows, and the man who has not sufficient interest in his herd to have them tested is working in the dark. It is indeed a pity that no testing associations are operating in the South-East, for there surely must be tremendous scope for improvement in this direction. When taken seriously, testing becomes very interesting, and is full of surprises to even the initiated or the man who considers himself a good judge of dairy stock. Frequently, as a result of not employing a regular herd test, good producers are disposed of and wasters are often retained. Each individual cow when tested becomes a separate unit of the herd, and according to her value as a producer so a definite value may be placed on her. Testing enables a dairyman to weed out the non-paying members of the herd, and concentrate only on those which prove profitable. It is also a distinct guide to feeding correctly and sufficiently, and will definitely show the producing capabilities of the herd sire when his heifers reach their age of production. There is much to be said in favor of testing, the cost of which is comparatively trifling when compared to the great losses at present involved through feeding, handling, and milking the wrong type of cow.

SORE SHOULDERS.

"The successful prevention of sore shoulders is wrapped up in close attention to the following matters" (says Mr. A. H. Robin, B.V.Sc., Government Veterinary Officer):—

1. Proper and gradual "conditioning" of the animal for work.—As an aid to hardening or toughening the skin of the shoulders, these parts can be swabbed daily with a strong solution of salt or a decoction of wattle bark, immediately after removing the collar.

2. Proper fitting of the collar.—Every horse requires to have his own collar, which should be properly and carefully fitted to him, and any necessary adjustments should be made from time to time as the horse gains or loses in flesh. Remember that a collar that "fits" a horse when he is in good flesh will not fit him when he gets poor, and *vice versa*.

3. The shoulders where the collar sits must by regular daily grooming (before the day's work is begun) be kept clean and free from accumulations of dried sweat, grime, &c., that are likely to set up chafing of the skin. Likewise, the linings and stuffing of the collar should by regular attention be kept clean and soft, instead of being allowed to become caked and hard with sweat, grime, &c.

HISTORY OF KYBYBOLITE STATION.

ESTABLISHMENT OF KYBYBOLITE EXPERIMENTAL FARM.

[By E. S. ALCOCK, Agricultural Instructor.]

The Kybybolite Station, which is situated in the South-Eastern district of South Australia, is in the hundred of Binnun, 13 miles north-east of the township of Naracoorte, and about 80 miles from Mount Gambier on the Mount Gambier-Wolseley railway line.

This property was originally selected by Edward Townsend in the 40's. No records of the date of his arrival are available. However, records state that the name was changed in 1849 from Townsend's Run to Kybybolite.

Prior to July 1st, 1851, pastoral lands were held in the South-East under what were known as "Occupation Licences." These cost £5 per annum, with the addition of annual charges for livestock. For every ram, ewe, wether, or weaned lamb the sum of 1d. was paid; for every bull, cow, ox, steer, heifer, or foal under six months, the sum of 6d.; and for every horse, gelding, mare, or foal over the age of six months, the sum of 2s. 6d.

It is also interesting to note that the pastoral leases issued after July, 1851, were charged according to the classification of the land—as first-class land, £1 per square mile per annum; second class, 15s. per square mile; and third class, 10s. per square mile. This area was classed as second-class land in those early days.

Records show that Edward Townsend was allotted lease No. 163, 64 miles of waste lands, from the Crown on July 1st, 1851, for a term of 14 years at an annual rental of £48 per annum.

He apparently lived over the border, since his address was Victoria, and he sold this lease for £10,000 on February 2nd, 1855, to Mr. Heighway Jones, a Welshman, and a brother of Henry Jones, who took up Binnun, Conkar, and Cadnite. Mr. H. Jones surrendered the lease upon condition of receiving a new lease of the same lands on May 31st, 1859. The new lease dated from July 1st, 1859, for a period of six years, carrying an annual rental of £181 6s. 8d. per annum, or £2 16s. 8d. per square mile.

This lease carried a condition which allowed the original lessee to sell, and Mr. Jones took advantage of this on June 10th, 1863, when he disposed of all his interest to James Affleck. A new lease was made out in the name of James Affleck on June 10th, 1863, carrying the same conditions, and this lease expired in 1865.

The land was again taken up by James Affleck, and a new lease was issued for five years, bearing an annual rental of £354 12s., or £5 10s. 10d. per square mile, on July 1st, 1865.

Then in 1869 this lease was subdivided by Surveyor Gosse as the hundred of Binnun. Kybybolite Head Station was situated on section 57 (608 acres), the freehold of which was purchased at auction by James Affleck for £2,280, or £3 15s. per acre, on July 21st, 1870. He also purchased most of the adjoining sections at the same time.

James Affleck died on February 15th, 1875, and this property was transferred to his executors, H. G. Cattanaach and R. Smith, in 1879. The property, which contained 26,614 acres, was purchased by George Stanley Harris from James Affleck's executors for £62,500, or £1 19s. 2d. per acre, in 1885.

Then, in 1888, Mr. Harris leased this station to Mr. Richard Kiddle, who purchased 26,783 acres from Mr. Harris for £52,500, or £1 19s. 8d. per acre, in 1890.

In 1905 the land was re-purchased by the Government from Mr. Kiddle for the sum of £63,498, or £2 7s. 6d. per acre, for closer settlement.

The original homestead was about three miles further north than where the present house stands. This was built by Mr. J. Affleck about 1861. There is no record of the name of the contractor, but it is understood that Henry Holmes and Harry Smith assisted with the building. It is a fine two-storey building of local stone, and is in a good state of preservation. The homesteads at Crower and Cairnbank were built off the same plan; both these properties are in the Lucindale district; and also Mortat, in Victoria.

Like most station properties, there is a private cemetery, and the one at Kybybolite has several graves in it. Very few of the station buildings are standing to-day, but the old buggy shed and stable are now used for barns, and the loft for storing odds and ends. Portion of the old wool shed and sheep yards are still in use, but the men's hut and other buildings have been pulled down and the material used where possible in the erection of more serviceable buildings. The immediate neighbors during the late sixties were H. and D. O. Jones, who owned Binnun in the north and Conkar and Naracoorte in the west. The former belonged to H. and D. O. Jones, and the latter to Thomas Magarey, whilst Hynam and Broadmeadows, belong to Adam Smith, bounded it on the south, and the Victorian border on the east.

EARLY RECORDS OF STOCK AND RETURNS.

It is not easy to secure reliable information regarding the numbers of stock carried on this property in the early station days, and the same remarks apply to the wool cut annually. However, the following have been supplied from various sources, and are as near as I have been able to get at present:—

Mr. R. Kiddle carried approximately 11,000 sheep, which cut an average of about 6lbs. of wool per head, and about 200 bales of wool. Another report states that they celebrated the occasion when the 300 bale mark was reached. It is also well known that they had to purchase the bulk of their ration sheep in those days.

These statements must be near the mark, for records of the clearing sale of this property, which was held on March 23, 1905, showed that they sold 12,992 sheep, which realised £7,482 1s. 3d., or 11s. 7d. per head; also 95 cattle for £313 14s. 6d., or £3 5s. 11d. each; and also 40 horses. These sheep would also include the previous season's surplus. Mr. Kiddle sold 26,760 acres at £2 7s. 6d. an acre in 1905, and this was cut up for closer settlement in blocks of about 700 to 800 acres, and records show that the total number was 49 blocks. To-day there are only 11 original settlers left.

THE EXPERIMENTAL FARM.

The homestead, together with 1,005 acres immediately surrounding it, was retained for an experimental farm, in order to assist the new settlers and the South-East generally. Two blocks were not allotted, and these were also used for same by the farm.

LAND.

The land is slightly undulating, and varies considerably in texture, color, and composition. However, the greater portion consists of a comparatively heavy, cementy loam, containing a large proportion of ironstone rubble over a very stiff clay, which varies in depth, and is practically deficient in lime. There is, however, a fair amount of heavy "crab-hole" land, which is more fertile, but also more difficult to work. Land of a similar type is to be found alongside the Victorian border practically to the coast.

NATURAL VEGETATION.

The natural timber consisted of fine, stately red and blue gums, with some magnificent and not sufficiently appreciated, but shady and shapely dry land ~~ti-trees~~ and bulloaks; these trees present a fine, park-like appearance, and have a

charm all of their own. Mr. Ebenezer Ward, in his book, "The South-Eastern District, 1869," states that "Although ordinary good grazing land, I am doubtful whether much of it could be profitably farmed."

The natural grasses were mainly wallaby grass, silver grass, and kangaroo grass, but since much of it was rather wet during the winter, it grew very little useful vegetation naturally, as we shall see later on. Then, large'y on account of the ill-nourished sheep, it was known by some as "Scabybolite."

NATURAL DRAINAGE.

Throughout this district, a number of runaway holes are found. These consist of depressions into which the water gradually flows and then gradually disappears, nobody knows quite where. These holes are both interesting and useful, and enormous quantities of water disappear down them in a very short time, and the change in appearance overnight is nearly enough to make one wonder if they can believe their eyes.

One of the holes is situated in part of the homestead at Kybybolite. The old station garden was planted on the banks surrounding this runaway hole, and was quite a source of attraction in the early days, particularly when the fruit was ripe. Kybybolite is a native name, and some say that it means "runaway hole," or "the noise that the water makes running down these holes." In the early days during the winter months it was difficult, and even dangerous, to gallop a horse over much of this country because it was so soft that a horse would sink to his knees, and teams would get bogged when drawing empty vehicles.

Under these conditions the difficulty of growing cereal crops can be better imagined than described, and thus the earlier managers spent considerable time and money in the making of drains to receive the surplus water, three-quarters of which they were able to drain into the runaway hole previously mentioned, and the remainder into one of the branches of the Naracoorte Creek.

A few figures relating to the rainfall may be interesting here, at the same time showing the disabilities which the earlier settlers had to contend with. The rainfall for the year ended December 31st, 1906, was 36in., of which 4in. fell during May, 5.35in. in June, and 9.35in. in July; then in 1909 the total fall was 27.84in.; 1910, 28.35in.; 1917, 26.69in.; and 1923, 25.67in.; since then the annual fall has been lighter.

The average yearly fall, 1906 to 1930, is 21.85in., whilst the average for 1906-1912 was 25.63in., then 1906-1915, 23.31in., and 1916-1925, 21.04in., and 1926-1930, 20.6in. The need for drainage was apparent since the growing of cereals was the main objective, and therefore 19 miles of surface drains were excavated by means of a plough and crowder, at an estimated cost of £2 per mile. The remains of many of these can still be seen to-day, but of latter years they have hardly functioned. Then later, in some of the fields difficult to drain, the land was ploughed in lands with a high crown to facilitate drainage.

MANAGERS.

The first manager, Mr. Simein Schinckel, of Naracoorte, was appointed in because of his practical knowledge of local conditions. He held the position for 12 months, and did a good deal of pioneering work under Professor Angus. Then he handed over to Mr. Harold Wilson, now manager of Werribee Research Farm, Victoria. He was transferred to Loxton Experimental Farm in 1909, when Mr. W. J. Colbatch was appointed Superintendent of Agriculture in the South-East, and stationed at Kybybolite. His efforts were mainly spent in getting a good grip of the conditions, and some years the yields for wheat were as high as 27bush. per acre. Then, in other years, they were as low as 6bush. per acre, and therefore it can be readily understood that he was soon convinced that cereal growing could not be carried on without drainage. He therefore turned his attention to this problem,

and also the testing of various grasses, in addition to such pioneering work as clearing, ring-barking, and burning logs, &c. Some fields were cleared by means of explosives, and some local residents have a vivid recollection of some of the demonstrations.

Whilst Mr. W. J. Colebatch was in charge he had the boundary of the farm securely wire-netted, thus making it rabbit-proof, and at the same time many fields were subdivided and made into smaller and more useful paddocks; many of the roads were formed, bores put down, windmills and tanks erected, and the cypress planted either side of the drive from the siding to the homestead. The men's quarters and the implement shed were also built.

POULTRY.

A poultry station was carried on under the supervision of Mr. D. F. Laurie, with Mr. W. C. Kearney in charge, and an egg-laying competition was conducted for the benefit of the South-Eastern poultry keepers.

Then Mr. L. S. Davis took charge for a year or two under Professor A. J. Perkins, Director of Agriculture. He inaugurated the change-over to livestock from cereals. The present manager, Mr. L. J. Cook, took charge in 1920, and he has raised the standard of work to a very high degree. It was largely owing to his efforts that the experimental farm was not closed a few years ago. When Mr Cook took charge, all the young stock had to be sent away, as soon as they were weaned, to another farm, Veitch, in the Murray Mallee. But now, with the use of licks and top-dressing and improvement of pastures, this difficulty has been overcome, and during the last year or so the position has been reversed, and they have stock from other farms on agistments.

STOCK RECORDS.

When the estate was cut up in 1906 it was subdivided into holdings of about 700 to 800 acres each; records show that the total number was 49 blocks. The homestead, together with 1,005 acres immediately around it, was retained for an experimental farm, in order to assist the new settlers and the South-East generally. However, two other blocks were unallotted, and they were also used until 1920.

In 1910 the total area of the farm was 2,272 acres. Area under crop was 432 acres; fallow, 69 acres; orchard, 12 acres; roads, yards, &c., 10 acres; natural grasses, 1,749 acres. Stock consisted of 23 horses, 21 cattle, 19 pigs, and 1,302 sheep.

To-day the area of the farm is made up as follows:—Under crop, 148 acres; pastures 797 acres (including 100 acres not improved); road, yards, orchards, etc., 60 acres. The stock carried for the immediate 12 months were as follows:—Horses, 24 (including 20 on agistment); cattle, 122; pigs, 58; sheep, 1,464 (including stud English Leicester and Crossbred breeding ewes).

Mr. Cook, in his 1930 report, stated that the number of sheep carried on the farm has increased 148 per cent., and 224 per cent. in production of wool during the last six years.

Then in 1931 his report shows a further increase over the seven-year period:—Number of sheep increased 150 per cent., and wool 200 per cent., and the cattle 98 per cent., and butterfat 152 per cent.

Thirty years ago 26,760 acres cut 200 bales of wool, or it took 130 acres to produce one bale of wool; to-day 1,000 acres are producing 90 bales, or one bale from 11 acres. It has been estimated that to-day there are 33,000 sheep, 700 cattle, and 150 horses running on what was the Kybybolite Estate. Of this area about 9,000 acres have been improved, and the balance is just as it was in station days, except some which has been broken up and cropped, and then left without further treatment, and probably of the 9,000 acres not more than half is regularly top-dressed.

LEVELLING.

A considerable area of the land in this district is somewhat similar to many other parts of the Commonwealth; the surface is so irregular that it needs levelling before it can be cultivated satisfactorily. Those areas enjoy several names, as "Bay of Biscay," or "Crab-hole," or "Gilgi," which give some idea of their natural appearance, which someone has described thus—"It looks as though someone had used a tip-dray all over it." The holes vary in depth from a few inches to over a foot, and from 3ft. to 2 chains wide. Mr. Colebatch commenced by using a plough and scoop for filling the larger holes. Then later Mr. Syd. Shepherd made a leveller, which he used with success on his farm. The land was first ploughed when wet with a disc plough, then left until harvest, when the leveller was used. A paddock of 200 acres, which grew practically nothing, was thus converted into one of his best paddocks, and he is now using it on his other fields, levelling them, and thereby making his holding more valuable and productive, for levelling prevents the surplus water from lying about, and improves the conditions for stock generally, especially lambing ewes.

GRASS OR MEADOW HAY.

The increased stock-carrying conditions which were brought about with the improved pastures necessitated the storing of some of this vegetation for use during the lean periods of the year. Mr. L. J. Cook, Manager of Kybybolite Experimental Farm, saw the need for this, and arranged a Field Day, when a number of implements were given a trial on one of the farm paddocks. The result was so successful that now each year the majority of the settlers cut some of their surplus feed during the spring, and store as either ensilage or meadow hay.

The clover and grass is first cut with a grass mower, then picked up with a sweep rake, and conveyed either to the stack or, in the case of hay, it may be pushed up to the baling or pressing machine, and put into handy-sized bales.

Where the loose stuff is stacked, stackers are used. These save the heavy labor involved in pitching it up on to the stacks. This is a big consideration, because the difficulty of handling loose hay was one of the principal reasons that more of this class of fodder was not used. Then last year a grab was introduced for handling the ensilage and hay, and this implement will be generally used.

Another difficulty was the cutting of these heavy crops of clover in the early days, but to-day by using machines with shorter cutting blades and a faster drive, no difficulty is experienced in handling the heaviest and most tangled crops. At the present time five baling plants are in regular use in the Kybybolite district.

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DEPARTMENT OF AGRICULTURE.

Bulls that are purchased under regulations of the Dairy Cattle Improvement Act, and upon which Government pays a subsidy, are available, for two years after purchase, to serve a certain number of outside cows.

The following list, compiled by the Department of Agriculture, shows the names of such bulls and of the people who own them, and indicates also the months until which the respective owners will be prepared to make the services available.

As will be noticed, the distribution of subsidised bulls is now fairly general throughout the State; hence, many of those persons, who in the past have found it difficult to get the use of a good bull, should not have much similar trouble in the future. And here let it be stated that everyone of these subsidised animals is a registered pure-bred and from a dam of proved productivity under Government official test.

The maximum service fee is 10s. per cow.

For the information of cowkeepers, it is pointed out that, although the addresses as given in the following list are those to which application should be made for the services of the bulls, the bulls themselves may, in a few instances, be located elsewhere.

Departmental Ref. No.	Breed.	Bull.	Owner.	Address.	Date when Subsidy Conditions Cease.
779	Friesian	Glenowie King Sylvia	R. C. McHugh	Burnside	July, 1934
812	"	Murray Glen Netherland Grielda	D. Smith	Hectorville	June, 1934
820	Jersey	Morella Sweet Duke	S. C. Bradley	Richmond Park	June, 1934
899	Friesian	Murray Glen Netherland King	A. E. Press	North Adelaide	Sept., 1934
900	"	Glen Murray Pletje Pontiac	Boys' Reformatory	Magill	Oct., 1934
910	Jersey	Para Vale Milkland 2nd ..	F. P. Smith	Blackwood	Sept., 1934
922	"	Eudunda Damsel's Lord ..	D. Fitzgerald	Edwardstown	Sept., 1934
927	"	Brinkworth Myra's Repulse	R. and J. R. Goldsack ..	Glen Osmond	Sept., 1934
1098	"	Glen Ewin Columbine's Masterman	J. C. Hagger	North Kensington	Aug., 1935
4104	"	Sweethaven Butterboy	M. B. Wright	Northfield	Sept., 1935
1181	"	Hampden Jane's Aristocrat	J. A. Bishop	Oaklands	Sept., 1935
1188	"	Burnlea Darkie	W. Harnden	Kersbrook	Sept., 1935
785	"	Para Wirra Jack	G. Rogers	Koorunga	May, 1934
790	"	Scrubview Duke	M. H. Modystack	Wilmington	Aug., 1934
798	"	Hampden Mariposa's Noble	H. L. Foote	Mount Bryan	June, 1934
799	"	Hampden Blonde's Quality	A. J. Babbage	Brentwood	June, 1934
800	"	Hampden Olive's Aristocrat	H. Masters	Balaklava	May, 1934
801	"	Hampden Peerless King ..	W. F. Wurst	Laura	May, 1934
806	"	Eudunda Damsel's Lad ..	A. H. Marshall	Eudunda	Aug., 1934
817	"	Roseworthy Chancellor ..	Hicks Bros.	Clare	Aug., 1934
826	Ayrshire	Kyby Rod	C. Whiting	Snowtown	May, 1934
827	Jersey	Para Wirra Percy	A. J. Marrett	Saddleworth	May, 1934
834	"	Para Vale Prince II	L. W. Frost	Saddleworth	June, 1934
850	A.I.S.	Sunnybrook Flirt's Victor	H. E. Krieg	Willaston	Aug., 1934
852	"	Melvin Noble	W. P. Eckermann	Eudunda	June, 1934
853	Friesian	Anama Netherland Jahn ..	M. C. Bentley	Koolunga	June, 1934
856	A.I.S.	Klama Royal	J. P. Smith & Son	Tarcoola	Sept., 1934
865	Jersey	Brinkworth Repose	C. A. Ottens	Brinkworth	July, 1934
868	Friesian	Barina Matador Rocket ..	F. W. Kotz	Emu Downs	July, 1934
869	Jersey	Para Glen Flashlight	C. E. Mellors	Gawler	July, 1934
874	"	Para Wirra Prince 2nd	A. H. Young	Owen	Aug., 1934
882	A.I.S.	Dunleith Lieutenant	E. A. Kelly & Son	Smithfield	Sept., 1934
883	"	Strathearn Haylo 2nd	L. J. Carman	Undalya	Sept., 1934
884	"	Strathearn Bloom's Searchlight	R. J. James	Riverton	Sept., 1934
885	"	Rivoli Hero	A. H. Frost	Lewiston	Sept., 1934
886	"	Liberton Sutala	J. McCormick	Yongala	Sept., 1934
93	Friesian	Glenowie Netherland Butterboy	L. B. Dean	Morgan	Sept., 1934
894	"	Anama Netherland Joker ..	R. J. H. Hoepner	Brinkworth	Sept., 1934
897	"	Anama Pontiac Mars	B. H. Hampel	Kybunga	Sept., 1934
905	Jersey	Pembroke Mischief	F. H. S. Hunt	Sandy Creek	Sept., 1934
917	"	Burnlea Echo	D. A. Agnew	Stansbury	Sept., 1934
918	"	Sweet Haven Mercedes Lord	W. G. Johncock	Narridy	Sept., 1934
926	"	Eudunda Glory's Star	M. S. Ferme	Wandearah West	Sept., 1934
928	"	Woorora Cream Chief	H. B. Scholz	Nuriootpa	Sept., 1934
929	"	Woorora Trumpeter	J. S. Miller	Auburn	Sept., 1934
930	"	Foran Bullseye Combination	A. W. F. Pittsner	Eudunda	Sept., 1934

PURE-BRED BULLS—continued.

Departmental Ref. No.	Breed.	Bull.	Owner.	Address.	Date when Subsidy Conditions Cease.
931	Jersey	Cudlee Creek Masterpiece	T. W. Roennfeldt	Greenock	Sept., 1934
933		Tucila Senator	E. A. A. Thiele	Julia	Aug., 1934
934	Ayrshire	Angle Farm Richard	A. H. Hewlett	Reeves Plains	Sept., 1934
935	Jersey	Banyule Pylon	W. M. Fletcher	Lewiston	Sept., 1934
936	A.I.S.	The Bluff, The Banker	W. J. Harding	Yongala	April, 1935
946	Friesian	Balaklava Gracida Beets	P. T. Bowker	Laura	Oct., 1934
949	Jersey	Eudunda's Flower's Chief	J. J. O'Sullivan	Tarlee	Oct., 1934
950	A.I.S.	Strathcarrn Bloom's Cupid	L. F. Rowe	Craddock	Oct., 1934
951	"	Northfield Blossom's Lime light	M. E. Saint	Saddleworth	Oct., 1934
952	Ayrshire	Angle Farm Maxwell	D. Sellick	Templers	Oct., 1934
953		Angle Farm Martin	J. P. Orchard	Salisbury	Oct., 1934
955	Jersey	Hampton Carissa's Lad	J. F. Provis	Balaklava	Oct., 1934
959	"	Pella Silver Lining	H. P. Semmler	Lyndoch	Dec., 1934
960	"	Pella Graceful Lad	H. Mader	Eudunda	Dec., 1934
975	A.I.S.	Klama Wizard	T. E. Richardson	Hill Town	Jan., 1935
994	Jersey	Para Wirra Don	E. W. L. Dawkins	Willaston	Feb., 1935
995	"	Delma Mercedes Duke	A. M. Lodge	Adrossan	Nov., 1934
990	Friesian	Karina Konigen Lad	T. S. Blahop	Mcrose	May, 1935
996	A.I.S.	Klama Felix	R. K. Bertram	Coobowie	Feb., 1935
1004	Jersey	Morella Belle's Chief II	J. J. Young	Alford	Feb., 1935
1011	Jersey	Brinkworth Jewel's Star	K. S. A. Dolling	Snowtown	June, 1935
1017	"	Hampton Mayflower's Aristocrat	C. E. Mayger	Kapunda	July, 1935
1019	"	Hampton Brown Chief	G. A. Noll	Canowie Belt	Mar., 1935
1041	A.I.S.	River Glen Flower's Royal 2nd	W. G. Fidge	Bute	May, 1935
1043	Jersey	Tucila Doctor	B. F. Jenkins	Salisbury	May, 1935
1045	"	Tucila Rajah	L. W. Hansen	Farrell's Flat	May, 1935
1046	"	Tucila Pharaoh	A. G. Schunke	Manoora	May, 1935
1056	"	Fenden Double Combination	C. Denholm	Lyndoch	June, 1935
1057	"	Oakhill Master King	D. T. Angus	Clare	June, 1935
1073	Friesian	Barina Echo Beets	G. H. S. Schunke	Mintaro	June, 1935
1074	Jersey	Oakhill Lord Carlos	T. P. I. Anson	Steeleton	June, 1935
1102	Friesian	Para Vale Prince III	Chapman Bros.	Hoylton	July, 1935
1107	"	Anania Netherland Laddie	W. D. Price	Kadina	Sept., 1935
1112	"	Murray Glen Echo Beets	C. Cooper	Moonta	Sept., 1935
1117	A.I.S.	Klama Redman	J. Matheson	Snowtown	Sept., 1935
1127	Jersey	Sweet Haven Mercedes Chief	F. Coleman	Saddleworth	Sept., 1935
1141	"	Morella Dandy	W. H. Thomas	Tarlee	Sept., 1935
1143	"	Morella Princella's Chief 2nd	H. C. Underwood	Balaklava	Sept., 1935
1146	"	Delma Signal	S. Weckert	Brinkworth	Sept., 1935
1150	"	Eudunda Presto	F. N. Gameau	Two Wells	Sept., 1935
1152	"	Para Wirra Dulele Pylon 2nd	P. O'Shaughnessy	Crystal Brook	Sept., 1935
1153	"	Para Wirra Millie's Pylon 2nd	E. A. Young	Port Broughton	Nov., 1935
1154	"	Auldearn Damsel's Chief	M. P. Humphry	Leighton	Sept., 1935
1156	"	Hamley Admiral	W. E. Blatchford	Mintaro	Sept., 1935
1175	A.I.S.	Sunnybrook Royal's Heir	T. Halliday	Gawler	Dec., 1935
1179	Jersey	Black Oak Peter Pan	S. D. Crosby	Kadina	Feb., 1936
1180	"	Para Wirra Pretty Noble	E. J. Hansen	Eudunda	Dec., 1935
1184	"	Hampton Juanita's Gamboe	P. O. Schutz	Eudunda	Dec., 1935
1190	"	Hampton Guitar's Noble	W. G. H. Wolthe	Eudunda	Feb., 1936
1197	"	Wooroora Pearl's Beau	Loffer Bros.	Morgan	Feb., 1936
1199	"	Tucila Daniel	C. Garrard	Farrell's Flat	Dec., 1935
1201	"	Auldearn Combination	C. L. Lynch	Kooronga	Dec., 1935
1202	"	Para Wirra Fride 2nd	Agricultural College	Roseworthy	Dec., 1935
1208	"	Auldearn Lily's Warrior	O. J. Sampson	Kooronga	Mar., 1936
1209	Ayrshire	Angle Farm Magnet	R. H. Bagster	Salisbury	Jan., 1936
1213	Jersey	Greenoaks Firefly's Duke	G. D. Oster	Balaklava	Feb., 1936
1218	Friesian	Anania Netherland Jahl	L. W. Sluggett	Seven Hills	Mar., 1936
766	"	Hampton Carnation's Aristocrat	H. A. Woolley	Mount Barker Junction	May, 1934
770	Jersey	Pella Masterpiece	A. L. Betteridge	Mylor	June, 1934
778	Friesian	Glenowie Netherland Triumph	A. McAllister	Jervois	May, 1934
795	"	Crofton Silver King	J. H. Wilhelm	Mannum	May, 1934
797	"	Alexandra's Repeater's Volunteer	J. H. Beare	Millang	May, 1934
822	"	Morella Damsel's Chief 3rd	T. M. Smees	Charleston	Sept., 1934
828	"	Burnlea Alice	S. J. Cox	Strathalbyn	Aug., 1934
836	"	Lanacona Merodes Duke	A. B. Rowley	Meadows	June, 1934
836	"	Lallawa Master II	Mrs. G. G. Bowman	Tallem Bend	June, 1934
845	A.I.S.	Klama Joffre	J. M. Irwin	Mount Barker	June, 1934
846	"	Lanacona Noble Kelly	W. F. Roads	Inman Valley	June, 1934
847	"	Lanacona Nimble	Mrs. M. H. Bowman	Dashwood's Gully	June, 1934
861	Friesian	Anania Netherland Paul	K. Lawson	Padthaway	Aug., 1934
876	Ayrshire	Holly Green Queen's Jamie	T. S. Paternoster	Nairne	Aug., 1934
880	Jersey	Lallawa Chieftain 3rd	J. G. Krueger	Sedan	Aug., 1934
881	A.I.S.	The Bluff Waratah's Lime light 2nd	F. H. Rowe	Peake	Sept., 1934

PURE-BRED BULLS—continued.

Departmental Ref. No.	Breed.	Bull.	Owner.	Address.	Date when Subside Conditions Cease.
887	A.I.S.	Sunnybrook Primrose's Pride	H. J. Jagger	Inman Valley	Sept., 1934
888	"	Klama Pilot	J. B. Kerber	Woodside	Sept., 1934
891	Friesian	Glenowle Netherland Duke	R. G. Magor	Mypolonga	Sept., 1934
898	"	Anama Netherland Dutchman	S. D. Stoddart	Mundalla	Sept., 1934
904	Jersey	Hamley Alpha Prince	A. B. Herrmann	Mount Torrens	Sept., 1934
911	"	Para Vale Pilot	G. W. Woolley	Mt. Barker Junction ..	Sept., 1934
912	"	Delma Ballarion	W. H. Roper	Strathalbyn	Sept., 1934
918	"	Oakhill Lord Lotus 3rd ..	A. B. Hartmann	Palmer	Sept., 1934
914	"	Kangaroo Flat Prince	B. McGlinchey	Millbrook	Sept., 1934
919	"	Bernoota Viola's Duke	R. S. Davie	Mount Pleasant	Sept., 1934
921	"	Eudunda Roderick	A. A. Sickerdick	Tweedvale	Sept., 1934
925	"	Morella Digger	A. Anderson	Meningle	Sept., 1934
937	Ayrshire	Denbigh Advance	J. M. Robinson	Meadows	Oct., 1934
938	Friesian	Murray Glen Sylvia Griselda	R. Guglielmin	Jervols	Oct., 1934
944	"	Glen Murray King Pontiac	R. Williams	Cooke's Plains	Oct., 1934
967	"	Willowvale Knight Posch ..	D. Thomson	Long Flat	June, 1935
968	"	Willowvale Model Posch ..	C. Rowley	Myponga	Jan., 1935
969	"	Willowvale Snow Posch ..	W. R. Evans	Long Flat	June, 1935
972	Jersey	Ontario Marcus	T. H. Rayson	Native Valley	Nov., 1934
973	Ayrshire	Talmon Jamie	F. M. Green	North Gumeracha	Nov., 1934
980	Jersey	Alinda Noble Combination	W. A. Mueller	Ambleside	Jan., 1935
981	"	Alinda Eminent Boy	A. M. Frahn	Mannum	April, 1935
982	"	Alinda Lady's Lad	S. S. Rathjen	Mannum	April, 1935
1001	"	Woorooa Rosalind's Orlando	K. M. Bowen	Flaxley	Feb., 1935
1020	"	Eudunda Whoopee	J. Hickey	Jervols	Mar., 1935
1022	"	Ontario Eclipse	A. M. Carruthers	Narrung	May, 1935
1023	"	Ontario Mak	J. Hobbs	Cherry Gardens	June, 1935
1024	"	Ontario Prince	C. C. Spencer	Clarendon	June, 1935
1026	"	Crofton Sultan	C. Weidenhofer	Ponde	Aug., 1935
1028	"	Crofton Tallsman	J. Rodda	Aml'side	April, 1935
1029	"	River Glen Red Night	E. S. W. Wise	Jervols	May, 1935
1031	"	Para Wirra Daniel	H. J. Heinemann	Walkerle	Mar., 1935
1033	"	Fernde High Commander	L. H. Powell	Parilla	June, 1935
1042	"	Clarendon Eyre Eminent's Brigadier	G. R. Nicholls	Pinnaroo	Sept., 1935
1054	"	Timbungalong Excelsior ..	A. Kelly	Milang	June, 1935
1075	"	Channel View McEwin's Dawn	Point McLeay Mission Station	Point McLeay	June, 1935
1078	A.I.S.	Strathearn Admiral	L. P. Peach and C. S. E. Peach	Tepko	July, 1935
1079	Jersey	Retford Skipper	V. T. Bartlett	Murray Bridge	Sept., 1935
1080	"	Cudlee Creek Flashlight ..	T. M. Smeo	Charleston	June, 1935
1096	"	Cudlee Creek Jazz Boy 2nd	H. O. Hannaford	Belair	July, 1935
1110	Friesian	Glen Murray Netherland King	J. O. Kernick	Lameroo	Sept., 1935
1116	A.I.S.	Klama Dasher	H. B. Kuchel	Murray Bridge	Sept., 1935
1122	Jersey	Gum Hill Defender	R. J. Stone	Bull's Creek	Sept., 1935
1123	"	Gum Hill Lord Grey	L. C. Mann	Milang	Sept., 1935
1124	"	Pembroke Playmate	M. N. Phillips	Strathalbyn	Sept., 1935
1125	"	Pembroke Dusk	J. M. Yelland	Milang	Sept., 1935
1126	"	Glandore Neat Lad	W. L. McDonald	Mount Barker	Sept., 1935
1128	"	Alinda Skipper	W. S. Yelland	Milang	Sept., 1935
1130	"	Hampton Blonde's Oxford	E. L. Goode	Narrung	Sept., 1935
1132	"	Scrub View Victor	D. Mundie	Gumeracha	Sept., 1935
1135	"	Lanacoona Don	W. D. Whittam	Ashbourne	Sept., 1935
1136	"	Burnlea Twinkler	J. R. Chapman	Yumall	Sept., 1935
1145	"	Alexandra Dora's Signal ..	H. S. Stanton	Strathalbyn	Sept., 1935
1147	"	Delma Bellboy	H. J. Edwards	Mount Barker	Sept., 1935
1149	"	Eudunda Karini	S. A. Bone	Pinnaroo	Sept., 1935
1160	"	Mira Chana Noble 2nd	H. A. L. Maidment	Goolwa	Oct., 1935
1163	"	Lanacoona Pelledes	E. M. Hodges	Lameroo	Nov., 1935
1170	A.I.S.	Long Flat Mayflower's Limelight	R. E. Shankland	Jervols	Oct., 1935
1171	Friesian	Glen Murray Dauphin	C. R. Collins	Wall Flat	Nov., 1935
1176	Jersey	Pembroke Treasure	M. M. Lambert	Coonalpyn	Dec., 1935
1187	"	Hampton Mayfern's Gamboe	E. F. Schutz	Eden Valley	Dec., 1935
1191	"	Pella Gamboe Knight	L. H. Burt	Coonalpyn	Dec., 1935
1198	A.I.S.	Strathearn Kingston	K. W. Semler	Springton	Dec., 1935
1205	Friesian	Anama Netherland Black Prince	R. Ellis	Wanbi	Jan., 1936
214	Jersey	Alinda Bridgroom	Gepp Bros.	Montacute	Feb., 1936
215	"	Crofton Sentinel	J. Bates	Macclesfield	Feb., 1936
216	"	Crofton Lord Starbright ..	R. H. Williams	Mount Lofty	Mar., 1936
263	A.I.S.	Ilawarra Bonnie	A. C. Bigham	Mount Gambier	July, 1934
1872	Jersey	Para Wirra Pansy's Pyon ..	J. M. Wray	Hynam	July, 1934
1877	"	Gambler Major Twinkler ..	W. F. Koop	Glence East	Aug., 1934
1878	"	Gambler Rose Chief	C. B. Davis	O.B. Flat	Aug., 1934
879	"	Selsey Royal	C. R. Kerr	Compton	Aug., 1934
886	Friesian	Anama Alcatraz Rex	J. S. McElroy	Lochaber	Sept., 1934
888	"	Anama Netherland King 4th	H. L. Miles	Hynam	Sept., 1934
896	Jersey	Pembroke Majestic	F. W. Staudt	Naracoorte	Sept., 1935

PURE-BRED BULLS—continued.

Departmental Ref. No.	Breed.	Bull.	Owner.	Address.	Date when Subsidy Condition* Cease.
947	Ayrshire	Kyby, Ivan	H. J. S. Clark	Moorak	Sept., 1934
948	"	Kyby, Bonnie Prince	M. Glynn	Kybybolite	Oct., 1934
974	Jersey	Gambler Star Bene	C. Hitchcock	Moorak	Dec., 1934
995	Red Poll	Victoria Captain	J. L. Hoggarth	Kalangadoo	Feb., 1935
1048	Ayrshire	Kyby, Oliver	G. D. Stuckey	Rendelsham	May, 1935
1119	A.I.S.	River Glen Mascot	M. Gilders	Beachport	Sept., 1935
1158	Jersey	Rivoli Prince	J. H. Williams	Naracoorte	Sept., 1935
1166	Ayrshire	Gowrie Park Imperator	L. S. Davie	Kybybolite	Sept., 1935
1167	"	Kyby Gesture	H. W. Holland	Millicent	Oct., 1935
1168	"	Kyby Gallant	A. W. Kilsby	Yahl	Oct., 1935
1217	Red Poll	Victoria Lustre	J. V. Angus	Kalangadoo	Jan., 1936
1016	"	Hampden Winsome Boy	H. E. Davies	Tranta	Mar., 1935
1018	"	Hampden Starbright Signal	J. T. Sparrow	Curramulka	Mar., 1935
1169	Jersey	Tue La Velle Lathmore Chief	W. and F. A. Agnew ..	Curramulka	—
754	"	Morella Bill	H. L. Bruce	Kimba	July, 1934
781	"	Glen Valley Watchman	C. F. Jericho	Butler	July, 1934
848	"	Lanacoona Silver Noble	I. R. Preiss	Cleve	Aug., 1934
849	A.I.S.	Sunnybrook Boronia's James	F. W. A. Du Bois	Wudinna	July, 1934
854	"	Klama Starlight	W. C. & F. L. Jettner ..	Yandiah	June, 1934
908	Jersey	Glandore Neat Boy	G. M. McKechnie	Tumby Bay	Sept., 1934
916	"	Burnlea Dandy	A. R. Butler	Ungarra	Sept., 1934
942	Ayrshire	Angle Farm Roy	C. J. Partington	Lipson	Mar., 1935
964	"	Hampden Blonde's Count	W. Doudle	Coulta	Jan., 1935
966	"	Delma Gipsy's King	E. R. Elson	Cleve	Nov., 1934
985	Jersey	Pembroke Sylvan	J. H. Octoman	Lipson	Feb., 1935
1030	"	Pernden Bell's Combination	J. Newell	White's Flat	May, 1935
1101	"	Black Oak Pretty Mike	G. T. Frost	Alford	Aug., 1935
1108	Friesian	Anama Pontiac Crystal	J. L. Simms	Cummins	Sept., 1935
1109	"	Glen Murray Olda's Crusader	W. V. Jacobs	Edillilie	Sept., 1935
1111	"	Glen Murray Netherland Duke	P. T. Vanstone	Cummins	Sept., 1935
1151	Jersey	Eudunda Pathfinder	D. Forbes	Cleve	Sept., 1935

RESULTS OF MEADOW HAY COMPETITION.

(HILLS DISTRICTS.)

Conducted by the South Australian Advisory Dairy Committee and judged by Mr. R. Hill (Agricultural Instructor). Won by Mr. F. P. Smith, Blackwood.

Competitor.	Address.	Suitability of Plants. 25	Curing. 25	Stage of Cutting. 15	Apparent Nutritive Value. 25	Storing. 10	Total. 100
Smith, F. P.	Blackwood ...	23	24	14	23	10	94
Peters, H. B. ...	Mt. Compass ..	23	24	14	22	10	93
Smee, T. M.	Charleston	23	23	13	22	10	91
Smith, H. L. ...	Encounter Bay ..	22	24	14	21	8	89
Liebelt, Mrs. A. A.	Littlehampton ..	21	23	13	21	10	88
Illohra Est. Ltd.	Inman Valley ..	22	21	13	21	10	87
Peters, R.	Mt. Compass	21	21	13	21	10	86
Rowley, B. T. ...	Myponga	20	21	12	20	10	83
Dunne, J. P. ...	Mt. Barker	20	21	13	20	8	82
Francis, A. E. ...	Bugle Ranges ..	22	19	13	19	8	81

THE WINNING ENTRY.

In his comments on the various entries, Mr. Hill stated that the stack entered by the winner was exceptionally well cured and well housed in an iron-roofed hayshed. It consisted of a mixture of subterranean clover, barley grass, soft brome grass, sterile brome, silver grass, perennial rye grass, and a little geranium. It was of splendid colour with the clover leaves all intact, and the whole mixture handled well. Top-dressed with two cwts. of super per acre, and the hay was cut when the clover was in the flowering stage; left in rows and carted within ten days of cutting. It was a very attractive hay, and the herd of cows was keeping up production without the addition of concentrates.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

CONFERENCE OF MID-NORTHERN BRANCHES.

The Annual Conference of Branches of the Agricultural Bureau was held at Laura on March 14th.

Mr. R. H. Lines presided, and the opening address was delivered by the Hon. A. P. Blessing, M.L.C. Messrs. W. J. Spafford (Deputy Director of Agriculture), Dr. A. R. Callaghan (Principal Roseworthy Agricultural College), H. B. Barlow (Chief Dairy Instructor), C. F. Anderson (Government Poultry Expert), E. L. Orchard and J. O. Hatter (District Instructors), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary) represented the Department of Agriculture.

The following papers were read and discussed:—"Bush Fire Legislation," R. J. Rose (Laura); "Growing and Harvesting Lucerne Seed," K. H. Moore (James-town); "Increasing the Sheep carried on the Small Farm," W. J. Cronin (North Bundaleer); "Refrigeration," J. Bowker (Laura).

Addresses were delivered by Messrs. W. J. Spafford, "Diseases of Cereals," and "Pigs on the Farm," by H. B. Barlow.

Conference adopted the following resolutions:—"That the 1935 Conference be held at Redhill;" "That section 17 of the Bush Fires Act be altered to compel all farmers to clear and plough around their own crops;" "That a travelling veterinary surgeon be appointed to visit all districts of the State;" "That flour millers be requested to put flour into new bags;" "That in the opinion of this Conference district councils should more rigidly enforce the provisions of the Noxious Weeds Act;" "That the Government be requested to raise the price of wheat."

At the evening session Mr. Anderson delivered an address, illustrated with lantern slides, "Poultry on the Farm."

WOMEN'S SESSION.

A special session was held for delegates from Women's Branches in the Mid-North Districts. The following papers were read:—"Feeding of Infants," Sister Harslett (Gladstone); "Good Fellowship," Mrs. F. Cummings (Belalie); "Toys," Mrs. S. Page (Belalie). Miss E. Campbell, of the Education Department, addressed the delegates.

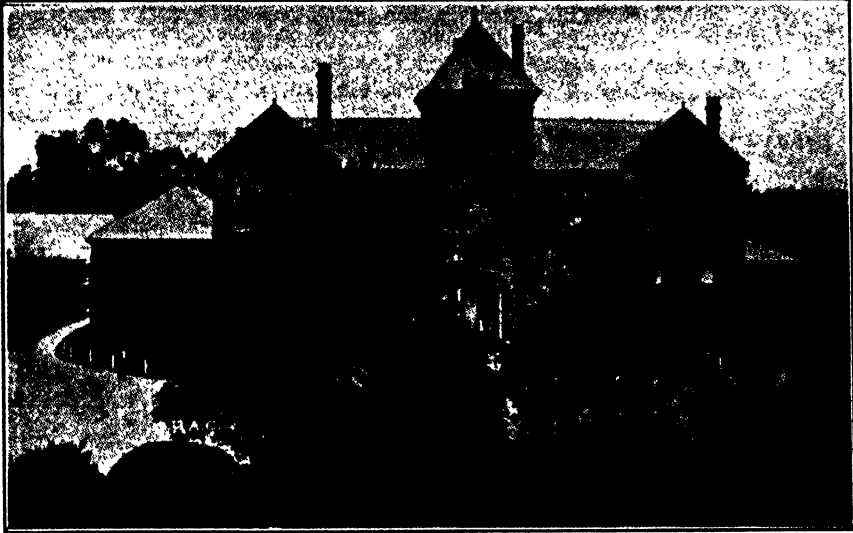
CONFERENCE OF LOWER SOUTH-EASTERN BRANCHES.

The Committee of the Tantanoola Branch of the Agricultural Bureau is to be congratulated on the very fine attendance of representatives of Branches in the Lower South-East who attended the Annual Conference at Tantanoola on April 11th. Delegates were present from the following Branches:—Allandale East, Penola, Mount Gambier, Millicent, Rendelsham, Kalangadoo, and Tantanoola.

Mr. G. H. Bird (Chairman of the local Branch) presided, and the Department of Agriculture was represented by Messrs. W. J. Spafford (Deputy Director of Agriculture), who delivered the opening address, H. B. Barlow (Chief Dairy Instructor), L. J. Cook (Manager, Kybybolite Experimental Farm), E. S. Alcock, W. H. Downes, and A. L. Warren (District Instructors), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary of the Agricultural Bureau).

The agenda covered a wide range of subjects, the following papers providing excellent discussions:—"Sore Shoulders on Horses," J. Carthew (Tantanoola); "Motor Taxation from the Point of View of Primary Producers," W. M. Laslett (Allandale East); "Improving the Butter Fat Standard of Dairy Herds," W. H. Downes (Mount Gambier); "Side Lines on the Farm," R. Hateley (Millicent); "Is Mixed Farming Scientifically or Economically Unsound?" A. A. Sassanowsky (Mount Gambier).

Conference adopted the following resolutions:—"That the 1935 Conference be held at Mount Gambier." "That this Conference strongly recommends that arrangements be made for a deputation, comprising delegates from all Branches of the Bureau, to



ROSEWORTHY AGRICULTURAL COLLEGE

AFFILIATED WITH THE UNIVERSITY OF ADELAIDE.

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wait on the Premier during the next Annual Congress requesting either the abolition or a substantial reduction in motor registration, and that the resolution be included on the 1934 Congress agenda." "That this Conference appreciates the action of the Commonwealth Government in granting a rebate on super, and strongly recommends the continuance of the scheme." "That the income tax returns papers be made less complicated—more like the old income tax papers."

CONFERENCE OF UPPER SOUTH-EASTERN BRANCHES.

Branches represented in the Upper South-East held their Annual Conference at Wolseley on March 21st.

Mr. J. E. Ridgway, president of the Wolseley Branch, occupied the chair, and the opening address was delivered by Mr. S. Shepherd, member of the Advisory Board of Agriculture. Messrs. W. J. Spafford (Deputy Director of Agriculture), C. F. Anderson (Poultry Expert), A. L. Warren (District Horticultural Instructor), H. C. Pritchard (General Secretary), and F. C. Richards (Assistant Secretary) of the Agricultural Bureau, attended on behalf of the Department of Agriculture.

Papers were read by Messrs. G. D. Butler (Wolseley), "Fallowing," and H. Bond (Tatiara), "Malting Barley."

Mr. Spafford replied to questions dealing with various aspects of the cultivation of wheat, and addressed delegates on "Fat Lambs." Mr. Anderson also delivered an address, "The Poultry Industry."

It was decided that the 1935 Conference should be held at Mundalla, and that a veterinary officer should be attached to the Agricultural Bureau, quite apart from the Stock and Brands Department, this matter to be treated as very urgent.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on March 28th, there being present Messrs. A. J. Cooke (Chairman), S. Shepherd, P. J. Baily, F. Coleman, H. N. Wicks, Dr. A. E. V. Richardson, and H. C. Pritchard (Secretary).

Apologies were received from Messrs. R. H. Martin, A. M. Dawkins, and Prof. A. J. Perkins.

Resignation of Member.—The resignation of Mr. P. H. Jones was accepted, and it was decided to place on record an appreciation of his services to the Agricultural Bureau of South Australia.

Appointment of New Member.—The Secretary reported that Mr. A. J. A. Koch had accepted the invitation of the Minister to act as a member of the Board.

Broadcasting Lectures.—The Secretary reported that a series of six broadcast addresses had been arranged by departmental officers, which would be given at fortnightly intervals, and that if proved satisfactory arrangements to be made for a further series.

Life Members.—Messrs. E. R. Moss and E. J. Moritz were approved as life members of the Agricultural Bureau.

New Members.—The following names were added to the rolls of existing Branches.—Gladstone Women's—Miss T. Leesue; Wandearah—T. Ryan, H. Davis, A. L. O'Shaughnessy, J. Dennis, E. V. Eagle, W. Vanstone, R. Vanstone, M. Coventry; Balhannah Women's—Mrs. R. James; Allandale East—T. A. Earl; Snowtown—G. T. Freebairn; Blyth—E. H. Denning; Myponga—D. Coombe; Laura—J. L. Read, L. S. Wurm, E. T. Hollitt; Auburn Women's—Miss Hitchcox; Sutherlands—E. Bannear; Brownlow—B. Biar; Warrambo—Albert Hurrell; Upper Wakefield—H. W. Gregor, E. C. Gregor; Nantawarra—M. P. Hamdorf; Truro—A. J. Steinert, O. C. Steinert; Cummins—W. L. Reed; Yaninee—J. G. Christian, C. H. Ruhe, J. Michell, W. J. Wilkins, C. C. Chewings, C. Kidman, J. Holland, C. A. Roe.

No. of present members, 8,024; No. of Branches, 336.

Several items were discussed in Committee.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of March, 1934, also the average precipitation for March, and the average annual rainfall.

Station.	For Mar., 1934.	Av'ge. for Mar.	Av'ge. Annual Rain- fall.	Station.	For Mar., 1934.	Av'ge. for Mar.	Av'ge. Annual Rain- fall.
FAR NORTH AND UPPER NORTH.				LOWER NORTH—continued.			
Oodnadatta	0.92	0.44	4.69	Brinkworth	0.15	0.77	15.83
Marree	0.79	0.53	5.93	Blyth	0.26	0.74	16.80
Farina	0.66	0.67	6.48	Clare	0.37	1.03	24.56
Copley	0.89	0.70	7.93	Mintaro	0.54	0.91	23.47
Beltana	0.81	0.70	8.53	Watervale	0.37	1.12	26.91
Blinman	0.53	0.78	11.92	Auburn	0.51	1.10	24.00
Hookina	0.67	0.68	11.46	Hoyleton	0.33	0.79	17.35
Hawker	0.78	0.61	12.31	Balaklava	0.58	0.72	15.49
Wilson	0.70	0.59	11.82	Port Wakefield ..	0.51	0.91	12.96
Gordon	0.22	0.74	10.59	Terowie	0.25	0.64	13.40
Quorn	0.02	0.60	13.29	Yarcowie	0.20	0.78	13.63
Port Augusta....	0.10	0.72	9.46	Hallett	0.37	0.67	16.48
Bruce	—	0.71	9.95	Mount Bryan....	0.63	0.70	16.81
Hammond	—	0.67	11.27	Koorunga	0.62	0.87	17.92
Wilmington	0.02	0.80	17.43	Farrell's Flat ...	0.38	0.75	18.68
Willowie	1.13	0.72	12.28	WEST OF MURRAY RANGE.			
Melrose	0.18	1.07	22.94	Manoora	0.52	0.82	18.93
Booleroo Centre	0.26	0.67	15.23	Saddleworth	0.58	0.93	19.61
Port Germein ...	0.18	0.75	12.55	Marrabel	0.41	0.85	19.94
Wirrabara	0.40	0.95	19.34	Riverton	0.45	1.00	20.81
Appila	0.33	0.88	14.66	Tarlee	0.25	0.81	18.13
Cradock	0.83	0.57	10.83	Stockport	0.46	0.80	16.97
Carrieton	0.43	0.58	12.29	Hamley Bridge .	0.42	0.78	16.61
Johnburg	0.66	0.55	10.59	Kapunda	0.35	0.99	19.82
Eurelia	0.17	0.60	12.85	Freeling	0.31	0.88	17.88
Orroroo	0.34	0.64	13.23	Greenock	0.51	0.95	21.57
Nackara	0.53	0.83	11.18	Truro	0.39	0.94	19.95
Black Rock	0.61	0.69	12.43	Stockwell	0.37	0.88	20.17
Oodlawirra	0.62	0.73	11.67	Nuriootpa	0.45	0.92	20.72
Peterborough....	0.34	0.72	13.27	Angaston	0.41	0.99	22.47
Yongala	0.16	0.67	14.47	Tanunda	0.47	1.02	22.03
NORTH EAST.				Lyndoch	0.46	0.85	23.46
Yunta	0.80	0.58	8.54	Williamstown ...	0.42	0.97	27.77
Waukaringa	0.50	0.60	7.97	ADELAIDE PLAINS.			
Mannahill	0.47	0.54	8.21	Owen	0.63	0.55	14.53
Cookburn	0.33	0.49	7.98	Mallala	0.64	0.76	16.59
Broken Hill,				Roseworthy	0.52	0.81	17.39
N.S.W.	0.76	0.63	9.57	Gawler	0.37	0.91	18.97
LOWER NORTH.				Two Wells	0.47	0.78	15.75
Port Pirie	0.24	0.82	13.26	Virginia	0.53	0.85	17.18
Port Broughton.	0.20	0.61	13.92	Smithfield	0.48	0.89	17.65
Bute	0.23	0.66	15.49	Salisbury	0.43	0.95	18.59
Laura	0.26	0.85	17.99	Adelaide	0.66	1.02	21.15
Caltowie	0.40	0.83	16.75	Glen Osmond....	0.66	1.03	26.03
Jamestown	0.68	0.86	17.75	Magill	0.49	1.16	25.60
Gladstone	0.32	0.73	16.33	MOUNT LOFTY RANGES.			
Crystal Brook ...	0.28	0.70	15.82	Teatree Gully ...	0.58	1.23	27.33
Georgetown	0.24	0.82	18.41	Stirling West ...	1.34	1.80	47.05
Narridy	0.15	0.80	15.88	Uraidla	1.16	1.80	44.19
Redhill	0.18	0.72	16.61	Clarendon	1.03	1.49	32.89
Spalding	0.27	0.80	18.99	Morphett Vale ..	0.96	1.12	22.68
Gulnare	0.22	0.72	18.71	Noarlunga	0.70	1.02	20.41
Yacka	0.15	0.65	15.40	Willunga	0.68	1.22	26.03
Koolunga	0.15	0.66	15.43	Aldinga	0.55	1.06	20.28
Snowtown	0.23	0.73	15.71				

RAINFALL—continued.

Station.	For Mar., 1934.	Av'ge. for Mar.	Av'ge. Annual Rain-fall.
MOUNT LOFTY RANGES—continued.			
Myponga	0.44	0.95	29.68
Normanville	0.26	0.95	20.73
Yankalilla	0.40	1.19	22.90
Mount Pleasant ..	0.39	1.10	27.24
Birdwood	0.35	1.06	29.24
Gumeracha	0.55	1.28	33.44
Millbrook Res.	0.59	0.93	34.82
Tweedvale	0.56	1.25	35.97
Woodside	0.54	1.18	32.39
Ambleside	0.76	1.35	34.90
Nairne	0.76	1.27	28.17
Mount Barker ..	0.83	1.25	31.97
Echunga	0.96	1.44	33.26
Macclesfield	0.91	1.40	30.44
Meadows	0.69	1.66	36.21
Strathalbyn	0.53	1.04	19.32

MURRAY FLATS AND VALLEY			
Meningie	0.32	0.90	18.42
Milang	0.24	0.79	14.97
Langhorne's Ck. ..	0.46	0.92	14.90
Wellington	0.60	0.87	14.70
Tailem Bend	0.57	1.01	15.08
Murray Bridge ..	0.40	0.90	13.64
Callington	0.34	0.84	15.22
Mannum	0.38	0.84	11.53
Palmer	0.21	0.87	15.55
Sedan	0.23	0.69	12.11
Swan Reach	0.13	0.70	10.62
Blanchetown	0.24	0.81	11.03
Eudunda	0.37	0.81	17.18
Sutherlands	0.27	0.65	10.88
Morgan	0.36	0.54	9.21
Waikerie	0.28	0.54	9.70
Overland Corner ..	0.10	0.81	10.37
Loxton	0.26	0.83	11.65
Renmark	0.18	0.68	10.49

WEST OF SPENCER'S GULF			
Eucla	2.72	0.84	9.98
Nullarbor	1.68	0.71	8.84
Fowler's Bay	0.26	0.52	11.93
Penong	0.42	0.54	12.23
Koonibba	0.43	0.57	12.11
Denial Bay	0.27	0.55	11.52
Ceduna	0.33	0.50	10.16
Smoky Bay	0.37	0.36	10.51
Wirrulla	0.41	0.40	10.50
Streaky Bay	0.38	0.54	14.88
Chandada	0.49	—	—
Minnipa	0.76	0.50	13.87
Kyanutta	0.89	—	—
Talia	0.27	0.48	14.63
Port Elliot	0.45	0.53	16.50
Yeelanna	1.54	0.53	16.02
Cummins	2.66	0.33	17.61
Port Lincoln	1.22	0.81	19.43
Tumby	2.90	0.64	14.14
Ungarra	2.06	0.70	16.87
Port Neill	1.07	0.61	13.16
Arno Bay	1.00	0.72	12.63

Station.	For Mar., 1934.	Av'ge. for Mar.	Av'g Annu Rain-fall.
WEST OF SPENCER'S GULF—continued.			
Rudall	0.96	0.45	13.12
Cleve	1.11	0.78	14.79
Cowell	0.78	0.81	11.12
Miltalie	1.12	0.98	13.64
Darke's Peak	0.71	0.48	15.23
Kimba	0.71	0.50	11.84

YORKE PENINSULA.			
Walleroo	0.46	0.81	13.99
Kadina	0.64	0.87	15.69
Moonta	0.40	0.86	15.10
Paskeville	0.61	0.75	15.52
Maitland	0.48	0.85	19.97
Ardrossan	0.37	0.74	13.98
Port Victoria	0.45	0.67	15.49
Curramulka	0.54	0.88	17.95
Minlaton	0.47	0.83	17.85
Port Vincent	0.28	0.64	14.50
Brentwood	0.57	0.73	15.58
Stansbury	0.38	0.78	16.84
Warooka	0.57	0.67	17.53
Yorketown	0.65	0.74	16.94
Edithburgh	0.41	0.81	16.40

SOUTH AND SOUTH-EAST.			
Cape Borda	0.75	0.88	24.86
Kingscote	0.56	0.81	19.16
Penneshaw	0.62	0.73	19.02
Victor Harbor	0.60	1.01	21.42
Port Elliot	0.64	1.01	19.95
Goolwa	0.62	0.97	17.87
Copeville	0.23	0.71	11.57
Meribah	0.35	0.53	11.46
Alawoona	0.32	0.39	10.29
Mindarie	0.32	0.50	12.22
Sandalwood	0.52	0.64	13.73
Karoonda	0.28	0.67	14.48
Pinnaroo	0.33	0.91	14.57
Parilla	0.31	0.67	14.01
Lameroo	0.56	0.81	16.10
Parrakie	0.33	0.80	14.64
Geranium	0.36	0.89	16.53
Peake	0.43	1.03	16.13
Cooke's Plains ..	0.54	0.95	15.43
Coomandook	0.33	0.96	17.20
Coonalpyn	0.44	0.89	17.53
Tintinara	0.41	0.91	18.73
Keith	0.47	0.79	17.26
Bordertown	0.54	0.82	19.26
Wolsley	0.53	0.77	18.52
Frances	0.47	0.92	20.01
Naracoorte	0.20	1.02	22.63
Penola	0.36	1.24	26.05
Lucindale	0.10	1.01	23.29
Kingston	0.20	1.01	24.37
Robe	0.30	1.03	24.68
Beachport	0.66	1.17	27.07
Millicent	0.80	1.32	29.81
Kalangadoo	0.45	1.16	32.38
Mount Gambier ..	0.53	1.43	30.55

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page.	Dates of Meetings.		Branch.	Report on Page.	Dates of Meetings.	
		April.	May.			April.	May.
Adelaide	*	—	—	Gladstone	*	27	25
Alawoona	*	—	—	Gladstone Women's	†	17	15
Allandale East	†	27	25	Glencoe	*	10	8
Alma	*	—	—	Goode	*	—	—
Appila-Yarrowie ...	†	6	4	Goode Women's....	*	—	—
Arthurton	1185	—	—	Greenock	*	9	30
Ashbourne	*	25	23	Green Patch	†	28	24
Auburn Women's ..	1222	27	25	Gumeracha	*	30	28
Balaklava	*	23	28	Hanson	*	24	29
Balhannah	*	—	—	Hartley	*	25	23
Balumbah	†	—	—	Hindmarsh Island..	*	—	—
Balhannah Women's	†	18	16	Hope Forest	†	2	7
Balumbah Women's	*	4	2	Hope Forest (Wom's)	†	—	—
Beetaloo Valley ...	†	23	28	Hoyleton	*	16	21
Belahie Women's ...	†	10	8	Inman Valley	†	19	17
Berri	*	30	30	Jamestown	*	18	16
Belvidere	*	—	—	Jervois	†	12	10
Blackheath	†	—	31	Kalangadoo Women's	*	14	12
Black Rock	*	3	1	Kalangadoo	*	14	12
Black Springs	†	—	—	Kalyan	*	18	16
Blackwood	†	9	14	Kangarilla Women's	*	19	17
Blyth	†	27	25	Kanni	*	—	—
Booborowie	*	23	28	Kapinnie	*	—	—
Booleroo Centre ...	*	27	25	Kapunda	*	13	11
Boolgun	*	—	—	Karoonda	*	25	30
Boor's Plains	*	—	—	Keith	*	26	24
Borrika	*	—	—	Kelly	*	7	5
Bowhill	*	23	28	Ki Ki	*	—	—
Brentwood	1186	5	3	Kilkerran	†	26	24
Brinkley	*	25	23	Kongorong	*	23	28
Brunkworth	*	23	28	Koolunga	†	—	—
Brownlow	†	—	—	Koonibba	*	26	24
Buchanan	*	—	—	Koonunga	*	—	—
Bute	*	19	17	Koppio	†	24	29
Butler	*	—	—	Kington	*	30	28
Caliph	*	3	1	Kuitpo	†	25	23
Caralue	*	25	23	Kulkawirra	*	10	8
Carrow	*	25	23	Kyancutta	*	3	1
Charra	*	—	—	Kybybolite	*	26	24
Cherry Gardens ...	†	28	26	Kybybolite Women's	*	—	—
Chilpuddie Rock ...	†	—	—	Lameroo	*	28	26
Clare Women's	†	—	—	Langhorne's Creek .	*	25	23
Clarendon	*	23	28	Laura	*	28	26
Cleve	*	7	5	Laura Bay	*	—	2
Collie	*	4	2	Laura Bay Women's	1222	10	8
Coomandook	*	27	25	Lensw'd & F'st Range	*	—	—
Coonawarra	*	26	31	Light's Pass	†	—	—
Coonawarra Women's	*	18	16	Lipson	*	28	26
Cummins	*	13	11	Lone Gum & Monash	*	25	23
Cungena	†	5	3	Lone Pine	1185	23	28
Currency Creek	*	30	28	Lowbank	*	25	23
Dudley	*	—	—	Loxton	*	13	11
Elbow Hill	*	26	24	Lyndoch	†	24	29
Eudunda	*	2	7	McLaren Flat	1188	—	—
Eurelia	*	14	12	McLaren Flat Wm's	1223	5	3
Eurelia Women's ..	*	4	2	Macclesfield	†	19	17
Farrell's Flat	*	27	25	MacGillivray	*	24	29
Finnis	†	—	—	Mallala	*	16	21
Frances	*	—	—	Maltee	*	26	24
Frayville	1188	—	—	Mangalo	*	—	—
Gawler River	*	—	—	Mangalo Women's .	†	11	9
Georgetown	*	28	26	Marama	*	—	—
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Millicent	†	27	25	Rudall	*	27	22
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Miltalie	*	28	26	Saddleworth Women's ..	†	3	1
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Moorlands	*	—	23	Shoal Bay	*	24	29
Morchard	*	6	4	Smoky Bay	*	—	—
Morchard Women's ..	*	6	4	Snowtown	†	13	11
Mount Barker	*	16	21	South Kilkerran ...	†	14	29
Mount Bryan	*	—	—	Springton	*	4	2
Mount Compass	*	—	—	Stanley Flat	*	16	21
Mount Gambier	†	13	11	Stockport	†	—	—
Mount Hope	*	24	22	Strathalbyn	*	11	9
Mount Pleasant	*	13	11	Streaky Bay	*	27	25
Mudamuckla	*	14	12	Sutherlands	†	—	3
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Myrta	*	25	23	Taragoro	*	26	24
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Narridy	*	—	—	Tulkinera	*	26	31
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Rosedale	*	—	—				

* No reports received during the month of March. † Held over. a In recess. ‡ Formal.

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

[Branch Secretaries are reminded that the following are exempt from payment of the Annual Bureau subscription:—Life members, Branch Secretaries, members appointed before August 1st, 1930, and new members who reside in the same house as (a) a life member, (b) Secretary, or (c) another member who already subscribes.

The subscription for all other members is 2s. 6d., commencing from August 1st in each year, provided that—subject to the above exemptions—nominations forwarded during the months of January to June must be accompanied by a payment of 1s. 6d. each nomination for that period.]

MEN'S BRANCHES. SOUTH-EASTERN DISTRICT.

PENOLA (Average annual rainfall, 26.06in.).

March 10th.—Attendance, 11.

The meeting took the form of a debate, "Specialised *versus* Mixed Farming." The Rev. McNaughton acted as adjudicator. Mr. Provis, as leader, with Messrs. J. Harmer and E. R. D. Hinze spoke in favor of mixed farming, and Mr. W. A. Clifford, as leader, with Messrs. E. Kidman and Mr. S. Ockley as supporters of specialised farming. The adjudicator awarded Mr. Clifford's team 86 points, and Mr. Provis's team 85 points. (Secretary, F. Hinze.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Allandale East .	2/3/34	8	Discussion	J. Laslett
Allandale East .	23/3/34	12	Discussion	J. Laslett
Millicent	23/2/34	7	Paper—Mr. Mitchell	L. Hutchesson
Millicent	23/3/34	9	"Side Lines." R. Hateley	L. Hutchesson
Mount Gambier	9/3/34	16	Address—A. C. McMillan.	G. Gurny
Tantanoola	3/3/34	15	Debate	H. Kennedy
Mundalla	22/3/34	11	Address—A. L. Warren .	A. Ross

UPPER NORTH DISTRICT. (PETERBOROUGH AND NORTHWARD.)

WEPOWIE (Average annual rainfall, 12.46in.).

October 2nd.—Attendance, 10.

HAY MAKING.—Paper read by Mr. L. R. Jasper.—"The best time to cut wheaten hay is when the grain is in the milky stage—about 12 days after flowering. Oats should not be cut before the straw shows purple at the bottom. If the hay is cut at this period stock will eat more readily. When the hay is cut it should be left 24 hours before stooking, if the ground is dry when stooking. I prefer the lying down stook; the sheaves are pressed down flat, which makes them better for handling, and they retain their weight better than those standing upright. If weather conditions are favorable, hay can be stacked 14 days after cutting. Build square corners in preference to a stack with round ends, because there is not so much danger of the ends slipping,

and they are more easily covered with straw, having only the two sides to cover. Always build with the butts outwards before starting to roof, fill the centre about 4ft. above the walls, giving the sheaves a good slope upwards.'¹

HARVEST REPORTS.—Meeting held February 12th.—Present: 12 members.—Mr. W. Rooke reported 9 bags to the acre on fallow from Early Burt and Palestine oats. Rane and Turvey yielded 14bush. each; Nabawa, Sultan, and Waratah each 9 bush. Stubble ground—Rane, Nabawa, and Joffre 4bush. Mr. C. Knauerhase sowed chiefly Rane, which yielded best on the late and roughest fallow, namely, 12bush. Mr. G. Gregurke: Waratah, 9½bush. and 14½bush.; Felix, 12bush.; Curly's Early, 19bush.; Rane and Werribee, 9½bush.—this field was struck by a hailstorm in October. Early Burt oats yielded 9½ bags to the acre. Mr. J. Burns: Nabawa, 21bush.; Rane, 15bush.; Waratah, 12bush.; Werribee, 10bush.; Rane on ground that had not been worked for 15 years, 6 bush. New ground (first crop) 12bush., old ground under same sowing 10bush. (Rane). Farm average, 11½bush. Mr. J. Crocker: Rane on best fallow yielded 18bush.; Rane on late fallow 8bush.; King's White, 10½bush.; Federation, Nabawa, and Rane, 8½bush. on stubble. Mr. L. Jasper: Rane, 14bush. after severe hailstorm in October; Turvey, 10bush.; and Nabawa, 9bush. Farm average, 12bush. Mr. T. Orrock sowed chiefly Rane 4H., which averaged 15bush.; Nabawa and Noonga each yielded 12bush.; Rane 4H. was procured from Dookie College in Victoria two years ago. Two bags have this year, in its second sowing, produced over 1,000 bags, and has been distributed on 34 farms this season to the extent of 700 bags. Mr. E. Rooke: 16½bush. from Canberra, Waratah, and Rane. Nabawa was rather disappointing, only yielding 14bush., yet looked the pick of the farm; unfavorable weather being the chief factor in the ripening stage. Early Burt and Palestine oats, 6 bags. (Secretary, E. Rooke.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Wilmington	13/3/34	19	Address—H. B. Barlow .	C. Cole

MIDDLE-NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

MURRAYTOWN.

February 24th.—Attendance, 8.

HARVEST REPORTS.—Members reported as follows:—Mr. F. Borgas sowed 60lbs. seed, 60lbs. super—Currawa, good heavy grain, 24bush.; Penny, 24bush.; Nabawa (pinched), 24bush.; Rane, 21bush. good grain; Rane on stubble, 15bush.. Messrs. N. and A. Scholz (14in. rain for year) sowed 60lbs. super, 60lbs. wheat—Currawa and Free Gallipoli, 27bush.; Rane, 8 to 9 bags, on stubble 5 bags. Mr. W. Scholz—Sword, thin crop, good grain, 30bush.; Free Gallipoli, 8 to 9 bags, cracked badly when harvested; Currawa, 8 bags; Rane, to 9 bags. Mr. E. Bonham—good crop of Rane, Federation, and Ford. Mr. E. B. Pitman sowed 60lbs. super and 60lbs. wheat—Free Gallipoli, 30bush.; Rane, 21bush. to 42bush. (300 acres); Sword, 24bush.; Marshall's No. 3 and Lens, 30bush. each; Early Burt oats, 45bush. (Secretary, E. Pitman.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Beetaloo Valley	26/2/34	8	Discussion	B. Giddings
Yandiah	22/2/34	9	Harvest Reports	O. Borgas
Appila	3/3/34	7	Experimental Plots	E. Wurst
Red Hill	27/2/34	9	Question Box	S. Pengilly
Wandearah	20/3/34	15	Address—E. L. Orchard .	J. O'Shaughnessy

LOWER-NORTH DISTRICT.**(ADELAIDE TO FARRELL'S FLAT.)****LONE PINE.****January Meeting.**

HARVEST REPORTS by Mr. J. Christian.—“The harvest in this district has been satisfactory with the exception of some crop which had to be sown late on account of the land being infested with sour-sobs, and were then too far backward when the warm weather and hot winds set in at the end of September. Hardly any damage to the crop was caused by frost. The weather for hay cutting was good with the exception of a few very hot days, but later for stripping the weather was rather unsuitable, being cool and windy. Some of the early sown crops on good fallow which were fed off with sheep yielded exceptionally well. Mr. C. F. Beckmann's Le Hugenot yielded 12 bags per acre, and Mr. F. Schulz's Waratah also averaged 12 bags, with Mr. Nettelböck's yielding 11 bags. Mr. J. Neldner's Le Hugenot went 10 bags, but was not fed off by sheep, and Nabawa averaged 9 bags. My crop of Sepoy and Teakle on red gravelly and hard setting soil was a very thin crop, but had a very plump grain and yielded 5 bags per acre. Mr. E. R. Hentschke averaged 6 and 8 bags of Sepoy and Teakle on good fallow. Some very good returns were also received from Sword, Correll's, and Ford. The best yield was from Sword by Mr. F. Fromm on late fallow, while Correll's and Ford had given the best straw though the lowest yield. Cape barley was sown late, yielded 8 bags, and the earlier sown yielded 10 bags. Algerian Cape oats yielded 10 bags, and the oats cut for hay went 1½ tons per acre. Mr. E. Alm cut 2 tons of hay per acre. Some of Mr. J. Neldner's and C. F. Beckmann's went over 2 tons per acre, sown in about the beginning of May at the rate of about 1½bush. to 2bush. of seed and 1cwt. of super per acre. The pea crop was very light, being damaged partly by the dry spring and hot winds and also by frost. The best yield was 7 bags, some only yielded 3 bags to the acre, being only half the crop of last year.” (Secretary, S. Turnbull.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Stockport	2/3/34	13	Address—H. W. Brown .	L. Klaffer
Penwortham ...	28/2/34	18	Address—K. Laught ...	A. Jenner
Snowtown.....	23/3/34	9	Harvest Reports.....	A. Hocking
Riverton	22/3/34	7	Formal	O. Longbottom
Lone Pine	26/2/34	10	Discussion	S. Turnbull
Brownlow	28/2/34	13	Annual Meeting	T. Rooke
Upper Wakefield	1/3/34	10	Annual Meeting	C. Neumann
Lyndoch	30/1/34	14	Address—Dr. A. Callaghan	J. Hamratt
Lyndoch	27/2/34	14	Address—F. E. Waddy ..	J. Hammatt

YORKE PENINSULA DISTRICT.

ARTHURTON (Average annual rainfall, 16in. to 17in.).

February 15th.—Attendance, 14.

HARVEST REPORTS.—Mr. W. Bagshaw reported Ghurka and Sword over 30bush. per acre. Mr. S. Coleman said wheat crops had yielded far better than had been expected, Ford returning over 12 bags per acre. Other varieties had returned over 10 bags per acre. The splendid yield would be some compensation for the very low price offering for wheat. In barley Mr. S. Coleman said his return had been 8 bags per acre on stubble land and 12 on grass land. Mr. M. Hynes had received best results from Ford, Caliph, and Nabawa. Mr. P. Roads said Dan and Ghurka had returned 11 bags per acre. Mr. L. Clasohm had not found much difference in varieties of wheat, but gave preference to Sword. Grass land had yielded 12 bags per acre. Mr. O. Jericho said Waratah had not given good results with him; other varieties returned over 30bush. per acre. Barley had yielded well. Mr. E. Clasohm's average was about 11 bags per acre. Mr. S. Henderson reported an average of 33bush. of wheat and 22bush. of barley. A paddock of wheat that he had entered for crop competitions yielded 39bush. per acre. Members all agreed that wheat at present prices would not pay expenses. Barley had been of great assistance to local farmers.

A further meeting was held on March 1st at Mr. T. Rodda's residence, there being present 14 members and visitors from the Boor's Plains Branch. Papers were read from the original minute book of the Branch, reporting meetings held 43 years ago. (Secretary, T. Howlett.)

BRENTWOOD (Average annual rainfall, 15.45in.).

February 8th.—Attendance, 12.

HARVEST REPORT.—Mr. J. Honner, after giving a resume of the weather, gave the following report:—"The past season proved once again the wonderful stamina of the wheat plant on Yorke Peninsula, for crops yielded from 15bush. to 36bush. to the acre on some of the best farms, with an average of 21bush. for this district. The sample in most cases was excellent, and crops practically free from disease in every particular. Good fallow proved its value other than where seeded too early, for it appears undesirable to start seeding until seven or nine days after a soaking rain. The most successful varieties of wheat were Ford and Sword, with good crops of Ranee, Major, Nabawa, Waratah, and Ghurka. The early harvesting period of the season was broken with cool weather generally, which resulted in less skinned barley and spread the delivery period over the whole harvesting.

The price of wheat was disappointing, opening at 2s. 3d. and ranging between that price and 2s. The prospect of any substantial rise is remote, with only Great Britain a buyer and all other nations—once customers of Australia—now self-supporting, and either sellers or indifferent buyers.

Barley crops were of a mixed quality owing to the adverse weather conditions of October. Nevertheless quite half of the harvest appealed to buyers, and owing to scarce supplies of malt on hand, fully two-thirds of the harvest was purchased at 2s. to 2s. 3½d., leaving a lesser portion to be pooled than is usual. Although the yield of barley was light—say, 15bush. to the acre average—again there was an absence of diseased and damaged or skinned grain. There is a tendency for farmers to grow more Californian Cape, which appears to meet a steady market at 2s. 2d. to 2s. 3d. per bushel, and merchants say there is an unlimited demand for quality Cape in England. Our experience with Californian Cape is that it yields well and ripens a fortnight later than Prior, thus minimising the risk of having a lot of barley ripe at the one time. Farmers could do worse than combine the two varieties. Yields up to 20 bags per acre were reported.

The quantities of grain delivered at Minlacowie would be in the vicinity of wheat 60,00 bags and barley 75,000 bags. Oats are grown chiefly for hay, and this year the yield per acre was approximately 30cwts. to the acre. The much talked of super and sulphate of ammonia mixture for barley and wheat on stubble land did not come up to expectations. There certainly was a difference, but the cost is too great to get the increased yield. With every prospect of low prices, quality and not quantity should be our motto for the coming year."

PASKEVILLE (Average annual rainfall, 15.52in.).

February 27th.—Attendance, 8.

HARVEST REPORTS.—Satisfactory yields were reported. Among the best yielding varieties were Waratah first, then Sword, Ranee, and Ford in that order. Samples in some instances were pinched, and the prevalence of barley was again noticeable. There were very few cases of smut. Generally speaking, the sample was considered very good. (Secretary, J. Prouse.)

WEAVERS (Average annual rainfall, 16.84in.).

February 5th.—Attendance, 11.

HARVEST REPORTS.—Mr. J. Bridges spoke on the harvest from a buyer's point of view, and said the wheat delivered was the best quality that had been grown for a number of years. Barley this year compared favorably with the best last year, but the poor quality was very inferior. Mr. W. Agnew said Ford yielded much better than Nabawa. Mr. W. Anderson reported Waratah as his best crop, with Sword second and Ford and Ranee third. Barley suffered badly for the want of a little more rain in the growing period. Mr. L. Slade said barley that was frosted just as it was coming through the ground was sure to be affected in the yield, but the sample was generally good. All wheat should be graded before being sown to remove all small seeds and cracked grain. He had reaped a splendid crop of Sword where 2,000 sheep had been grazing for some time to eat Sand Rocket. (Secretary, H. Cornish.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
South Kilkerran	27/2/34	9	"Transport of Sheep," O. Heinrich	R. Hasting
Kilkerran	5/3/34	10	"The Combine," V. Clasohm	G. Heinrich

WESTERN DISTRICT.**WARRAMBOO.**

February 13th.—Attendance, 11.

HARVEST REPORTS.—Mr. P. Daniel reported late sown crops badly pinched, but they weighed heavier than early sown, which was not pinched so bad. Late sown yielded 8bush., early a little better. Mr. J. Sampson had an 8bush. average, fallow 12bush. Golden Drop and Gluyas were his best wheats. Mr. O. Murphy: Fallow 12bush, farm average 10bush., Waratah was the best crop on new ground, going 10bush. Mr. A. Collins reported mid-season wheat more affected with take-all and hay-die. Mr. F. Chilman: Nabawa badly affected with hay-die, Gluyas on fallow 12bush. (Secretary, F. Chilman.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Cungena	1/3/34	14	Harvest Reports	A. Voumard
Koppio	28/2/34	11	Harvest Reports	M. Gardner

EASTERN DISTRICT.**OVERLAND CORNER** (Average annual rainfall, 10.37in.).

February 9th.—Attendance, 12.

HARVEST REPORTS.—The subject for the evening was "Harvest Reports." The chairman in his report showed conclusively that nothing but fallow paid, stubble ground was a complete failure, while fair returns were obtained off the fallow ground. Mr. G. Chesney reported the same experience. Mr. T. Atkinson, who had the outstanding crop of the district, gave a very interesting account of his year's experience, with the aid of the blackboard. He experimented with new land by fallowing it. He also put in new land straight after the burn off. The result was up to 12bush. per acre off new land fallow, 3bush. per acre off new land. The new land was put in with same wheat and quantity of super and at the same time as the fallow. Not only would the difference be in wheat yield, but a clean stubble burn would result, destroying shoots, etc., whereas the new land was a wilderness of shoots, and a burn impossible; a big factor in working costs and condition of the land. His experience was a complete demonstration of the fact that it paid to fallow new land in the mallee. The crop results were obtained with a 3½in. rainfall during the growing period. Mr. Atkinson also reported having sown ½lb. of Wimmera rye grass to the acre, with wheat, on new country, and believed a fair seeding for next year would result. The rye grass was put in the dry pickler with the wheat, and an even distribution was obtained. He recommended farmers to sow rye grass on new country and get it established before other weeds appeared. (Secretary, Len. Atkinson.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Overland Corner	28/2/34	8	Address—E. Atkinson ...	L. Atkinson
Pinnaroo	27/2/34	7	Address—R. L. Griffiths .	H. Badman
Yurgo	5/3/34	8	Annual Meeting	H. Mackenzie
Ramco	20/2/34	43	Address—Prof. Prescott .	J. Odgers
Ramco	5/2/34	18	Paper from <i>Journal</i>	J. Odgers

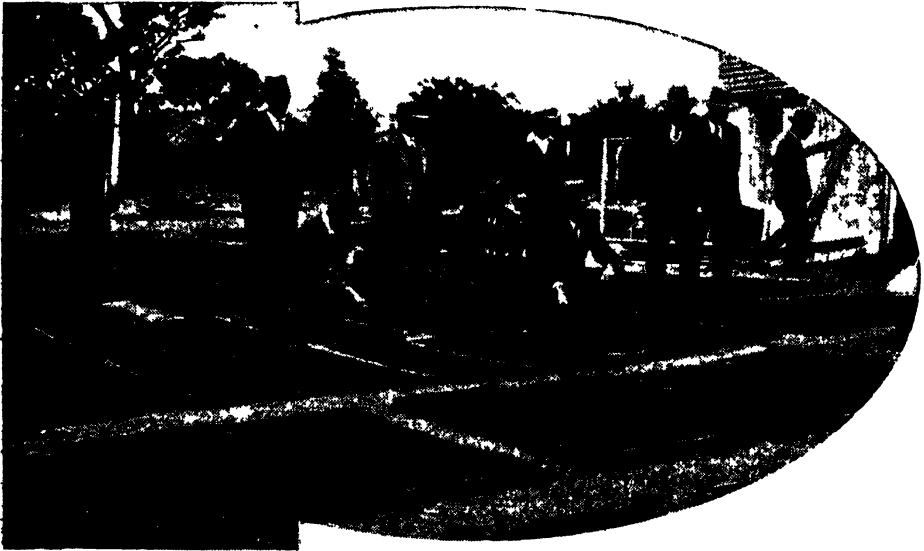
SOUTH AND HILLS DISTRICT.**FRAYVILLE.**

March 1st.—Attendance, 10.

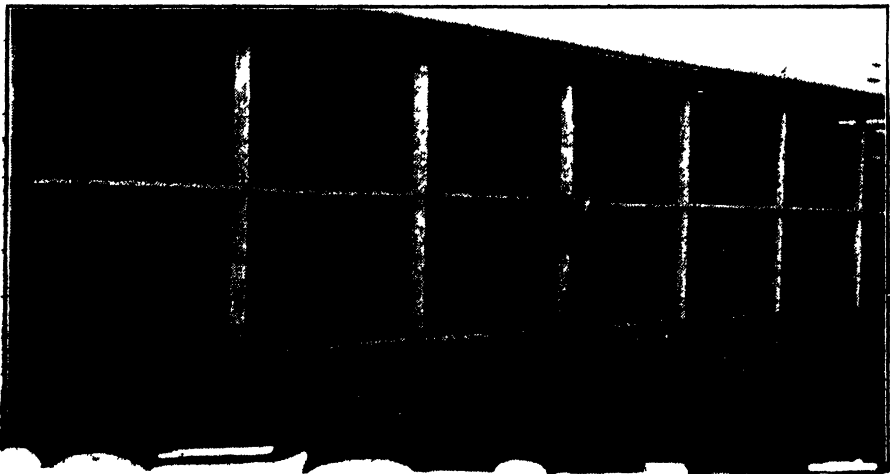
HARVEST REPORTS.—Harvest reports were given by each member present. Among the leading varieties of wheats mentioned were Free Gallipoli, Rancee, Sword, and Nabawa. Currawa was generally condemned owing to its uncertainty. Members discussed the use of a roller for pulling out chokes of harvesting machinery. One member said he reaped a comparatively difficult crop of Nabawa with its use, thereby saving the heavy expense of buying a reaper-thresher. (Secretary, H. Ramm.)

McLAREN FLAT BUREAU FIELD DAY.

In company with Messrs. R. Fowler, H. H. Orchard, and F. C. Richards, of the Department of Agriculture, members of the McLaren Flat Branch of the Agricultural Bureau, including Mr. G. Connor, M.P., inspected a number of orchards in the McLaren



McLaren Flat Field Day: Some of the Party inspecting the Drying Ground at Mr. W. L. Townsend's Orchard.



McLaren Flat Field Day: Drying Racks on Mr. R. G. Bell's Property.

Flat District on Saturday, March 17th. After lunch, which was provided by the members of the Local Women's Branch of the Bureau, the party moved on to Mr. W. L. Townsend's orchard and vineyard. His property consists of 50 acres planted



McLaren Flat Field Day Those who took part in the Tour of Inspection

with currants, wine grapes, apples, and prunes, and the main crops are currants and prunes, of which he harvests each year 14 and 2 tons respectively. Evidence of the lack of rain was noticed in practically every orchard. Mr. Townsend said where the



Annual Field Day, Blackwood Agricultural Bureau.

soil has been well cultivated the vines were standing up to the dry conditions, but where this work had been neglected, the vines were suffering. Under the guidance of Mr. Townsend, the party next visited Mrs. Lowe's house, to visit what local residents

claim to be one of the oldest vines in tthe State. The girth of the butt of this vine 18in. from the ground is 4ft. 10in., and the vine is trellised all around the house, a distance of 126ft. One year over 1 ton of grapes was picked off this vine. The age of this vine can be vouched for by Mrs. Lydiard, who now resides at McLaren Vale. She is 90 years old, and has distinct recollection of the vine when she was a young girl.

Perhaps one of the most interesting places that the party visited was that of Mr. R. G. Bell. The sheds, drying racks, and all outbuildings were in excellent order. Mr. Bell has one of the most up-to-date plants in South Australia for the cleaning and packing of dried fruits. Boxes for the fruit are made on the premises; 240 tons of currants are packed each year for export. Mr. Bell has installed a dehydrator. Twenty-four hours after the fruit has been taken off the tree and passed through a dehydrator it is ready for packing. Its capacity is 3,600lb. of prunes and just under 2 tons of currants. In bad weather, Mr. Bell said he had worked the machine three weeks, day and night, without stopping. It is electrically driven, the power costing 3s. 6d. for 24 hours.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Hope Forest ...	5/3/34	25	Addresses—Messrs. Peters and Jacobs	A. Eve
Finniss	21/3/34	16	Address—R. Hill.....	L. Dunn
Cherry Gardens	24/2/34	13	Question Box	A. Stone
Kuitpo	28/2/34	10	Address—R. Hill.....	J. Pickup
Yundi	21/2/34	14	Inaugural Meeting	T. Smart
Macclesfield	15/3/34	11	Address—B. Fry	H. Ross
Blackheath	1/3/34	10	Paper from Journal	E. Paech

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WOMEN'S BRANCHES.

THE FOOD VALUE OF MILK.

NUTRITIVE VALUE OF THE SEVERAL COMPONENTS OF MILK.

[Continued from page 1056.]

THE PROTEINS.

Milk contains the proteins casein, lactalbumin, lactoglobulin, and an alcohol soluble protein. These supply about 19 per cent. of the total calories of milk. The principal protein, casein, best known perhaps in the form of cottage cheese, is characterised by containing 0.8 to 0.9 per cent. phosphorus. It is present in cow's milk to the extent of 3 to 4 per cent. and in human milk in a decidedly smaller amount—0.05 to 1.5 per cent.

Lactalbumin, the principal protein of whey, or milk serum, is present as 0.5 per cent. of whole cow's milk and represents about one-sixth of the total protein. Human milk contains a greater proportion of lactalbumin than does cow's milk. The lactalbumin content of cow's milk is equivalent to one-tenth of the casein, whereas in human milk it is equivalent to one-fifth of the casein.

These two proteins, comprising about 93 per cent. of the total milk proteins, are both biologically complete, that is, either one given in sufficient quantity has been found to support satisfactory growth and reproduction in suitable test animals, provided the protein is fed in conjunction with an otherwise adequate diet.

Of particular interest are the experiments which demonstrate that the nitrogen of milk is more efficiently utilised by the human body than is the nitrogen of various other foods.

The proteins of milk are equally readily assimilated whether presented in the form of whole milk, evaporated milk, dried milk, cheese, or purified casein. Infants appear to utilise the protein from heat-treated milk rather more readily than that from untreated milk, since in the former case undigested protein curds do not appear in the stools.

THE CARBOHYDRATES.

Lactose, on digestion, is split into glucose and galactose. It is non-fermentable by ordinary baker's yeast. Lactose possesses slight laxative properties.

Liberal quantities of this carbohydrate in the diet produce a favorable medium in the intestine for the growth of the non-putrefactive organisms.

Lactose plays a peculiar role in the diet inasmuch as it increases, in some unexplained manner, the absorption of the salts of calcium, or phosphorus, or both, from the gut, and their retention in the animal body. Under certain conditions the influence of this sugar in inducing proper deposition of inorganic salts into the bones may be as great as that of the bone-calcifying vitamin D. In this connection it should be pointed out that the incidence and severity of rickets is much less in babies reared on human milk than on cow's milk in spite of the richer supply of inorganic salts in the latter milk. This may be associated with the higher lactose content of human milk.

THE FAT.

Milk fat is easily digestible. Owing to its fine emulsification in milk a considerable portion may undergo digestion in the stomach. The size of the fat globules is a species characteristic. The fat globules of human milk and goat's milk are relatively smaller in diameter than are those in the milk of the cow, and are consequently more easily digested by the enzymes of the gastro-intestinal tract.

From a nutritional point of view, butterfat is notably valuable as a source of the fat-soluble vitamins. There is also a growing belief that fat, or rather certain fatty acids, are necessary adjuncts to a normal diet.

THE INORGANIC SALTS.

The inorganic salts or ash constituents comprise the residue that remains when all the organic matter in the food is burned away by heating in the presence of air; they supply an essential part of the diet. Numerous substances of this type are necessary for the growth of the skeleton, for the development of the soft tissues of the body, and for the maintenance of the osmotic pressure and of the neutrality of the body fluids. These substances are more satisfactorily supplied by milk than by any other feasible combination of natural foods. During the early period of infancy, when the rate of growth is so phenomenally rapid, milk is the major source of the inorganic substances in the diet of most mammals, and at this time the demand for these substances is great, owing to the enormous growth in size of the skeleton.

Iron and copper are the only known essential elements that occur in milk in less than optimal quantities; although only small quantities are required, red blood cells cannot be formed by the body unless these metals are supplied. Young animals at birth, however, possess a goodly supply of both these elements, and this tides them over until a mixed diet can be given. When the supply of iron and copper in the body is exhausted, normal growth ceases and anaemia may result. Restoration to normal growth and health by the addition of other foods will occur only in so far as these contain iron and copper.

The calcium content of cow's milk is three times that of wheat and six times that of corn. Milk is the best source of dietary calcium; all other foods, with the exception of the green leafy vegetables, are relatively poor sources of this substance. Calcium retention by the animal body, furthermore, is greater when milk is fed than if the same amount of calcium were given in the form of vegetables. Babies reared on cow's milk absorb and retain more calcium and phosphorus than do those reared on human milk. Experiments on children between the ages of 3 and 13 years have demonstrated that optimum storage of calcium is made when the daily diet of the child contains at least 1 quart of milk.

The inorganic constituents of milk vary according to the stage of lactation, the season and the locality in which the milk is produced. Data reported for the iodine content in two sections of the United States are of particular interest. Cows in a dairy section of New York produced in the summer a milk which, in a dry powdered form, contained 145 parts of iodine per billion; during the winter months the iodine fell to 67 parts per billion. Milk powder from Wisconsin, however, contained 704 parts of iodine per billion in the summer and 961 in the winter.

Dried and evaporated milks may contain more iron and copper than the original fluid milk. Milks desiccated by the revolving cylinder process have been reported to contain two to five times more iron than the original milk owing to the dissolution of iron from the metallic cylinders. The copper vacuum pans and tubes used in the commercial evaporation of milk may also increase the copper content of the milk. Milks dried by the spray process do not contain additional iron.

Pasteurisation, boiling, or evaporation may cause a slight precipitation of calcium phosphate. The amount lost in this manner is small, and, since cows' milk is at least four times richer in calcium than human milk, the possible loss to the infant is inappreciable. Evaporated milk is as good a source of the inorganic salts essential for human nutrition as pasteurised milk. Vigorous boiling is said to reduce the iodine content by as much as 20 per cent.

The efficiency of the salt mixture found in milk has been demonstrated in experimental laboratories for years. In the early nutrition studies milk itself was used as a source of the inorganic salts. Later, in an attempt to ascertain the nature of the factors in milk which stimulated growth in rats, an artificial salt mixture was prepared the composition of which was designed to simulate

that of milk ash as closely as possible. Additional iron, of course, had to be incorporated. This salt mixture was found to be very satisfactory and is now used in many laboratories to supply the mineral requirements in experimental studies with animals.

THE VITAMINS.

Milk contains all the vitamins which have been shown to have been necessary for man but, with the possible exception of vitamin A, cannot be considered a rich source of any of them. Consequently, milk should never be fed as the sole supply of these dietary essentials. During growth the demand for vitamins is so great that it is not always possible for the baby to consume as much milk as is required to furnish some of them in sufficient amount. For this reason many pediatricians prescribe cod liver oil and tomato juice or orange juice as early as the third week of life. Likewise, the adult who may be forced to subsist largely on a milk diet, must have access to foods more concentrated in the vitamins.

Vitamin A.—From observations that had been made of the presence of vitamin A in milk fat it was noticed that animals grew well for a certain period on various mixtures of purified food materials but they ultimately declined rapidly in weight and died unless butterfat were included in the diet. This led at first to the view that butter contains an unknown substance, the chief function of which is to promote growth. Later, when the diets were more carefully refined and purified and contained little if any natural food, it was found that the absence of butterfat from the food not only brought about a rapid decline in weight, but also gave rise to a definite pathological condition of the eye characterised by a dryness of the tissues and their subsequent invasion by bacteria. The unidentified substance in butterfat which prevented it was designated vitamin A.

Xerophthalmia has been observed in children who did not have access to liberal amounts of a good milk, butter, eggs, yellow or green vegetables, or cod liver oil. Numerous cases occurred in Denmark during the early years of the World War when margarines were substituted in the diet for butter, which was being exported. From 1917 to 1919 the exportation of butter was forbidden, and this eye lesion disappeared.

The vitamin A content of human milk may be equivalent to that of cows' milk, but its presence in any milk is dependent entirely on the amount taken in in the mother's diet. It is believed that the vitamin A of mothers' milk, although no more concentrated than in cows' milk, is more completely utilised by the infant, even if identical amounts of the vitamin are given in the form of cows' milk. Since vitamin A is confined to the cream portion, about 90 per cent. is removed by the process of skimming. Therefore, skimmed milk formulas would fail to furnish the baby with sufficient vitamin A, and this essential material must be supplied in some other way.

Although vitamin A is destroyed by prolonged exposure to air, and by heat and storage, the temperatures ordinarily reached in cooking and in the preparation of infant formulas only slightly diminished its original concentration in milk. In the most careful commercial evaporation or powdering of milks, no appreciable destruction of this vitamin results.

Vitamin B.—This vitamin is not plentiful in milk. Cows' milk is about one and one-half times richer than human milk, but, weight for weight, is less than one-fiftieth as potent as a good sample of dried brewery yeast. Vitamin B is soluble in water and therefore is contained in the skimmed milk portion. It is fairly resistant to heat and oxidation and thus is unaffected by ordinary cooking, by desiccation, or evaporation.

Like vitamin A, this vitamin is present in the milk only to the extent that it occurs in the maternal diet and, since it is not stored in the body during periods of plenty, its absence from the food is quickly reflected in the quality of the milk.

The vitamin B content of human milk varies inversely with the quantity secreted. Thus women who produce large quantities of milk may be supplying their babies with a food far below the optimum in vitamin B. Since the rate of growth of experimental animals can be retarded or accelerated at will by the amount of vitamin B administered in their diet, it is evident that some other source of it than the mother's milk must frequently be supplied in order to ensure the normal growth of the young.

Vitamin C.—Milks, even in a fresh condition, are rather poor sources of the scurvy-preventing substance, vitamin C. Summer milk may be richer than winter milk, but this is dependent on the type of fodder fed. Herds that receive the same ration winter and summer, without access to fresh green pasturage, will probably produce a milk constant in its vitamin C value although carrying a minimal amount.

Vitamin C is quickly destroyed by oxidation and by exposure to air and heat, hence the milk delivered to the average consumer is relatively deficient in this substance. Milk quickly boiled without stirring may retain most of its vitamin C, but pasteurisation at 60dg. C. for 30 minutes will destroy it almost completely. Evaporated milk and sweetened condensed milk are consequently nearly devoid of it. Milk powders vary in their vitamin C content with the process of manufacture. The roller process leads to somewhat less destruction of this vitamin than does the spray process.

Since milks contain so little vitamin C, even when freshly secreted, and since destruction occurs so readily on exposure to air and to high temperatures, it is imperative that adults as well as children should be assured of other sources of vitamin C. Liberal portions of fresh fruit juices, fruits, and vegetables are necessary to forestall the bleeding and tenderness of the gums, the loosening of the teeth and the swollen and tender joints that are symptomatic of scurvy.

Vitamin D.—Milks in general very seldom contain sufficient vitamin D to prevent or cure rickets in babies. Assays of human milk have revealed an almost total absence of this factor, although cows' milk probably contains a small amount. As is the case with the other vitamins the concentration in the milk depends somewhat on the access of the cow to foods rich in vitamin D. It is not possible, however, to increase the potency of human milk by dietary means. Exposure of the lactating mother to sunshine or to artificially produced ultra-violet light will stimulate the secretion of vitamin D into her milk. This is true, also, for the goat. Similar exposure of the cow does not thus enrich the milk. Vitamin D is not readily destroyed by heat, therefore ordinary boiling or pasteurization may be carried out with impunity. Commercially evaporated milks have been shown to be as potent as are pasteurised milks in inducing maximal calcification of bones.

It is a curious fact that, although average human milks contain little demonstrable vitamin D, rickets develops less often and in far less severity in exclusively breast fed children. It is yet to be learnt whether the explanation of this lies in the high lactose content of human milk, in the concentration of its inorganic salts, or in both.

It should be stressed that no milk, either human or cows', can furnish enough vitamin D to the rapidly growing infant to allow for the perfect development of its bones. Intake of cod liver oil, or egg yolk, and exposure to the unobstructed rays of the sun should be begun in the early weeks of life.

Vitamin E.—This is the dietary factor that has been found in experimental studies to be essential for successful reproduction in the albino rat. Its value for the human species has not as yet been proved. The concentration in cows' milk is extremely small, even when the ration of the cow contains ample portions of fresh lucerne. Since the vitamin is found in the fat fraction, skimmed milk is devoid of it. Human milk has not been tested for its vitamin E content. Destruction due to heating and oxidation does not readily occur.

Vitamin G.—Pellagra, a serious disease that is prevalent in the southern part of the United States, has been found within recent years to be of dietary origin. It may be prevented or cured by a substance of unknown composition in milk, glandular meats, yeast, and also in certain vegetables. Liberal quantities of cows' milk must be ingested if this food supplies the only source of the pellagra-preventing vitamin G. Human milk contains less of it than is found in cows' milk. Evaporated, condensed, and dried milk have not been studied for their vitamin G content, but since it is known to be extremely resistant to heat, it is probably present to the same extent as in raw or pasteurised milk.

ENERGY VALUE OF MILK.

Because of its large water content, whole milk has a relatively low energy value per unit of weight. Table III. on page 909 of the February *Journal* shows the calorific value of milk and of different milk products. The figure there given, 315 calories per pound, indicates that an average person would require about 3½ quarts daily to supply the needed 2,500 calories of energy. A person employed at vigorous manual labor would need nearly twice as much. Milk is manifestly unsuited to serve as the sole food of adult man, not only because of the deficiencies mentioned in the previous sections, but also because of its low energy value. However, its value as one of the fundamental constituents of a well chosen dietary can hardly be over-emphasised.

(To be continued.)

SUMMER SWEETS AND DISHES.

[Paper read by Miss I. Sires at the March meeting of the Wasleys Branch.]

BAKED APPLE AND FIG CUSTARDS.

Ingredients.—½lb. cooking apples (peeled and cored), 2ozs. figs, ½oz. shelled walnuts, ¼ gill water, 2 dessertspoons sugar, 1 whole egg, 1 white of egg, ¼ gill milk, 1 tablespoon castor sugar, ¼ level teaspoon ground cinnamon, finely grated orange rind. **Method.**—Peel, core, and slice apples (½lb. prepared), stew with water and sugar. Stew until tender, then mash them up finely, cut up figs and chop walnuts. Beat the whole egg and mix it with milk. Stir all into the mashed apples when they have cooled slightly, then turn mixture into a pie dish and bake it until set without letting it boil. Whisk the egg white to a stiff froth, mix cinnamon with castor sugar, and fold it into the egg white lightly, then heap it on top of custard. Dredge the top of the egg-white with sugar, and put into cool oven to set. Serve cold with finely grated orange rind sprinkled on top if cared for. Sufficient for 3 persons.

COFFEE BLANC MANGE.

Ingredients.—1 pint milk, 1½ozs. cornflour, coffee essence, ½oz. butter, 1½ dessertspoons sugar. **Method.**—Smooth the cornflour with a small quantity of the milk and heat the remainder of the milk in a saucepan with the sugar. Pour this on to the mixed cornflour then return it all to the pan and bring it to the boil, keeping it well stirred. Boil gently for a few minutes then add the butter and sufficient coffee essence to flavor, and more sugar if required. Turn the blanc mange into a mould rinsed with cold water, and when set unmould it and serve it with cream. Sufficient for 4 persons.

PEACH CUSTARD.

Ingredients.—1doz. good juicy peaches, 1 cup castor sugar, 1 pint milk, 3 eggs, 1 tablespoon cornflour, few drops essence lemon. **Method.**—Skin peaches, break in halves and remove stones, put into a piedish, sprinkle sugar over and stand 2 or 3 hours. Make a custard of the milk and yolks of the eggs. Make rather

thick by adding a good tablespoon of cornflour. Add essence and stir occasionally while cooling. When nearly cold, pour over the peaches. Whip the whites of eggs to a very stiff froth, add 2 tablespoons castor sugar, stir in lightly and spread over custard. Put in a hot oven for a few minutes to set, until a pale fawn color.

RICE JELLY MOULD.

Ingredients.—1 pint packet jelly, left over fruit juice (about $\frac{3}{4}$ pint), $\frac{1}{4}$ lb. rice. *Method.*—This is a good way of using up left over fruit juice from tinned or bottled fruits, or jelly made with water. Choose a jelly that will blend with the flavor of whatever juice is being used, such as plum juice for raspberry or strawberry jellies, pineapple, apricot, pear, or peach juice for lemon or orange jellies. Heat the juice and dissolve the jelly in it, making it up to 1 pint with the jelly. Wash the rice and cook it in boiling water until tender, drain well and stir into dissolved jelly. Add sugar if required and leave until it begins to thicken and then turn into a wet mould. Unmould the rice jelly when set and serve with custard or cream.

APPLE CUSTARD.

Ingredients.—2lbs. good cooking apples, $\frac{3}{4}$ pint water, add more water if necessary, 4 eggs, 6ozs. sugar. *Method.*—Make a syrup of water and sugar, peel and core the apples and cook gently in the syrup until tender. Rub through a sieve, beat eggs, stirring well. Cook over the fire gently, but do not boil; serve cold in custard glasses.

SUBSTITUTE FOR WHIPPED CREAM.

Ingredients.—1 pint milk, 1oz. butter, 2ozs. castor sugar, 2 eggs, $\frac{1}{4}$ oz. gelatine, few drops essence vanilla. *Method.*—Soak gelatine in a little of the milk for 1 hour. Put remainder on to boil, cream butter and sugar, add yolks of eggs and beat. Pour in a little of the boiling milk, then gradually add the remainder. Stir in gelatine and cook very gently until gelatine is dissolved, taking care the eggs do not curdle. Allow to cool slightly then add the vanilla and whites of eggs beaten to a stiff froth. Stir in lightly and put aside to cool.

COCOA MOULD.

Ingredients.—2 eggs, 1 pint milk, 1 dessertspoon cocoa, $\frac{1}{4}$ oz. gelatine, $\frac{1}{2}$ gill water, vanilla flavoring, 2 $\frac{1}{2}$ dessertspoons sugar. *Method.*—Mix cocoa to a smooth paste with a spoonful of milk, heat remainder and add to cocoa, then return all to the pan and bring to the boil. Boil for a minute or two, then take off fire and cool slightly. Beat eggs, add cocoa, milk (hot but not boiling), then turn the mixture into the top of a double boiler and add sugar. Stir until custard thickens, then remove it and leave it to get cold. Dissolve gelatine in a saucepan with water, then strain it into the cold custard. Flavor it with vanilla and add more sugar if required. Leave custard until it is beginning to thicken, then turn it into a wet mould to set. Unmould the mixture and serve plain or with cream.

PUDDINGS, STEAMED AND BOILED.

(Miss P. Richter.)

With a foundation mixture for a plain steamed pudding such as 2 tablespoons butter, 3 tablespoons sugar, 1 egg, 1 cup milk, 2 small cups S.R. flour, and steaming for 1 $\frac{1}{2}$ hours several different kinds of puddings can be obtained. By adding 1 tablespoon of cinnamon it gives a nice brown pudding that can be served with either custard or white sauce. The same mixture can be made as a waterfall pudding by placing 3 tablespoons of dark jam in the steamer before putting in the mixture. Golden syrup can be used in the place of jam if preferred. If the mixture is left plain it can be served with jam sauce, made by using 1 cup water, 1 $\frac{1}{2}$ tablespoons sugar, 1 tablespoon dark jam, and thicken with cornflour. Stale cake can be used for puddings with the addition of fruit and spice, pour custard over and either steam or bake.

DRIED APRICOT STEAMED PUDDING.

Ingredients.—2 cups S.R. flour, 2 cups dried apricots (soaked overnight), 1 dessertspoon butter, 2 tablespoons sugar, pinch of salt, enough milk to make a stiff dough. Rub butter into flour and salt, add sufficient milk to make a stiff paste, roll out lightly and cut into four circles. Place 1 cup of apricots in the bottom of a greased basin, add little sugar, then layer of paste, then a layer of apricots sprinkled well with sugar; another layer of paste, and continue until the basin is full, making top layer pastry. Steam 3 hours, serve with custard or apricot sauce made thus:—Strain the water in which the apricots were soaked overnight, add $\frac{1}{2}$ cup sugar and boil; thicken with a little cornflour.

BAKED ROLY POLY PUDDING.

Raspberry Roll.—Mix 2 cups S.R. flour and 1 tablespoon dripping, add enough milk to form a stiff dough. Roll out and spread thinly with raspberry jam. Place in a pie-dish and pour the following sauce over the roll:—1 cup of boiling water, 1 tablespoon butter, 1 tablespoon sugar. Bake in moderate oven for $\frac{3}{4}$ hour. Thinly sliced apples sprinkled with sugar may be used instead of jam. Boiled puddings are usually made with suet, put into a scalded floured cloth and kept boiling. If allowed to go off the boil they will be heavy. They are usually served with a sweet sauce, or if the weather is hot the Christmas pudding is nice served with whipped cream.

CHRISTMAS PUDDING.

Ingredients.— $\frac{1}{2}$ lb. plain flour, $\frac{1}{2}$ lb. suet, $\frac{1}{2}$ lb. bread crumbs, $\frac{1}{2}$ lb. each of currants, sultanas, and raisins, $\frac{1}{2}$ lb. sugar (brown or white), 2ozs. shredded candied peel, 1 teaspoon mixed spice, 3 or 4 eggs, 1 wine glass brandy (optional), $\frac{1}{2}$ teaspoon carbonate soda dissolved in $\frac{1}{2}$ cup hot water, grated rind of $\frac{1}{2}$ lemon, $\frac{1}{2}$ teaspoon salt. This recipe is also suitable for putting into Fowler's jars, but in this case

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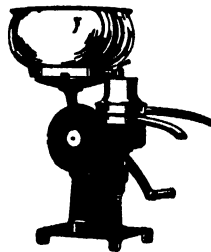
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butter should be used instead of suet. They will keep indefinitely and are handy in case of visitors. Fill the bottles two-thirds full and boil 4 hours.

A plain pudding more suitable for everyday use is 2 cups flour, 1 cup sugar, 1 cup raisins or currants, 1 tablespoon dripping, 1 teaspoon carb. soda; mix with boiling water; usually called boiling water pudding.

BAKED RHUBARB ROLL.

Ingredients.— $\frac{1}{2}$ lb. flour, 4 ozs. dripping, 1 dessertspoon castor sugar. Make into light crust and roll out thinly. Peel and cut rhubarb into small pieces, roll them in sugar, place on paste, sprinkle in few fine bread crumbs, roll as for ordinary jam roll, place in greased pie dish, brush over with white of egg and sugar. Bake nice brown and serve with custard or cream.

CABINET PUDDING.

Ingredients.—Butter inside of pudding mould, have ready 1 cup chopped citron, raisins, and currants. Sprinkle some of this fruit on bottom of mould, then slices of stale sponge cake. Shake over this some spice, cinnamon, cloves, and nutmeg, then fruit again and then cake until mould is nearly full. Make a custard of 1 quart milk, 4 eggs, pinch salt, 2 tablespoons melted butter, pour over cake without cooking it. Let stand and soak 1 hour; then steam $1\frac{1}{2}$ hours. Serve with sauce.

HOUSEHOLD INQUIRIES.

[Replies supplied by Miss E. Campbell, Dip. Dom. Econ., Education Department.]

Belalie Women's Branch asks—(1) How are pleated godets stitched into a skirt? (2) Should women and girls attend to the dairy herd on a farm? Replies—(1) Turn in the edge of the opening in the skirt about half an inch, and the top of opening should be carefully turned in perhaps only as much as quarter of an inch; it must be flat and might have to be snicked to allow it to set flat—then tack down. Place the godet under the skirt and stitch along the turned edge of skirt. The skirt must be on top of godet. The pleats at the top of godet should be made to lie flat, then on the inside of skirt, a small strip of binding should be placed across the top of godet and allowed to overlap the skirt about half an inch, then slipped stitched into position. This will keep the pleats in position, and will strengthen the join in the skirt. (2) It is generally recognised that it is a man's work to attend and care for stock of all kinds on farms, for there is often heavy, intricate, and sometimes unpleasant tasks to be performed. But the division of labor on a farm is an internal domestic affair, to be settled between the folk anxious for the welfare and advancement of the property.

Penola Women's Branch—(1) How to remove rain spots from a felt hat? and (2) Why does a blister sometimes rise on a sponge cake? Replies—(1) Steam the hat by allowing the steam from the spout of a kettle to pass into the crown of the hat, then as the steam works its way through the felt it will release the pile on the right side. With a stiff brush give the right side of the hat a good brushing, but care should be taken not to force the hat out of shape whilst it is damp. (2) If a sponge is put into an oven which is slightly too hot the surface will be hardened, and then when the interior is heated the air and gas in the mixture expands, if it is not thoroughly mixed and incorporated with the other ingredients, it will then come in one mass, and being unable to escape, as the surface has hardened, it will form a blister. Smaller strokes with the beater, when folding the flour into the egg and sugar, will often overcome this difficulty.

LEATHER FURNITURE.

Coonowarra Women's Branch asks—Why is it that American duck covered furniture (leather) becomes sticky after use? Reply—The imitation leather covering for furniture, commercially known as "Rexine," is made with a canvas backing and a mixture of paint and oil is worked well into the canvas. After the furniture has been in use for some time the canvas becomes pliable, and through climatic conditions the oil dries out of the surface, thus when heat is applied, either by the weather conditions or from the body heat of persons using the furniture, the leather stretches out of shape, and the paint mixture is slightly softened and becomes sticky. This cannot be permanently remedied, but by washing the surface over with a soft cloth, rinsed out of warm soapy water and immediately thoroughly dried. Then, when quite dry, rubbed well with an oily duster—linseed oil is the best—then rub with clean duster to remove any surplus oil. This will restore the Rexine for two or three months, or perhaps a little longer.

DRY TANNING A SHEEP SKIN.

Clare Women's Branch asks—(1) How to remove a stain from a cream flannel coat? (2) How to "dry tan" a sheep skin? Replies—It is impossible to give definite instructions until the nature of the stain is known, as each kind of stain requires a different treatment. Some general rules are as follows:—Always try weak chemicals first. Only have material in chemicals a short time, and then dip it into clean cold water. Do not rub too hard whilst in chemical. Wash out all chemicals before drying the article. Rub flannel material with a piece of flannel. (2) These directions are from the *Journal of the Department of Agriculture, South Africa*, page 55, July, 1922: Take two parts of saltpetre and one part of alum and reduce to a powder. Saltpetre is best, but if none is on hand use salt as a substitute. Rub well the flesh side of the skin with the powder, taking care that every part is covered with the mixture. Lay the skin away in a cool place for several hours. In cold winter weather it may be rolled up and left for a fairly long time. Next stretch it and allow it to dry a little, then scrape it, and before it is entirely dry, rub and twist it until it is entirely soft. It should be remembered that a solution has an advantage over dry tanning, because with the former there is little chance of any part of the skin escaping its effects.

GRASS STAINS.

Kangarilla Women's Branch asks—How to remove grass stains from cream trousers and silk dresses? Reply—Methylated spirits is used for the removal of grass stains. It is often necessary to allow the stain to soak in the spirits for a short time, then rub the stain with a piece of flannel dipped in the spirits, rubbing the way of the grain. Rinse the article in warm soapy water, the water should be just warm; hot water will often fix a stain. It might be necessary to repeat the process several times. Stains are always easier to remove if they are treated immediately they have occurred. Eucalyptus oil will also remove the stain, but the oil stain has to be removed later, and this is sometimes difficult.

HOW TO RID NEW BLANKETS OF UNPLEASANT ODORS.

Kybybolite Women's Branch asks—How to rid new blankets of unpleasant odors? Reply—Washing the blankets, using a deodorizer is the most satisfactory method of freeing blankets of any unpleasant odor. Sixpenny worth of formalin will be sufficient. With care the new appearance can be retained. Prepare sufficient cold, soapy water to cover the blankets, add to the water half of the formalin, then immerse the blankets. There should be a good lather on the water—dissolved Velvet soap and borax will produce a satisfactory lather.

Thoroughly wash the blankets by kneading and dollying—forcing the water through every particle of the blankets. When well washed pass the blankets through the wringer and then shake well to release and raise the pile. Pass them through two rinsing waters—both clear cold water with half of the remaining formalin added to each. Each time the blankets are passed through the wringer shake them well to raise the pile. Finally, rinse them in clear cold water, wring and shake well, then hang out on the line to dry, having only a small part of the blanket across the line. It will be found expedient to pull the blankets into a good shape when pegging them out. At frequent intervals change the position of the blankets from side to side in order to keep the moisture moving through the blankets instead of all draining to the one edge of the blankets, and it will avoid peg marks. When thoroughly dry the blankets should be their original size, perfectly white, very fluffy, and no trace of any unpleasant odor. A breezy, sunny day is best for washing blankets.

FERMENTING JAMS.

Kybybolite Women's Branch asks—What is the cause of jam fermenting after being opened a day or so? Reply—If jam has been boiled sufficiently to sterilize the fruit and to permit of the jam setting when tested, then put into perfectly clean and sterilized jars, and sealed, there should be no fermentation when the jars are opened and whilst it is being used. In selecting fruit for jam, care must be taken to see that the fruit is all perfectly clean and that no bruised, damaged, or diseased fruit is used. Three-quarters of a pound of sugar to each pound of fruit is a sufficient quantity of sugar to preserve the jam. Jam should not be watery when finished, as watery jam has not a good flavor, and it is liable to ferment. Jam should be stored in a dry, well ventilated cupboard and protected from dust.

MID-NORTH CONFERENCE (WOMEN'S SESSION), MARCH 14th, 1934.

The Branches of the Mid-Northern Agricultural Bureau held their Annual Conference at Laura on Wednesday, March 14th. The President of the Conference, Mr. H. R. Lines, extended a welcome to all those present, and expressed his desire that they would be much benefited by the Conference. The President then called upon the Hon. A. P. Blesing, M.L.C., Minister of Agriculture, who delivered a most able and interesting address.

For the afternoon session the women adjourned to an adjoining room, Mr. H. C. Pritchard declared the meeting open, and Mrs. R. P. Noble, of the Nelshaby Branch, was appointed President. The following papers were read:—

FEEDING AND CARE OF INFANTS.

[SISTER HARSLETT, Gladstone.]

Health is maintained by suitable food, fresh air, sunshine, exercise, regular habits, cleanliness of person, hygienic surroundings, sufficient sleep, and recreation. If a person is thus thoroughly healthy, with a sound mind in a sound body, he will offer a big resistance to any disease germ that comes along. His mental outlook will be bright and he will do good, intelligent work.

Mothers should realise that they are laying the foundation-stones for the future welfare and happiness of their children. In caring for the boys and girls of to-day they are caring for the fathers and mothers of the future. Each succeeding generation should be better than the preceding one.

The food of the expectant mother should be plain and good, easily digested, and such that will best nourish her baby. For example: milk, eggs, raw fruit, vegetables, and meat.

A baby's teeth are in the gums long before birth (about seven months before) and will be influenced by the diet the mother is taking. All rich, indigestible food must be excluded. All alcoholic drinks must be strictly avoided. Drugs and narcotics should not be taken. The mother must not smoke.

The ante-natal period, and the first few months after birth, may be considered the most momentous in the life of the individual, for growth or development taking place then is enormously rapid—foundations are being laid down for all time, and during this period of immaturity and greatest growth the organism is most likely to suffer permanent damage from deforming influences.

Speaking broadly, the important foods from the point of view of "building materials" are vegetables of all sorts—including raw salads to the greatest possible extent—fruits of all sorts, including dates, raisins, and other sun-dried varieties. Milk, and the products of milk, brown bread, and other unrefined cereals. If these essentials are adequately provided for, the rest of the diet will usually take care of itself.

Butter and eggs are important foods, and should not be stinted, but taken in moderation; meat should be taken only in strict moderation. Vegetables, fruit, milk, eggs, and whole cereals are selected for special mention, because all these foods are rich in mineral elements and vitamins. These are the constituents of food which are most likely to be lacking in an ordinary diet, and they are the very ones which are all-important for the building of sound bodies, especially the bones and teeth. One cannot too strongly emphasise the fact that a diet consisting largely of white bread, scones, tea, meat, and sweet stuffs, with little fruit, vegetables, and milk, is a deficient diet, and for the expectant and nursing mother it is calamitous. It utterly fails to provide adequately the essential elements for building up the various complicated and marvellous structures of the baby's developing body. Apart from the question of diet, the chief consideration for the expectant mother from the point of view of health affecting the baby are fresh air and sunshine, outdoor exercise, adequate rest, and complete freedom from chronic constipation.

If children have any defects or are abnormal in any way they should be promptly investigated and the children given the advantage of the best advice obtainable. Defective eyesight should be corrected; adenoids, diseased tonsils, decayed teeth, and other sources of infection should be removed. Very many diseases are fly-borne. Thousands of babies' lives are sacrificed every year through fly-carried diseases. Mothers should do all in their power to prevent contamination by flies. Mosquito-netting should be put over the baby's perambulator and cot. All food should be covered; kitchen refuse—scraps of food, &c.—should be wrapped in paper and put in a rubbish tin with a well-fitting lid. Houses should have doors and windows wire-netted to keep out flies. By exterminating flies, sandy blight, amoebic dysentery, gastro-enteritis and typhoid fever can almost be stamped out.

FEEDING.

Every baby ought to be breast-fed; nothing will ever equal the mother's milk. Her milk is the right composition that is required. It is exactly the right temperature, it is germ-free, it has the necessary vitamins which are damaged or destroyed when milk is heated. Another very important point is that the breast-fed baby has to work for his drink; this exercises his jaws, and stimulates all his digestive juices.

Babies bottle-fed on artificial food may appear all right, but children are much stronger ultimately if breast-fed. The risk of gastro-enteritis and such troubles are infinitely greater to the bottle-fed baby.

The importance of establishing and practising perfect regularity in the feeding times for babies is so great and the prejudice against waking an infant, if he happens to be asleep when feeding-time comes round, is so widespread that it is

necessary to specially insist on the point. All leading authorities of the day agree that the first thing to establish in life is regularity of habits. The mother who "can't be so cruel" as to wake her sleeping baby if he happens to be asleep at the appointed feeding-time, fails to realise that a few such wakings would be all she would ever have to resort to.

At the dawn of life a day or two of regular feeding with proper intervals (practically speaking, no normal baby needs to be fed more often than every three hours) suffices to establish clock-like regularity of alternate sleeping and feeding. The new-born babe should sleep nine-tenths of his time. At perfectly regular intervals the infant should wake, feed, and drop off to sleep again. Babies regularly and properly fed tend to sleep like dormice, digest their food well, and are infinitely more contented and happy than those whose mothers are irregular and unsystematic. The most reliable modern experience and research shows that even during the first month, feeding every four hours suits most babies, and no normal baby needs feeding more often than three-hourly. If a mother regulates her life, arranging everything for the baby's welfare, she will be rewarded with a healthy, regular, easily-managed baby, and will soon say he is no trouble at all.

To make a success it is very important that both the mother and the baby should have a good night's rest. From the very first the baby must not be fed during the night: that is, after 9 or 10 p.m. If he is fed every three hours from 6 a.m. to 9 p.m. he will get six drinks; a new-born could not do with less. If he is to sleep through the night without a drink, he must get enough nourishment during the day. Later on, about the third month, he can have only five meals a day—four hours apart—6 a.m., 10 a.m., 2 p.m., 6 p.m., and 10 p.m. respectively.

Baby will probably need five meals a day until he is nine months old. Baby will often like a drink of water between meals, especially in summer. Give him lukewarm boiled water with a cup and spoon. Train him to take water in this way and it will make it easier when weaning him. His orange juice may be given the same way.

If the baby is unhappy and has green stools something is wrong. It may be overfeeding, under-feeding, or aerophagy (that is, wind). Find out the total number of ounces of food the baby is getting in 24 hours. If the baby is over-fed there is regurgitation and the baby is well nourished. Diminish the supply by giving less and the intervals longer. If the baby is under-fed, increase the supply by complementary feeding of modified cow's milk and attention to the breasts by massage and fomentation.

It is very important to put the baby in an upright position after his drink, and sometimes during a drink, so that the airball in his stomach (due to air-swallowing) will rise to the top, where he can bring it up. While holding him upright, press gently over the lower ribs on the left side. If the baby is laid down it needs a violent contraction of his stomach to get rid of the airball, and thus causes regurgitation of food. In between meals, drinks of warm water help a baby to get rid of wind. Aerophagy is produced not by rapid intake, but by uneven sucking due to over-excitement and hunger; it is very usual. All excitement must be avoided when the baby is drinking.

ARTIFICIAL FEEDING.

Every baby is a law unto himself, and what will suit one child may not agree with another. The food next to human milk is modified cow's milk. Cow's milk is just right for the calf, but not for the baby, unless the milk is especially modified to fit it for the young human being. Cow's milk is much richer in protein than human milk, therefore it has to be diluted with boiled water or barley water. This dilution diminishes the fat and sugar, so more fat and sugar have to be added. When modifying cow's milk, the inorganic salts are reduced by dilution, hence the necessity for raw beef juice, which must be very carefully prepared. When baby has become used to modified milk, whey can be used instead of water. This will supply inorganic salt, vitamins, and milk sugar. No sugar need be added then.

Cow's milk must be sterilised—boiled for three minutes—brought to the boiling point rapidly, boiled three minutes, and cooled quickly. The germs of gastro-enteritis, summer diarrhoea, tuberculosis, or typhoid may be in the milk. Therefore it is best to sterilise it. To keep milk relatively germ-free is very difficult because it is a splendid medium for germs to flourish in, and they flourish and multiply if the milk is kept at average summer temperatures. So the first thing to remember is that even sterilised milk does not remain safe unless kept free from contamination and also kept very cold. The jug of milk should stand in a basin of cold water and be covered with a wet muslin or fine net cloth which covers the whole jug, dips well into the water, and placed in a cool safe or a good cool draught. Do not use a thermos flask to keep milk or any other food warm for baby. The prolonged warmth causes bacteria to multiply. Boiling of milk kills the harmful germs and also spoils the vitamins. To see that baby gets those vitamins which are essential to health, give him fruit juices. The fruit juices are orange juice, tomato juice, and grape juice. Orange juice is the best; because oranges are longer in the sun they mature more slowly than other fruit. The health-giving rays of the sun which impart vitamins to growing things impart to oranges Vitamin C, which is a preventive of scurvy. Give baby a little strained orange juice once every day; failing that, tomato or grape juice.

To make whey, take 18ozs. of milk in a saucepan, make it lukewarm, add one junket tablet, stand for three minutes, when a firm curd should have formed. Break the curd with a fork, put the saucepan on the fire and bring to the boil. Pour off the whey from the curd, straining it through a scrupulously clean boiled strainer. Whey made from new milk contains about one-third of the fat of the milk.

To make beef juice: Raw beef juice should be given to all weaned and to all artificially-fed babies, and continued until baby is 18 months old, when he will be able to take finely cut red meat. It is made by taking 2ozs. of juicy beefsteak and cutting and shredding it very finely with a very sharp knife. Then add a pinch of salt and 2 tablespoons of cold boiled water. Stand for two hours in a cool place, then mix it well with a spoon, squeezing and pressing it. Strain it through clean boiled muslin. Do not warm it; give it cold—this is very important. A baby will take this readily. To a very young baby give only a few drops at first once a day. Gradually increase the amount. At nine months give 1oz. a day. Great care in preparation is necessary. Have all utensils very clean. Strain very carefully so as not to get the smallest speck of meat in the juice. Make a fresh quantity every day.

WEANING.

Make all changes slowly. When changing a baby's food and when weaning a baby always dilute the food to give the baby time to learn to digest the new food. Commence with half and half. This can be altered day by day, by the increase of 1 tablespoon of the food and 1 tablespoon less of water until the food is undiluted. For babies being weaned under nine months of age, the best food is modified cow's milk. Babies of nine months can be weaned on to whole cow's milk. If weaning on to whole cow's milk, commence with half milk and half water, and gradually add more milk and less water. If weaning on to modified cow's milk make up half the quantity required for the drink and then make it up to the required amount with water. Gradually increase the strength of the drink. Nine months is the best age to commence weaning. At first give only one artificial meal a day. After a week, when the proportions of the artificial drink are four of the food (milk) and one of water, give two artificial meals a day. Increase the strength of these two meals gradually until they are undiluted. The best meal to make an artificial one at first is the 2 p.m. When giving two artificial meals change also the 6 p.m.

It is difficult to get a breast-fed baby of nine months to take a bottle, and it is better to wean him on to a cup and spoon. At first he will probably make a fuss, but the mother must persist, holding the baby with his head well back and putting

the food a little at a time into his mouth. After a week in which two artificial meals a day have been included, a baby will, as a rule, take his meal quite nicely. The next week a third meal can be made—an artificial one—namely, the 10 p.m. one. At this time commence orange juice. Give it between two meals (not too soon after a meal). At first give 1 teaspoon of strained orange juice diluted with 1 teaspoon of water. The amount and strength of the orange juice can usually be rapidly increased. Judge by the baby's bowel action how much to give. Cold raw beef juice—1oz.—should be given once a day at this stage.

After the baby has been having three artificial meals for a week, the fourth meal could be changed: that is, the 6 a.m. drink. Now he will be able to do without the fifth drink, the 10 p.m. one. The times of these four meals should be 6 a.m. and 10 p.m., 2 p.m. and 6 p.m. After this 6 p.m. drink he should be sponged and put to bed, and he should sleep through the night. If the baby has been weaned on to modified cow's milk, this can be gradually changed into cow's milk when he is nine months old.

At the age of six months baby can have a cleaned chicken or chop bone to suck. When he is seven months give him unbuttered rusks occasionally before a drink. Butter rusks and crusts for him at eight months. At nine and a half months he can have a little scraped apple. Do not add sugar to baby's milk. Gradually the baby is given more solid foods: eggs, potatoes, porridge, and vegetables are gradually added (in very small quantities at first), so that by the time he is one year old he is having a very nutritious diet, and three meals a day will be quite enough for him. With each of these three meals it is important for him to have from 8ozs. to 10ozs. of milk. This should be given in preference to other food. The milk should be drunk first. Glass beer mugs with handles and holding at least 10ozs., or half a pint, are very suitable for the children's milk. They are weighted at the bottom and do not easily fall over. At one year old the baby can have his meals at 7.30 a.m., 12.30 p.m., and 5.30 p.m. These times are convenient, for as he is spoonfed, it is best to feed him just before the family meal. As he gets older and more able to feed himself his meals should coincide with those of the family. This is rather important, as a child will take food more readily and enjoy it better in company. By 18 to 20 months of age most children are able to feed themselves. It is good to train the child to be independent. Do not allow him to play with his food or splash it about. Give drinks of water between all meals. At 10 months baby may have his crust dipped into a very lightly boiled egg, or he may have a little custard, boiled or baked, commencing with 3 teaspoons. The quantity of egg food should be gradually increased until by the age of 12 months baby can be given an egg a day. If a child is not fond of eggs he can be given half an egg only, sometimes missing it for one day, but it is important that all children over 12 months should have egg food each day in some form or other. For a baby an egg should be very lightly boiled and then beaten up with 2 teaspoons of bread crumbs. At 15 months baby may have fish or brains; at 17 months rabbit and chicken, and at 18 months red meat.

Suggested diet for healthy child of 12 months:—*On waking*: a drink of water (8ozs.). *Breakfast*: 7.30 a.m., 8-10ozs. milk, a little porridge, a buttered rusk, a little raw fruit. *Mid-morning*: Drink of water or orange drink (8ozs.). *Dinner*, 12.30 p.m.: 8 to 10 ozs. milk, 1oz. raw beef juice, 3 teaspoons well-mashed potato, 3 teaspoons well-mashed beans or peas, a bone to suck, a little raw fruit. *Mid-afternoon*: Water 8ozs. *Tea*, 5.30 p.m.: 8 to 10 ozs. milk, lightly boiled egg beaten up with 2 teaspoons of dried bread crumbs, buttered rusks or crusts and honey, a little raw fruit.

The most important food is milk, then follow meat, eggs, raw fruit, raw vegetables, and butter. Least important are the starchy foods and sugar. The starchy foods include potatoes, bread, biscuits, and all puddings with the exception of those made with eggs and milk.

Food is cooked to render it more digestible, but a diet of cooked food is not sufficient for health. It must contain some fresh raw food, such as raw fruit and raw vegetables (lettuce, celery, watercress).

VITAMINS.

There are certain life essentials in food, which have been called vitamins, and which have been classed as A, B, C, D, and E. Foods vary in the amount and nature of the vitamins they contain. Heat affects the value of vitamins. The greater the heat the greater their destruction. Heating rapidly does not affect them as much as a lower degree of heat continued for a long time. Cod liver oil is rich in Vitamins A and D. To obtain vitamins in plenty in our food we must eat a certain amount of raw food. Cod liver oil, being very rich in Vitamins A and D, is good for growing children, especially in winter.

Fish is a good food for all over 15 months. For babies break it down well and remove all bones. At 15 months baby may commence to have a teaspoon of this, then gradually increase the amount; let older children have steamed fish once a week instead of meat. If carefully and lightly cooked, brains are a good food. At 15 months a baby may commence to eat brains boiled (not fried), served with white sauce or in milk. Give 2 teaspoons once a week, gradually increasing the amount and frequency. The babies that have been taking fish and brains at 15 months may at about 17 months have a little well-cooked rabbit and chicken, and at 18 months a little finely-cut red meat from a grilled steak or chop. Commence with 1 teaspoon at first and very gradually increase the quantity. Children should have meat once a day only, and that at mid-day. Train them to eat a little fat with their meat. All meat should be well cooked, but not over-cooked. A joint should be put into a very hot oven, but soon after the heat must be reduced. A dish of water placed in the oven helps to prevent the meat from becoming too dry. Meats suitable for children are roast mutton, roast beef, roast chicken, grilled steak, grilled chop, stewed rabbit, well-stewed steak, well-boiled tripe, and well-boiled sheep's tongue.

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FRUIT.

All kinds of raw fruits are good for health, especially oranges, apples, peaches, pears, and apricots. Fruit should be quite ripe, but not over-ripe. Cooked fruit is not so valuable. Raw fruit is rich in vitamins. It serves not only as a food, but where firm enough, gives the teeth good exercise in chewing. It also acts as a cleanser for the teeth; therefore give fruit last at each meal. Bananas are not suitable for young children through the swallowing of large pieces of banana without being chewed. When bananas are given they should be finely cut or pulped with a fork.

VEGETABLES.

Each householder would do well to have a vegetable plot in his own yard, and where possible a lemon tree. Raw vegetables, such as celery, watercress, and lettuce are better than cooked vegetables for all. Do not give raw vegetables to babies under 18 months of age. Great care is necessary in preparing raw vegetables. They should be well brushed and very thoroughly washed and then dried. The importance of washing well is immense. Threadworms may be acquired by eating raw lettuce not well washed. Potatoes are a starchy food, but nourishing. At 10 months baby may have potato well mashed, but do not add milk and butter, because they make potato indigestible. Commence with 2 teaspoons and gradually increase. Vegetable juice can be given to babies of any age. It is useful when fruit juice is unobtainable. Carrots and turnips are most suitable for this. Wash the vegetable well, plunge into boiling water for half a minute, scrape the skin off, and then grate it up. Just cover with cold boiled water and leave for two hours. Then strain through clean boiled muslin. Commence with 1 teaspoonful.

Butter is a most important food for children and should always be given freely, though not to excess, or it will act as a laxative and may cause indigestion. It is the main fat food in a child's diet. At eight months, baby may have butter on a rusk or a crust of bread. Give it just before a drink.

Pure wholemeal bread is rather difficult to obtain, but it is more nutritious than white bread. If given continually, children soon tire of it. Brown scones can be made of flour composed of half white and half pure whole wheatmeal flour. Make the dough fairly moist. They are delicious and a nice treat for children. Well-made toast and rusks buttered when cold should be given daily. Rusks are made by baking dry bread until it is golden brown in the oven. Do not give fresh bread to children. Encourage them to eat crusts.

Biscuits lend variety to food, but as a rule they have too much cane sugar in them and it is better not to give them at all to babies under one year old. Buttered wheatmeal and oatmeal biscuits and ginger nuts are very good for children over one year old.

Nuts are a splendid food but need to be pulped or chewed well or they pass through undigested. Do not give them to children before they are at least three years of age. Honey should be given freely to children of 10 months and over. It is an excellent food. It is generally well liked and sweetens the food without doing harm. Cane sugar taken in excess is distinctly harmful. All foods containing sugar should be given in restricted amounts. Portion out the number of lollies and biscuits and limit the quantity of cake, pudding, &c., and allow the children to eat their share only at their meals—never between meals, for they are always harmful then. Hard-boiled lollies are dangerous to young children. If one is swallowed whole it may lodge in the throat. Sticky lollies cling around the teeth and cause decay. Soft puddings cannot be recommended as a rule unless made of pure milk. Rice is a very good food. Sago and tapioca are poor starchy foods. Jelly in itself is useless as a food. It has no food value beyond the sugar or other food that has been added to it. Those containing milk and eggs, e.g., milk jelly and vanilla cream, are good.

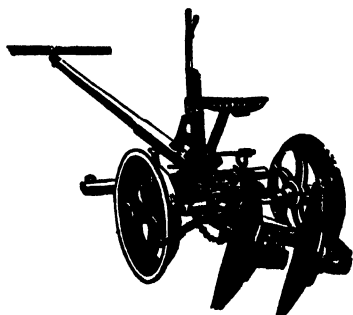
FOODS TO BE AVOIDED.

Pepper, mustard, vinegar, and all condiments should never be given to children. Corned beef, sausages, pork, ham, bacon, sauces, pickles, all tinned foods, all highly-flavored and spiced foods, pastes, pastry, cucumber and radish; any food that has been soaked in fat is difficult to digest and should not be given to children—like hot buttered toast. Butter should not be put on hot vegetables. Casserole cooking is indigestible. Fatty acids permeate the food, rendering it highly flavored and very palatable, but at the same time indigestible, and therefore unsuitable for children. Cheese is a very good food for adults. Being a concentrated nourishment, only a little should be taken at a time. It is not suitable for children.

In dealing with fried foods, it is important that the frying be done properly so that the food is not soaked with fat. When dry-frying, first cover the food to be cooked in flour or in egg and breadcrumbs to prevent the fat from entering the food. Use very little fat; have the pan well greased all over and have it at a very high temperature before the food is put into it. The heat will immediately convert the coating into an envelope through which the fat cannot enter. Soon turn the food, and when both sides are lightly browned, lower the heat and cook slowly. Put a cover over the fryingpan to keep in the heat, and thus aid the cooking.

Wet-frying is different. Have a large quantity of fat in a deep vessel and submerge the food totally in the fat. This fat must be brought to the boil, 400deg. Fahr., and then the heat is raised yet higher until the bubbling fat is quite still again and a blue flame is noticed on the surface of the fat. Then the food is placed in the frying-basket, which is sunk in the fat until the food is quite covered. At this great heat no fat will enter the food, and the food will be well cooked. However, there is danger in using fat in quantity at such a high temperature. A drop of water accidentally splashed in would cause the fat to burst into flame.

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MEALS.

Three meals a day are sufficient. There must be no food between meals. The digestive organs can then deal with one meal at a time with a rest between. This is very important if they are to function well. Children should have their hot dinner of meat and vegetables at mid-day. Avoid lunch at school if possible, but if circumstances render it necessary, make the lunch as nourishing as possible, including a bottle of milk and raw fruit. The more nourishing a diet the less required. It is important not to give a child too much to eat. Serve moderate amounts, and a little more can be given if desired. A mother can be guided by a child's appetite if a child has always been carefully and regularly fed at proper intervals. Give a dry diet that has to be well chewed and mixed with saliva. Avoid slop foods where possible. Soups and broths may stimulate the appetite, but should never be allowed to take the place of more important food. They consist of much water with a little extract of meat, &c., and are better omitted. The chewing of food is extremely important to the teeth. This is necessary to their wellbeing, for the movement stimulates the blood supply of the teeth, keeping them healthy. It also excites the secretion of digestive juices. Thorough mastication takes time, and therefore a proper amount of time must always be set aside for each meal. Food eaten quickly without being chewed does more harm than good. Undigested food may form poisons which are absorbed, and will probably give rise to headaches and to other symptoms of toxæmia or auto-intoxication—so-called bilious attacks.

Fluid can be taken either at mealtimes towards the end of the meal or between meals. Children should drink milk as part of their meals and only water between meals freely. Water drunk last thing at night will disturb sleep. Tea and coffee are harmful and unnecessary for children. They will not miss them if trained to do without. Soft drinks, such as lemonade, ginger beer, &c., are not good for children. All drinks containing alcohol: for example, wine, beer, whisky, brandy—must be forbidden absolutely.

Suggested meals for a young family two years and older:—

6 a.m.—Water 8ozs.

Breakfast, 8 a.m.—Milk $\frac{1}{2}$ pint (10ozs.); a little porridge, egg and toast, 1 apple.

11.30 a.m.—Mid-morning drink, water or lemon drink (8ozs.).

Dinner, 12.30—Meat, potatoes and green vegetables, junket (10ozs. milk), oatmeal or wheatmeal biscuits, and gingersnaps, a little raw fruit.

4 p.m.—Water 8ozs.

Tea, 5.30 p.m.—Milk $\frac{1}{2}$ pint (10ozs.), raw celery, lettuce, or tomato, rusks or brown bread, butter and honey or lemon cheese, a little raw fruit.

TOYS.

[MRS. F. CUMMINGS, Belalie.]

Before giving a demonstration of toys made in the home, it is proposed to relate how England provided toys for the children during the Great War. A lady who was visiting England during the War spent much of her leisure in toy-making, and has written the following article on the subject:—

“Previous to the Great War England imported most of her toys from Continental countries. The War broke out in August, 1914, before any Christmas orders had entered the country and there was a scarcity of toys in most of the smaller towns; consequently the English children were faced with a toyless Christmas.

Two kind-hearted elderly ladies of Devon formed a working party to make toys for the children's Christmas. Having plenty of leisure I joined the class, and soon found the work very interesting. At first only small soft toys were made: rabbits of various kinds—Mr. and Mrs. Peter Rabbit complete with basket of carrots and umbrella, the White Rabbits copied from “Alice in Wonderland,” Dogs, Elephants, Penguins, and Lambs.

As I was from Australia, our instructress insisted on the Kangaroo being added to the family, and he became a great favorite with the little English children. Dolls were also made—small black dolls, black golliwogs, and dolls made of two colors and dressed as Jesters.

Material for the toys was purchased in rolls—ripple flannelette for the animals, and calico and sateen for the dolls—while small pieces for dressing the dolls were given by friends and samples from the shops. The stuffing was more difficult to obtain, as wool, flock, and materials of that description were too scarce and costly. The difficulty was overcome by collecting straw packing and shavings from shops; also cork-dust in which grapes imported from Africa were packed. This answered very well, and large orders were received from London and other large towns. By the second Christmas dolls' heads and limbs were procured from a Staffordshire pottery. These were bought by the gross and attached to calico bodies; the wigs for the dolls came from a firm in Birmingham, and it was a work of art to select the wig most suited to the doll's complexion. Some wigs were curled, some straight, and many in two pigtales, either fair or dark and tied with colored bows. Each assistant had her own job; mine was cutting and stitching; another did the stuffing, someone else the finishing, and so on. A young girl about 17 did most of the designing. The children often came to watch the toys being made, among them many Belgian refugees. It was not unusual for the small folk to request that their doll be dressed as a soldier or a nurse. The character dolls were always favorites. "Jig-saw" puzzles were made for the older children. Tea boxes were procured from the stores; the wood from these smoothed with emery paper, pictures pasted on and then sawn into pieces with a fretsaw. These were done up in fancy bags made from scraps of material. Although the business was so successful, the toys were sold so cheaply that only enough money was made to defray expenses—hire of room, cost of materials, &c. I worked in the toyshop for three years, giving most of my leisure time until at the close of the War I returned to Australia. Ours was only one of the many toy-shops organised by the lovers of children in larger towns of England during the War."

HOME-MADE TOYS.

Toys are so cheap now that it would not pay to buy new materials to make them, but old garments and scraps from the patch bag can be used to make nice toys to gladden the hearts of many poor children whose parents have not the means to purchase toys for Christmas stockings. The toys exhibited were all made from old garments, pieces left over from dressmaking, odd balls of wool, a little colored silk, and a few buttons.

Priscilla the Penguin was made from some scraps of velvet and stuffed with flock. *Dilly the Duck* is big and soft and will serve as a pillow when baby falls asleep at play. Her grey covering was only a flannel under-garment. A few scraps of flannel made gay feathers for her wings. She swims on the carpet. *Koala the Bear* is part of an old winter's coat with a scrap of brown velvet for ears. He is filled with flock and is altogether a quaint little chap. *Mr. Roo* is stuffed with straw packing and his coat was a piece left over from a small child's winter outfit. As the pattern was designed by an English girl he looks as though he might be a distant cousin to our kangaroo. *Fido* is also made from an old winter coat and filled with straw packing. *Mr. and Mrs. Peter Rabbit* are soft and cuddly, filled with wool, and quite smart in their best clothes. *Golliwogs* may be knitted from odd balls of wool left over from jumpers, &c. *Sambo* is an old woollen stocking, as also is the little black *Kitten*. Quite a small child can cuddle them. *Jumbo the Elephant* has a nice grey coat which one would not recognise as being the best parts of an old discarded pair of moleskin trousers; his gay trimmings make him a great favorite with small children. The woollen balls and rattles are for the tiny tots and may be hung on the perambulator for baby to play with. At Christmas poor children in big towns will appreciate any of these toys, and besides giving pleasure we have the satisfaction of making something from nothing.

GOOD FELLOWSHIP.

[MRS. A. E. PAGE, Belalie.]

A notable example of fellowship in modern times is the Returned Soldiers and Sailors League, whose members are joined by the common link of having been comrades in arms during the Great War. Man is a social being, and the ground of fellowship is our common humanity. The social instinct is bound up with the constitution of our being, and has been implanted therein by the Creator. The oldest record of the race tells us that at the dawn of humanity the Lord God said: "It is not good that man should be alone," and mankind was thus grouped in families, clans, and communities. In the course of time these units were extended into larger groups, and thus the great nations of the earth came into existence.

But the fellowship of the human race was not always "Good Fellowship," and the early annals of our race are marked by wars, strike, and bloodshed. Advocates of the scientific theory of evolution claim to see in these upheavals the process of the elevation of the race by means of the "survival of the fittest," but one cannot avoid the feeling that the highest destinies of the human race are to be promoted by the exercise of good fellowship and peace. There can be but little doubt that the conditions of modern life are most favorable to bringing people together in closer union and fellowship. For one thing, there is a far swifter means of communication between country and country than existed a century ago.

The early pioneers of the State who left the shores of their native land no doubt felt that they were going away into another world, so little means of communion had they with the land and friends which they left behind. But the introduction of swifter means of travel, and a better means of communication, have brought the distant countries nearer to one another. The marvellous inventions of air travel and the wireless have been the cause of removing the barriers of distance in a manner undreamed of by our fathers. These two inventions have been of special benefit when applied to the open spaces of the vast island continent of Australia. In former times we were appalled by the extreme loneliness of the people who lived in the far inland portions of Australia. Such conditions rendered it almost impossible for families to be reared in these far remote districts, but thanks largely to the efforts of the Australian Inland Mission, the establishment of the wireless stations, and the "Flying Doctor," have brought the benefits of civilisation within reach of the most remote. Perhaps the sense of how wonderfully near we are being brought into touch with others has brought home to a number of the most thoughtful people the great need for the cultivation of the spirit of good fellowship. The almost world-wide depression through which we are passing emphasises the need for the cultivation of the spirit of good fellowship, for if we are to soften the pain and disappointment of unemployment and poverty, we can only do so by the exercise of the spirit of comradeship and goodwill.

Who is there who has travelled to any extent in a public conveyance who has not experienced the pleasure that can be derived from social companionship. The distance has often been materially shortened, in imagination at least, by social conversation with folk one has never seen before and in all probability will never see again. Fellow-passengers on railway or steamer live for a time at least in a little world of their own, and are like "Ships that pass in the night." Surely it is worth while to afford some pleasure to these brief wayfarers, especially if the pleasure of comradeship is mutual. There are, of course, certain restrictions and social barriers in the way of these passing fellowships, but these barriers are far less than one would suppose.

This affable and friendly spirit is characteristic of the true nobility and titled class of the old land. I am inclined to believe from all that I have read of the Feudal System, that the knightly vow enjoined upon the one who had taken it the strictest courtesy and kindness towards all, whatever their rank or station may

have been. Chaucer in his "Canterbury Tales" gives a description of the Knight who travelled in the company of the pilgrims, and amongst his many excellencies he added that he had never been known to speak a harsh or unkindly word to any person of whatever rank they may have been. And if the spirit of good fellowship can bridge the barrier of social class, it surely should be able to pass over the barrier of race, of nation, and of color. In Australia we have need for thankfulness that we have never been seriously faced by the "color problem." In South Africa and in the United States of America the color prejudice has been most intense, and the infusion of colored blood, however remote, acts as a barrier which is well nigh impassable. Nevertheless, we should never forget that in Australia there are still many thousands of full-blooded natives living. These people were the original dwellers in our land, and as such they constitute the true aristocracy of Australia. In her book, "The Australian Aboriginal as a Human Being," Mrs. Bennett reminds us that the early white settlers made no effort to treat the blacks kindly, but massacred and ill-treated them shockingly. She writes of them as the most interesting race in the world, and the most wronged at our hands, and all who read without bias the history of our failure in the past to protect and help the native must indeed feel a debt of gratitude to this brave woman who has so fearlessly upheld their cause, and is counting not the cost if she can help to bring about a system that is equally just to the black as well as the white citizen of Australia. Mrs. Bennett gained much practical knowledge of the aborigine through association with them in North Queensland. Her sympathies were aroused as she recognised the intelligence and loyalty which is a characteristic of this dark race. She has also been successful in arousing some of the leaders of Women's organisations in Perth to a greater sense of their responsibility in relation to the lot of their dark sisters.

It has also been proved that the aborigine woman can be taught useful and skilful arts, for Mrs. Bennett has visited some of the Mission centres with her spinning

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wheel, with the result that in these Missions the women are now spinning and weaving cloth for garments. " " "

The cultivation of the spirit of comradeship is by no means easy, for we are called upon to overcome our natural diffidence; but the effort required is more than repaid by the pleasure which comes not only to others but to ourselves. There are many people with whom we come in contact who are warm-hearted and companionable, if only we could break down the barriers of reserve, and in order to win their confidence one is called upon to exercise the most friendly and sociable spirit. Good fellowship means refraining from conduct of an actively unsociable character. But opportunities for good fellowship to-day are wide and varied, and surely there is no one who cannot find some means of exercising it, not for our own pleasure only, but to make a contribution to the wellbeing of others.

Life is too short to waste, and there is an obligation resting on each one to see to it that our fellowship with others is uplifting. We all associate with people of very different temperaments. Is it not true that sometimes we feel depressed in spirit after being in the company of some people, while on the contrary, after being with others we are always cheerful. True fellowship is only possible where there is high ideals, and if our motto is "The utmost for the highest," we shall endeavor to lift the things about us on to a higher level, and make this world of ours a better and sweeter place.

PAPERS READ AT CONFERENCES OF LOWER SOUTH-EAST BRANCHES.

There was an excellent attendance of delegates from the Penola, Millicent, Kalangadoo, Rendelsham, and Tantanoola Branches, as well as a large number of visitors at the Conference held at Tantanoola on April 11th. Mrs. D. Considine presided, and the following papers were read and discussed:—

PRESERVING FRUITS.

[Mrs. H. A. RESCHKE (Coonawarra.)]

A valuable asset in the home for winter and early spring is a good supply of preserved fruits. When fresh fruits are not available, and to have this supply on hand, it is necessary to preserve each kind of fruit as it ripens. Fowler's preserving outfit and bottles are the best, but Mason jars can be used in the Fowler's preserver as well. If Mason jars are used fill tightly with the aid of the packing stick. Add water as syrup; put on the rubber ring, which has been scalded first in boiling water, then the lid, which has been scalded also, and screw down lightly. If they are screwed very tightly the jars sometimes crack off just under the lid. Put into a steriliser, and sterilise as directed for each fruit. When taken out of the steriliser, screw down as tightly as possible with the wrench used for Mason jars. In selecting fruits for preserving, use at the exact ripeness, if possible—ripe enough to have the nice flavor of each fruit, and not too green or over-ripe. Fruit over-ripe will never be a great success; it is likely to squash when filling the jars, and rises very quickly in the bottle. Always fill the jars tightly with fruit; this also helps to keep it from rising in the jars. Cherries and gooseberries are about the first fruits to ripen; they preserve well. Apricots come early in the new year, and are one of the best fruits to preserve, Moorpark being the best variety to use. Cut the apricots in halves, take out the stone, and pack well in layers, one piece over the other, with the cut side downwards. Fill up the bottles that way; put in the syrup, and fill to the top. Put on the rubber ring, which has been previously scalded, then lid, also scalded, and press the lid down. See that the ring does not bulge over the lid; put on clip, and place in the steriliser. Continue until the steriliser is full; then put water in the steriliser until it is three-quarters of the way up the bottles. Put the

steriliser on the stove, and bring the temperature slowly up to 160 degrees, and maintain as near as possible for 1½ hours. Mulberries are a great stand-by during winter to use with apples as conserve, or for pies. Fill the jars as full as possible, crushing the mulberries down, and preserve them in their own juice, without water or sugar. They have the true mulberry flavor when opened, and the sugar can be added as they are mixed with the apple. They can also be preserved with sliced apple or quince. They require exactly the same temperature as apricots, slowly bringing up to 160°, and maintaining as near as possible for 2½ hours, instead of 1½, as for apricots. Nectarines can be packed exactly the same as apricots, and bring slowly up to 180° in temperature, and maintain as near as possible for ½ an hour only.

Nectarines are very sensitive to heat, and rise in the bottle if the temperature comes up too quickly. Pears are one of the best fruits to preserve, and are easily done, but the temperature is higher than most fruits, being 200°, allowing to drop to 180°, and maintaining at that for 2½ hours. Prunes and plums are easily done, preserve well, make a nice collection in the pantry, and are very useful in the home.

Tomatoes are easily preserved, and are a great success, either whole or pulped. Peel and pulp them, and do not use either water or salt, only their own juice; and they make delicious tomato soup in winter. Mushrooms are also very good. Peel and clean the mushrooms while quite fresh, and place in a saucepan, with a little butter, pepper, and salt, and boil very slowly, and cook them in their own juice instead of using water. When cooked allow to cool, and then place them in bottles, and preserve as directed in Fowler's book. They must be sterilised twice, or they are likely to ferment. They can then be used at any time of the year, and make delightful breakfast dishes if heated and placed on toast.

HOUSEHOLD ECONOMIES.

[Mesdames EDGCUMBE and BURCHARD (Tantanoola.)]

In the successful management of the home it is essential to economise, mainly by using, whenever possible, products of the farm in preference to goods purchased from stores, and to avoid wasting anything that could, perhaps with a little extra trouble or cost, be made into something both practical and useful.

Where meat is killed on the farm there is usually sufficient fat to provide the dripping for cooking purposes, and tallow for soaps and candles.

Economical Household Soap.—7lbs. clean fat, 1lb. washing soda, 1 tin caustic soda, ½lb. resin, 2½galls. water. Boil an hour.

Sand Soap.—Cut up 1 bar of household soap in a cut kerosene tin, with a quart of water. Stir over fire until soap dissolves. Then add 1 quart of clean white fine beach sand and 1 quart of white wood ashes. Remove from fire, and stir occasionally until it begins to thicken. Turn into mould, or cut into blocks when cold.

Oatmeal Toilet Soap.—To each ½ cup of scraps of household soap add 1 cup of hot water. Dissolve, and, while slowly boiling, stir in sufficient fine oatmeal to form a firm mixture. Scent may be added. Pour into mould.

Tallow Candles.—Dissolve 1 dessertspoonful of alum and 1 dessertspoonful of resin (powdered) in melted tallow—1½ pints for 6 candles. Thread mould with wick previously dipped in kerosene.

Simple Home-Made Disinfectants (for Washing Floors).—Take 1 bar of ordinary soap, and dissolve in 1 quart of water, with 1 bottle of Solypol and ½ pint of turpentine. Boil all together, and put in a tin. A tablespoon in a bucket of water is sufficient to refresh a room.

Useful Mop Oil.—1 cup raw linseed oil, 2 cups kerosene; shake well together.

Preventive for Dandruff (good for school children).—1 part kerosene, 2 parts olive oil; rub well into the scalp.

Anchovy Mince.—Cut 1lb. of steak into small pieces, put in a jar with ½lb. butter, a little mace, pepper and salt. Cover closely, and stand in a saucepan of water,

and simmer 3 hours. Drain off gravy, and mince the stock. Add to it the gravy with 1 tablespoon of anchovy sauce and a little nutmeg. Beat all together; place in jars. Excellent for sandwiches.

Flour Paste for Jams, &c.—A good recipe that will keep. Sift 1lb. of flour, and stir in about 1½ pints of water, or till the mixture is like a thin cream. Place over a slow fire, and bring slowly to the boil. When boiling, add ½oz. each powdered alum and boracic. Stir constantly while cooking, and boil 5 minutes, or longer if possible. Allow to cool, and add 1 teaspoon of oil of cloves. Pour in small pots, and seal down.

Baking Powder.—½lb. ground rice, 4ozs. carbonate soda, 3ozs. tartaric acid; roll out all lumps; sift twice, and store in airtight tins.

Self-Raising Flour.—24lbs. flour, 18ozs. cream tartar, 9ozs. carbonate soda, 3 dessertspoons salt; rub lumps from carbonate soda, mix with flour, sieve through fine sieve several times, and keep in airtight tin.

Cleanser for Canvas Shoes.—1 cup of boiled starch (thin), a squeeze of the blue bag, 2 tablespoons methylated spirits, enough whiting to make a nice paste.

Furniture Polish.—Equal parts raw linseed oil, turpentine, methylated spirits, and vinegar; mix well. Put on with a soft glove, and rub up with same.

Dried Apples and Pears.—When the fruit crop is heavy peel and slice, spread on a large frame with small mesh wirenetting in the sun to dry. Store unbleached calico bags, and hang in draught.

To Prevent Table Salt from Going Lumpy.—To every 1lb. of salt add 3ozs. of corn-flour; sift 3 times. The product is very nice, keeps dry, and may hardly be distinguished in appearance from shaker salt.

For Rough Hands.—Equal parts of lemon juice and glycerine; put on hands while damp. The same mixture is excellent if taken for an irritating cough.

To Get Rid of Ants.—Moisten with water a mixture of borax and sugar. Place in lids of a tin where the ants are troublesome.

Glaze for Pastry.—A different and delicious glaze for pastry can be made by using the syrup of apricot jam. Thin with hot water, and apply with pastry brush as soon as the pastry is taken from the oven.

To Make Lime Water.—Dissolve a lump of unslaked lime (about 1 dessertspoon) in 1 pint of waetr. Next day pour off clear liquid. Useful for burns if equal parts of lime water and oil are mixed to make carron oil.

A Use for Old Wool.—A cosy rug may be made from old skein wool by crocheting loops around the finger, giving a looped appearance to the finished article.

Sugar Bags can be utilised for various useful articles—work aprons, laundry aprons with waterproof slip, verandah cushion covers, peg aprons, &c.

Floor Cushions (from tins).—Procure any kind of tin. For each cushion the tins must be alike. To make a nice size cushion take 7.2lb. treacle tins; another nice shape is with 9 honey, health saline, or coffee tins. The following material is required:—The one piece, or different scraps; 2 pieces cardboard and wadding for padding. Cover the centre tin with any old piece of material. Cover all other tins with material to be used, leaving 1in. longer top and bottom to turn in. Place tins together for the desired shape, and sew across; turn upside down and do the same. Place shape on cardboard, and cut out 2 pieces. Cover with material, place one on bottom of tins. Put padding on top; leave plenty of material to turn in on top of cardboard. Having completed this, sew some cord to match around the tins on the top.

MAKING DAINTIES FOR A CHILDREN'S PARTY.

[Miss JESSIE TELFER (Tantanoola).]

First, see that the oven is properly cleaned out at the bottom, and the shelves washed and dried. There must also be plenty of small wood ready. The oven must be kept at an even temperature; some require a quick oven, such as shortbread creams; others a very slow oven, such as rice bubbles and macaroons.

Shortbread Creams.—10ozs. flour, 5ozs. each sugar and butter, 1 egg, 1 teaspoon baking soda, 2 teaspoons cream tartar. Beat butter and sugar, then eggs; add other ingredients, and put through biscuit forcers. Bake in a moderate oven.

Walnut Fingers.— $\frac{1}{2}$ lb. butter, 2 ozs. sugar, $\frac{1}{2}$ lb. flour, 1 teaspoon cream tartar, $\frac{1}{2}$ teaspoon soda, yolk of 1 egg, essence of vanilla, warm water. Cream butter and sugar, add egg, flour, enough warm water to mix into a stiff paste; roll out, and spread with icing made from the white of 1 egg, and about $\frac{1}{2}$ lb. icing sugar. Flavor with essence of vanilla. Scatter chopped walnuts, and cut into fingers. Bake in a moderate oven.

Melting Moments.—8ozs. butter, 2ozs. cornflour, 6ozs. flour, 2ozs. icing sugar; mix butter and sugar, add flour, and drop on a slide.

Bird's Nests.—4ozs. each butter and sugar, 1 egg, 8ozs. self-raising flour, $\frac{1}{2}$ teaspoon ground cinnamon, a little apricot jam. Cream butter and sugar, add egg, then flour, &c. Roll out about $\frac{1}{4}$ in. thick. Cut into rounds; out of half the rounds cut the centres, leaving rings about $\frac{1}{4}$ in. wide. Bake in a moderate oven. Place a ring-piece on each biscuit after coating the whole with warmed apricot jam. Ice with chocolate icing, and sprinkle with brown coconut. Fill each nest with tiny marzipan eggs, made as follows:—Mix 2ozs. icing sugar and 2ozs. ground almonds, with a little yolk. Form into eggs, and leave to dry before putting into nest.

Peanut Crisps.— $\frac{1}{2}$ lb. butter, 1 cup of sugar, 1 egg, 1 cup of flour, $\frac{1}{2}$ teaspoon salt, 1 teaspoon cocoa, $\frac{1}{2}$ lb. raw shelled peanuts. Mix sugar with melted butter; add beaten egg and dry ingredients. Put dessertspoon on a buttered tray. Bake slowly.

Ujarganappy.— $\frac{1}{2}$ cup melted butter, $\frac{1}{2}$ cup sugar, 1 egg, 1 cup coconut, 5 small cups cornflakes. Beat butter and sugar together, add egg; then add coconut, and mix well with cornflakes. Use fairly hot oven, baking in cake containers.

Rice Bubble Macaroons.—2 egg whites, cup of sugar, $\frac{1}{2}$ teaspoon vanilla, 1 cup coconut, 2 cups rice bubbles, $\frac{1}{2}$ cup shelled nuts (chopped). Beat egg whites until stiff, add sugar gradually; then add vanilla, coconut, rice bubbles and nuts. Drop by spoonful on a buttered pan, and bake in a moderate oven until a delicate brown.

Sandwiches.—Take 5 thin slices of bread; spread thinly with butter. Spread first slice with curried egg, place a slice of bread on top, and butter other side, and then spread with cheese paste. Place another slice on top, and spread with butter and anchovy paste. Place another slice of bread on top, and spread with butter and ham paste. Place the fifth slice of bread on top and cut off all the crusts and cut into finger lengths. These are delicious.

MAKING AND WATERPROOFING OVERCOATS.

[Mrs. G. W. ALTSCHWAGER (Tantanoola.)]

I have been using these coats now for the last four years. They wear well, and are quite waterproof, and I can recommend them. Each year I oil them afresh, and, with care, they last for years. These coats are very easily made if one has an old coat pattern. I obtain a fairly good unbleached calico, about 1s. 5d. a yard, and wash the calico first, press it out, and then cut and make the coat to fit the girl or boy, as required. Double-line the yoke and the top of the shoulders to make the coat much stronger.

When the coat is made I purchase $\frac{1}{2}$ gall. of raw linseed oil; make it lukewarm in a flat dish, and put the coat in, and squeeze the coat well through the oil. When done enough take out, roll up in a ball for about 3 hours, and then take out and put a stick right through both sleeves. Hang up to drip, having a dish underneath to catch the oil. When it has finished dripping, warm oil again, with a little fresh oil added; dip coat again, and hang up as before. This has to be done three times, but only roll up in a ball the first time.

Leggings and caps that are a great asset can also be made. They cover the whole leg down to the instep; the child does not get wet, and the leggings keep the legs

warm on cold days. Put a tag on the top to fasten them on to the braces. They are also splendid for men for riding. I made 3 coats, which cost 15s. complete. These coats have lasted 4 years, with 1 oiling each year.

Top-Dressing for Coats.—1 small tin of black enamel, as much boiled oil as black enamel, ½oz. beeswax. Mix together, and heat over fire until wax has dissolved. Mix well, and put on with brush while hot.

DEYING FRUIT.

[Mrs. W. L. REDMAN (Penola.)]

The drying of fruit for home use requires no expensive outlay for utensils, etc., and is so simple that there should be no fruit go to waste in the home garden. The general principle involved is the removal by evaporation without injury to the fruit of sufficient moisture to ensure its preservation. The moisture may be driven off by exposure to the sun's rays or artificial heat. Trays of a convenient size may be made from match lining. Fairly effective drying may be done indoors in the stove, leaving the door partly open. Some varieties are dried whole, including grapes, prunes, figs, &c., which are usually dipped in a boiling solution of lye, which cuts the bloom and causes minute cracks to open on the skin, through which the moisture escapes more readily, thus hastening the drying process.

Apricots.—This fruit dries better and quicker if cut in halves and placed in a sulphur box. This process is carried out by placing the trays of fruit in a box the length and width to admit the trays being slipped in and out readily. Sulphur is then placed in a suitable receptacle, ignited, placed under the tray, and the door of the box closed. We usually leave it in all night. If the skin peels off easily it has had sufficient sulphur. The trays are then placed in the sun. The period required for drying depends on weather conditions, varying from 2½ to 4 days, or longer. When sufficiently dry the fruit should be pliable; yet when twisted between the fingers have no sign of juice.

Apples.—These are peeled, cored and sliced, dropped into a salt solution (about 2 tablespoons to 1 gallon of water, left for a few minutes, and sulphured for a few minutes.

Dipping.—The lye solution is made by dissolving 1lb. of caustic soda in 20galls. of water. An ordinary copper is suitable for dipping. A wire basket or perforated tin is necessary to hold the fruit during the dipping operation. Immerse the fruit into the boiling lye and count 30, which should be long enough to make minute cracks on the fruit. Prunes and plums are treated thus. Light-colored plums are improved if placed in the sulphur box.

Peaches are treated in the same way as apricots, but take longer to dry.

Pears.—Williams's Bon Chretien, better known as Duchess, are a good drying variety. They are cut in halves, the core removed, spread on trays, well sulphured, and put out to dry in the sun for the first day or two. After that they are stacked and allowed to dry in the stack. When finished they should be somewhat doughy and "stretchy" in texture if worked between the fingers.

SAVORIES FOR BREAKFAST AND LUNCHEON.

[Mrs. O. P. KLEMM (Rendelsham.)]

A good housewife can produce tasty and inexpensive dishes, made from "left-overs," with the addition of a little extra preparation, and one is only too glad, at present incomes, to make the most of simple, ordinary foods.

Regarding the extra preparations, say, for breakfast, much can be done the day before, such as mincing meats, preparing vegetables, or crumbling bread. Always save any gravy that is left from roast dinners, for, besides being helpful in serving

rissoles, patties, etc., it is useful to bind same. Eggs have excellent food value, but instead of having plain eggs and bacon, scrambled eggs, or boiled, every other morning, try to vary the menu by using them in some of the following ways:—

Eggs Poached in Tomato Sauce.—4 eggs, 4 rounds buttered toast, $\frac{1}{2}$ pint tomato sauce, pepper and salt. Put sauce in frying pan, and when boiling break eggs in and poach, basting well with sauce. Place eggs on buttered toast, and pour sauce over and serve, or the sauce may be kept for another occasion.

Eggs with Cheese Sauce.—Take 4 hard-boiled eggs, shell and cut in halves and put in dish, cut side up. For the sauce: Melt 1oz. butter in saucepan, add 1oz. flour, cook without browning, then add $\frac{1}{2}$ pint milk, and stir until boiling. Add 2ozs. grated cheese, pepper and salt, and pour over eggs. Sprinkle with a little grated cheese and serve very hot.

Moulded Eggs with Cheese.—3 eggs, 3 cups milk, $\frac{1}{2}$ cup grated cheese. Beat milk and eggs, add cheese and seasoning, pour mixture into greased mould and bake until brown and firm, turn out and garnish with chopped parsley.

Curried Egg Toast.—3 eggs, 1 teaspoon curry powder, salt and pepper, toast. Butter slices of toast and keep hot; beat eggs well with curry powder and seasoning. Heat a little butter in a pan, then pour in eggs. Stir over the fire until thick and set, but do not dry eggs by over-cooking. Pile on slices of toast and serve immediately.

Nest Eggs.—1 $\frac{1}{2}$ lbs. mashed potatoes, 2 tablespoons milk, 2ozs. butter, pepper and salt, eggs. Make the potatoes hot, add butter, milk and seasoning. Form in round shape with spoon on hot baking dish. Break an egg into each and bake in hot oven until set. Serve hot.

Tomato Toast.—Chop up a little bacon and put into small saucepan to cook with a small piece of butter, for a few minutes. Add 2 or 3 tomatoes (skinned and cut up) and add a little pepper. When tomatoes are well cooked break in 2 eggs and stir well. When thick enough serve on pieces of buttered toast.

Tomato and Cheese Savory.—Cut some fairly thick slices of cheese and cover the bottom of small flat dish with them. Take six small tomatoes, skin and halve them, then arrange over cheese, season with pepper and salt. Set tiny dots of butter on top of each tomato. Sprinkle with bread crumbs, bake in hot oven until light brown and serve very hot.

Potato Puffs.—1lb. cold mashed potatoes, 1lb. flour, $\frac{1}{2}$ lb. butter, a little salt and sufficient water to make stiff paste. Turn out on board and work well. Roll out thinly and cut in rounds as for pasties. Take a little cold meat (minced and seasoned) and place in each piece of paste. Fold over, press edges together, fry in pan half full of boiling fat. Cook on each side till light brown—about 5 minutes.

Meat Fritters.—Mince cold beef or mutton (or even rabbit), season it and flavor with mixed herbs. Make a batter with 2 eggs well beaten and pinch salt, 4ozs. S.R. flour, add little milk. Stir the meat into batter very lightly, drop into pan of very hot fat, taking large spoon for each fritter and fry until golden brown.

Another meat dish is cold meat and mashed potatoes blended with gravy or sauce; form into rissoles, roll in egg and bread crumbs and fry. Serve with gravy.

Potato Savory.—Grate 2 large potatoes, beat in 2 eggs, add pepper and salt, drop in spoonful of hot fat. Served with tomato or Worcestershire sauce.

To keep patties, &c., hot without becoming "soggy," a good plan is to have a wire gauze tray to stand over a baking dish, and the patties drain some of the greasiness away.

A Meatless Luncheon Dish.—Cut up 3 or 4 large onions and boil until tender. Grate 2ozs. of cheese and add to onions. Thicken with cornflour and serve on toast.

Parsnip Fritters.—Boil parsnips whole until cooked, but not too soft. Then cut in rings $\frac{1}{4}$ in. thick. Dip them in batter and fry in hot fat, drain and serve with chops or on toast. Carrots can be done the same, only add parsley to the batter.

Peeled Mushrooms on Toast.—Remove ends from mushrooms and clean, washing carefully in cold water, drain, place in pan with a little butter, season with salt and

pepper; cook 10 minutes, stirring lightly over fire, add a little chopped parsley and lemon juice; serve on toast.

Mushrooms with Onions.—Cut up onion and simmer in saucepan with a little water. When slightly cooked add sliced up mushrooms and simmer until tender, adding pepper and salt. Cover with milk and when boiling thicken with flour or cornflour and serve on toast.

Mince and Poached Eggs.—Place minced cold meat, pepper and salt, a little chopped shallot, and 1 tablespoon tomato sauce in a saucepan. Simmer gently without stirring much. Thicken with flour and place a flat layer on buttered toast, then a poached egg on each layer and serve hot.

An Easy Dish to Prepare.—Cut up some cold meat with an onion, put into a saucepan and cook with 1 tablespoon of butter until onion is tender. Cover with milk, let come to the boil, and thicken with cornflour, pepper and salt to taste. Serve on buttered toast. Fried tomatoes as a garnish improves the flavor.

Mutton Loaf.—2 cups each cold mutton and breadcrumbs, 2 eggs, $\frac{1}{2}$ an onion, pepper and salt, milk, tomato sauce. Mince the meat, soak breadcrumbs in milk, squeeze fairly dry and add to meat, then add eggs, well beaten, pepper and salt and minced onion. Press into well greased mould, cover with greased paper and steam 2 hours. Turn out and serve with tomato sauce.

Salmon Moulds.— $\frac{1}{2}$ lb. tinned salmon, $\frac{1}{2}$ cup hot water, 2 dessertspoons gelatine, 1 teaspoon finely chopped parsley, juice of 1 lemon, pepper and salt, 1 teaspoon good mayonnaise or salad dressing (may be omitted). Free the salmon from skin and bone, flake the fish finely, mix in parsley, lemon juice and seasoning. Dissolve gelatine in hot water and pour over other ingredients. Stir well and pour into small tumblers or cups to set. A slice of hard-boiled egg placed on top of each mould before it sets makes it even more appetising.

Tomato Jellies.—Simmer together $\frac{1}{2}$ lb. tomatoes, 1 small onion, 1 or 2 sticks celery, 1 teaspoon each vinegar and sugar, $\frac{1}{2}$ teaspoon salt, 1 clove, $\frac{1}{2}$ hour. Add dessertspoon gelatine, and stir until dissolved, strain the mixture through a sieve; when cool, pour in small vessels to set. Include in the lunch a few crisp lettuce leaves to be eaten with the jelly, or egg and lettuce sandwiches are equally good with it.

Sardine Eggs.—Boil as many eggs as required, shell and cut in half, and remove yolks. Scrape and bone 1 sardine to each egg. Pound yolks and sardines together, adding salt and a little cayenne pepper. Fill egg cases with a little of the mixture, shaving off a little at the bottom so that they will stand.

PRESERVED AND SMOKED FISH.

[Mrs. S. S. SMITH, Rendelsham.]

Fish, in order to be enjoyed, must be perfectly fresh. Sweep are very good keepers, and if to be kept a day or so should be sprinkled lightly with salt and pepper and hung in a cool, airy safe.

Frying is the most popular method of serving fish. They are also very nice stuffed with any good seasoned stuffing and baked in a hot oven. In order to fry fish satisfactorily, some little preparation is needed. Fillet the fish and then cut in nice pieces, not too thick, and roll in S.R. flour (with pepper and salt added), then dip in beaten egg and roll in flour again, and have fat at a high temperature and fry quickly. They have a nice, golden crust if done by this method and all the juices are retained. Another popular way is to dip in beaten egg and roll in baked and sifted breadcrumbs. Schnapper are particularly nice done this way.

A large sweep or schnapper, stuffed and then rolled in egg and flour and baked in a hot oven, served with either baked or mashed potatoes, makes a very nice meal and is much appreciated for a change.

A very successful way to keep fish on hand is to smoke or cure them. I have very good success with the following method:—First take out the backbone and have the fish in two large slabs, and then place in brine for 12 hours, remove from brine, rinse in clean water, and hang up to dry for a few minutes, then paint over with “essence of smoke” (a preparation on the market for the purpose), or, equally as good, smoke with wood smoke in old chimney if no smoke-box is available and when smoked sufficiently hang each piece separate in the safe. When needed for use, soak pieces of fish in a large dish of clean cold water overnight, and place fish in fresh cold water and bring to the boil, then simmer for about 15 minutes. This is very nice eaten with mustard sauce. Method to make:—1 teaspoon mustard, 1 dessertspoon each butter and cornflour mixed to a paste with milk, add boiling water until right consistency.

CRAYFISH.

The usual method of cooking is to boil in sea water, but if cooked at home they need plenty of salt added to the water in which they are to be cooked. About 20 minutes is the usual time allotted to their cooking, and when taken from water they should be immediately plunged into fresh cold water, which gives them a clear red color. Crayfish are very nice eaten cold with lettuce or tomato salad or mayonnaise dressing. Curried crayfish is very nice by way of a change. *Method to Make.*—Prepare curry by mixing 1 small dessertspoon curry with 1 tablespoon cornflour, 1 dessertspoon butter, small cup of milk, bring slowly to the boil and place in slices of cold crayfish and simmer for a few minutes. Serve on rounds of buttered toast.



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Preserving Crayfish.—Take out of shell when cold and cut in neat slices and arrange with claws neatly in Mason or preserving jars. Put equal quantities of vinegar and water on to boil, add spices to taste. I use about 1 teaspoon of allspice and a shake of pepper, sugar and salt to taste; when cool, pour vinegar on to bottled cray and then seal and sterilise in the usual way. Screw down very tightly. They must be perfectly airtight or they will not keep. A very nice sandwich filling can be made by mincing cray very finely and placing in a saucepan with equal parts vinegar and melted butter, pepper and salt to taste. Simmer gently for a few minutes and pour into small jars and when cool pour fresh melted butter on top and cover with butter paper. This paste will keep for several days and is much appreciated by children in sandwiches.

RECIPES SUPPLIED BY PENOLA WOMEN'S BRANCH.

Apple Pulp.—Pare, core, and cut up apples, to every pound add 1 cup of water. Boil well without sugar, add $\frac{1}{2}$ lb. sugar to every pound of fruit. Boil $\frac{1}{2}$ hour, bottle or paste down. Very nice for apple cake, tarts or apple sauce.

Mulberry Syrup.—4 $\frac{1}{2}$ lbs. ripe mulberries, 1 bottle white vinegar. Crush mulberries with the vinegar and leave for three days. Strain. Take 1 cup sugar to 1 cup of liquid. Boil for 20 minutes. Bottle whilst hot and cork when cold.

Mason Jar Preserves.—Make a syrup of 2 cups boiling water, 1 cup sugar. Peel and cut up fruit, cook until tender, but not to a "mash." With a fine fork lift carefully into heated jars, pour syrup over until overflowing, quickly screw down, and turn the bottles upside down. If any air escapes, unscrew, fill up again quickly.

Crystallised Figs.—6 cups sugar, 3 cups water, 3 tablespoons vinegar. Bring to boil, put in 6 lbs. figs (tailed and pricked), boil from 2 $\frac{1}{2}$ to 3 hours gently, lift out and leave draining. Dry in shade. Second day roll in castor sugar.

Preserved Fruit.—To every quart of water allow $\frac{1}{2}$ lb. sugar, make a syrup. Pack fruit into jars and when the syrup is cold, pour over fruit. In the preserving pan, or copper, cover the bottom well with straw, put in bottles just lightly screwed down, and pack straw around bottles. Fill copper with water about three-quarters of the way up jars. Slowly bring to a boil, about 1 hour.

Preserving Fruit in Screw Top Honey Jars.—Procure an old motor car tube, a very thick one is best; then cut from it rounds the exact size of the inside of the lid, the piece of cardboard that is in the lids when bought with honey in, is the pattern to use to cut rubber. Pack jars with fruit and syrup, wash rubber rounds very thoroughly and put inside lids (they must fit in nicely), then screw down as tightly as possible. Do not screw lids again after taking them out of steriliser, as this will probably shift rubber, which has only a very small rim to rest on.

Some difficulty may be found in removing the lids. If bottles are stood upside down in boiling water for a few minutes, this loosens rubber and may be easily screwed off, and lids used again next year, or many years if taken care of and not allowed to rust.

Carrot Marmalade.—4 each medium sized carrots and lemons. Grate carrots finely, cut up lemon small, put them together in the preserving pan and add 4 pints of water and let stand for 24 hours. Boil for 1 $\frac{1}{2}$ hours, then add 4 lbs. sugar and boil for 1 hour more, or until set.

Loganberry Jam.—Gather berries and weigh them and boil for 30 minutes. Then add 1 lb. of sugar to each pound of berries and boil another 20 minutes.

Preserved Figs.—15 lbs. ripe figs, 9 lbs. sugar, 7 cups water, $\frac{1}{2}$ lb. whole ginger. Soak ginger all night, add to the syrup which has been made of the water and sugar, add figs and keep pressing down. Do not stir. Boil for about 4 hours. Add rind and juice of 3 or 4 lemons, or 1 teaspoon citric acid.

Apple and Blackberry Jam.—3 lbs. each blackberries and apples, 6 lbs. sugar, 4 cups water. Put apples and blackberries through mincer, add water, boil $\frac{1}{2}$ an hour, then add sugar, boil another 2 hours.

Apple and Dark Plum Jelly.—To 1 quart water allow 1lb. apples, and to each 4lbs. apples add 1lb. black plums. No water allowed for plums. Boil for $\frac{1}{2}$ hour, strain through cheese cloth bag, and allow to drip overnight. Measure liquid and boil liquid 10 minutes before adding sugar. Allow 1 cup sugar to each cup liquid. Boil about 1 hour or until it jells when tried.

Preserve Orange or Lemon Peel.—Soak peel in salted water for 3 or 4 days, drain in clean water and boil until soft. Make syrup by boiling 2 cups sugar with 1 cup water for 5 minutes. Put peel, which should be well drained, into a basin and pour syrup over it. Let stand for 5 or 6 days. Drain off syrup and boil up for 20 minutes. Put peel back in boiling syrup and boil very slowly for 20 minutes or until it looks clear, spread on a dish, sprinkle with sugar, and dry in sun or a cool oven. Lemon peel may be put through mincer and stored in jars ready for use.

Fig Chutney.—3lbs. each ripe tomatoes, onions, and brown sugar, 1lb. sultanas, 4lbs. figs, 2 tablespoons salt, 1 tablespoon ground ginger, 1oz. garlic, $\frac{1}{2}$ oz. chillies. Cut up and cover with $\frac{1}{2}$ gall. of vinegar. Stand over-night and next day boil for 2 hours.

Fig Jam.—12lbs. ripe figs which have been peeled, sprinkle 9lbs. of sugar and leave over-night. Put on stove next day and when boiling add 1 tablespoon of citric acid. Boil for 2 hours, just before removing from fire add $\frac{1}{2}$ lb. preserved ginger.

Marmalade—Grape Fruit.—To every measure of cut up fruit add 3 of water. Second day boil and measure again; then add measure of sugar to every 1 of marmalade. Boil until jells.

Gooseberry Marmalade.—3lbs. gooseberries, 3 pints water, 6lbs. sugar. Put all together in preserving pan and bring quickly to boil. Boil until red (about 1 hour).

Tomato Sauce.—14lbs. tomatoes, 2lbs. onions, 1oz. garlic, $\frac{1}{2}$ salt, 1lb. sugar, 1oz. ginger. Boil 2 to 3 hours, strain and add $\frac{1}{2}$ dram each oil of cloves and spirits of wine, 3ozs. acetic acid, 40 grains of cayenne. Return to pan and boil 1 hour.

Fig Jam.—Peel and cut up figs, then weigh fruit. Place in preserving pan and to every pound of figs allow $\frac{1}{2}$ lb. sugar. Put half the required amount of sugar on and the rest when fruit comes to the boil. Juice and rind of 1 or 2 lemons, and $\frac{1}{2}$ lb. green ginger. Boil slowly until well set when cool on saucer.

Tomato Chutney.—2lbs. peeled tomatoes, 1lb. each brown sugar, white sugar, sultanas, and dates (cut small), $\frac{1}{2}$ lb. preserved ginger, 1 teaspoon cayenne pepper, 2ozs. salt, 1oz. garlic, 3 cups vinegar:—Boil tomatoes in vinegar until soft. Add other ingredients, boil for 25 minutes.

Green Tomato Chutney.—3lbs. green tomatoes, 1 tablespoon salt, 3 pints vinegar, $\frac{1}{2}$ teaspoon cayenne, 1lb. raisins, 1 tablespoon mustard, 1 $\frac{1}{2}$ lbs. sugar, 2ozs. whole ginger, 2lbs. each cooking apples and onions. Slice tomatoes and cook until soft with half vinegar. Put through sieve and return to pan. Mince apples, raisins, and onions, all add to pan with sugar, seasoning and rest of vinegar. Tie ginger well bruised in muslin bag. Boil $\frac{1}{2}$ hour. Bottle when cold.

Pear and Tomato Jam.—Take equal quantities of pears and tomatoes, allow $\frac{1}{2}$ lb. sugar to each 1lb. fruit. Peel and cut up pears. Peel tomatoes by dipping in boiling water for a minute and then in cold, cut them in half and add to the pears. Strew half the quantity of sugar over the fruit and leave all night. Next morning add the rest of the sugar and boil until it thickens—about 2 hours, longer if a large quantity is made.

Peach and Apple Jam.—2lbs. each peaches and apples, 3 pints water, 3lbs. sugar. Peel, core, and slice apples and put in pan with water, boil $\frac{1}{2}$ hour, then add peeled and cut up peaches and boil $\frac{1}{2}$ hour; add sugar and boil 1 to 1 $\frac{1}{2}$ hours longer. When cool, bottle and seal.

Tomato Jam.—6lbs. yellow tomatoes, 2lbs. pears, 12 passion fruit, 4 $\frac{1}{2}$ lbs. sugar. Boil for 2 hours.

Apricot and Pineapple Jam.—8lbs. ripe apricots, 6lbs. sugar, 1 large tin pineapple. Put half sugar on over-night, in the morning add the remainder of the sugar and pineapple and boil 1 hour.

Sweet Pickled Gherkins.—Cover gherkins with water and salt, and stand for 8 days, then drain off liquid and dry gherkins with cloth and pack in jars. *Method:* Boil sufficient vinegar to cover gherkins; to each quart add $\frac{1}{2}$ pepper corns, 4 cloves, 2 blades of mace, a few caraway seeds, 1lb. sugar. Boil 10 minutes and pour while boiling over gherkins. Each day for about three days pour this liquid off into a saucepan, bring to the boil and pour back on the gherkins. This will make them crisp and bring back the green color.

AUBURN (Average annual rainfall, 24in.).

February 23rd.—Attendance, 14.

QUESTION BOX.—What makes gherkins turn green in pickle? *Ans.:* Boiling the vinegar several times and pouring on to the gherkins which are packed in a jar with spinach or vine leaves. Does salt improve the flavor of jam? *Ans.:* Yes; it is a great improvement to jam, about 1 teaspoon to 12lbs. of fruit. What is the best way to clean a white hat? *Ans.:* Use petrol, eucalyptus, or warm flour. To take ink stain out of silks. *Ans.:* If the stain is fresh, soak in new milk until it turns sour, or use salt and lemon. To make the Bureau meeting more interesting. *Ans.:* Let every member take an active interest in the meetings, and introduce fresh subjects for discussion. **Household Hints.**—Keep in a convenient place a basin in which a cup of oatmeal has been mixed with a teaspoon of boric acid, and rub hands with the mixture when work is completed. Another good mixture for the hands is equal parts of lemon juice, glycerine, and methylated spirits. To cure hicoughs, take slowly small sips of water; if not effective, sip a little vinegar. The easiest way to wash windows is with a piece of chamois leather because it is not necessary to dry them. Care must be taken that the washing water is clean and the cloth squeezed dry when wiping the glass. To treat chilblains. Steep the affected parts in water as hot as can be borne; when scalding becomes unbearable, plunge momentarily into cold water. Repeat the hot dip several times. This cure must not be attempted with broken chilblains. At night time apply tincture of iodine. When dealing with broken chilblains an antiseptic dressing is necessary. Very strict attention should be paid to cleanliness. Dress with boric acid ointment. Now and then dip the affected part in a weak peroxide of hydrogen bath. (Secretary, Miss. L. Dennison.)

LAURA BAY.

February 13th.—Attendance, 13.

SMALLGOODS.—The following papers were contributed by Mesdames Hoffrichter and Blumson:—"After the pig has been scalded, scraped, and washed, remove the head, cut into quarters, and wash several times, then put in a copper half full of water and boil for three hours or longer. Add the other parts of the pig when boiling the head, except the liver—the latter requires only half an hour's boiling. **Black Pudding No. 1.**—Mince part of the head, heart, and lights, some meat and fat cut into squares, half pint of blood, salt, pepper, allspice, sugar, thyme, and marjoram to taste; mix all together thoroughly, then fill in runners, which must be thoroughly cleaned; they usually take three to four hours to clean with salt and warm water. **Black Pudding No. 2.**—Same ingredients as No. 1, but add one to two cups of well boiled rice, and the meat must be all minced. Mix well and fill in runners, not too tight, to allow for swelling. Boil from quarter of an hour to an hour according to sizes. **White Pudding.**—Mince some head meat, liver, and kidneys, use same spices to taste. Take two cups of broth from the copper in place of blood. Mix all together and fill in runners. **Saveloys.**—Take half quantity of cooked and raw meat minced, say, 1 pint of each, and 1 pint of broth, 1 teaspoon salt, $\frac{1}{2}$ teaspoon of saltpetre, and $\frac{1}{2}$ teaspoon of caraway seeds. Fill in runners, scald them in a dish, then hang up for a week or longer. Before using boil them in water for 10 minutes. **Metwurst.**—6lbs. of pork, 4lbs. of beef, 2lbs. of fat, 4 tablespoons of salt, 3 tablespoons of pepper, 1 tablespoon of saltpetre, 2 tablespoons of sugar, half a wine glass of brandy, and a little garlic if liked. Fill in beef runners and smoke. Repeat for a month before using."

SOAP MAKING.—"Save all fat that is free from salt. Some favor the receipt on the caustic soda tin, which is—Dissolve 1lb. of caustic soda in 3 pints of water—the liquid will become quite hot. Then heat 6½lbs. of fat over a fire until it becomes liquid. Let it cool, and then pour into the caustic lye, slowly stirring with a spoon until it is well mixed and has the appearance of honey. Stir for 2 minutes only. Pour into a lined mould and leave in a warm place until next day, then cut up; ready for use in four weeks. For toilet soap—Glycerine (½lb.), some lux, ½lb. palm olive oil; stir until mixed. Another receipt—½lb. honey, ½lb. oatmeal, and 2 teaspoons

of lavender. Small tobacco tins are very handy in which to set toilet soap. Each of the above are added to a quarter of 6lbs. making of the usual soap recipe. Another recipe—6lbs. fat, 1lb. resin, 1lb. caustic soda, $\frac{1}{2}$ lb. borax, 14 pints of water. Lux is an improvement, and a knob of blue is recommended. (Secretary, Mrs. D. Morrison.)

McLAREN FLAT.

March 1.—Present: 20 members.

Mrs. J. Foggo gave a demonstration of tatting. The result of the Dark Fruit Cake Competition was as follows:—First prize Miss F. Bell and second prize Miss M. Ward. Mrs. J. Bruce acted as judge.

Fruit Cake Recipes (winning recipe).—1lb each butter and sugar, 1doz. eggs, 2lbs. currants, $\frac{1}{2}$ lb. mixed peel, $\frac{1}{2}$ lb. sliced blanched almonds, 1 grated nutmeg, 1 teaspoon mixed spice, 1 wineglass dark brandy, $1\frac{1}{2}$ lb. plain flour. Method: Beat butter and sugar to a smooth cream, add eggs, two at a time, beating them thoroughly through the mixture, add flour and other ingredients, sprinkle brandy over the whole, and beat lightly but well. On the thoroughness of the beating depends the lightness of this cake, and on the length of baking the color. Bake in a very slow oven $3\frac{1}{2}$ to 4 hours.

Fruit Cake without Rising (second prize).—1lb. each butter and sugar, 1doz. eggs, 2lbs. currants, 1lb. raisins, $\frac{1}{2}$ lb. mixed peel, $\frac{1}{2}$ lb. blanched almonds, 1 grated nutmeg, 1oz. mixed spice, $1\frac{1}{2}$ lbs. plain flour, essence of lemon, a little brandy. Cream butter and sugar, add well-beaten eggs, mix well, add currants, raisins, lemon peel, and almonds. Then add nutmeg, spice, and flour sifted together; lastly, add essence of lemon and brandy and mix all well together for five minutes. Put in well greased tins, cook in moderate oven for about 3 to 4 hours.

Dark Fruit Cake, without Rising, or Soda (Mrs. B. Elliott).—4 cups plain flour, 3 cups brown sugar, $1\frac{1}{2}$ lbs. currants and seeded raisins, $\frac{1}{2}$ lb. each lemon peel and almonds, 1lb. butter, $\frac{1}{2}$ lb. dripping, eggcup brandy, $\frac{1}{2}$ packet mixed spice, 3 teaspoons cinnamon, 1 grated nutmeg, 3 tablespoons cocoa, 2 teaspoons essence lemon or vanilla, 9 eggs. Bake $2\frac{1}{2}$ to 3 hours. This mixture makes three cakes. Method: Beat butter, dripping, and sugar to a cream, add eggs, which have been beaten 15 minutes, then add brandy and essence, sift in flour and mix thoroughly, add fruit and spices lastly, and mix well together. Put all fruit and almonds into a bowl, and flour well, and mix together, before putting into mixture.

Fruit Cake (Mrs. W. Cooper).— $\frac{1}{2}$ lb. each butter, sugar, sultanas, and currants, $\frac{1}{2}$ lb. mixed peel, 10ozs. plain flour, 2ozs. each shredded almonds and dates, rind and juice of lemon. Clean and prepare fruit, beat butter and sugar to cream, add beaten eggs, stir in flour, add fruit, grate rind of lemon and add juice. Mix all together.

Dark Cake (Miss R. and Mrs. B. Elliott).—Breakfast cup each butter and sugar, $2\frac{1}{2}$ cups flour, $\frac{1}{2}$ cup currants (washed and cleaned), $\frac{1}{2}$ cup pudding raisins (chopped a little), 1 cup sultanas, 4 or 5 pieces orange and lemon peel (shredded), 5 eggs, $\frac{1}{2}$ cup almonds (cut in halves), $\frac{1}{2}$ teaspoon salt, $\frac{1}{2}$ teaspoon each mixed spice and cinnamon, and juice of half a lemon. Cream butter and sugar with hand, add eggs one at a time and beat each one in well, sift the flour, salt, and spice together, add half the flour, then the fruit, then the rest of the flour, and add lemon juice last, and beat well. Put the mixture in greased tin, smooth the top, and bake in moderate oven for about 4 hours. (Secretary, Mrs. D. Elliott.)

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PARRAKIE (Average annual rainfall, 14.64in.).

February 20th.—Attendance, 12.

SAUCES AND PICKLES.—Mrs. N. Catford read the following recipes:—“*Tomato Sauce*: 15lbs. tomatoes, 1½ onions, 2ozs. garlic, 1½lbs. apples, 1½lbs. sugar, 1oz. ground ginger, 1 teaspoon cayenne pepper, 1oz. ground allspice, ½lb. salt, ½oz. cloves, 1½pints vinegar. *Method*: Break the tomatoes, peel and cut up apples, onions, and garlic, add cloves; boil all slowly together for 3 hours or more, then strain and add vinegar and other spices and boil until thick enough; strain through flour sifter. *Tomato Relish*: 12lbs. tomatoes, 4 large onions, 2 cups treacle, ½oz. cloves, ¼ teaspoon cayenne pepper, 2ozs. whole ginger (bruised), 1 bottle vinegar (1½ pints). *Method*: Peel tomatoes and onions, cut up and sprinkle with salt; stand over-night and drain off liquid; put ingredients in muslin bag and boil all together for half an hour or longer. *Tomato Chutney*: 4lbs. each tomatoes and apples, 1lb. each sultanas, brown sugar, and treacle, 1½lbs. onions, 1 teaspoon cayenne pepper, ½lb. salt, ½oz. cloves, 1½ pints vinegar. *Method*: Put all through mincer except sultanas; skin tomatoes and peel apples; boil for 1 hour.” (Secretary, Miss J. Halliday.)

PENOLA (Average annual rainfall. 26.06in.).

March 7th.—Attendance, 25.

Thirteen entries were received for the Jam Roll Competition conducted under the auspices of the Branch, the successful competitors being:—First prize, Mrs. T. Oswald; and second prize, Mrs. C. Neilson. (Secretary, Mrs. E. Kidman.)

RENDELSHAM.

February 7th.—Attendance, 12.

DRESSING POULTRY.—Mrs. W. McArthur presented the following paper:—“*Choice of Bird*—Choose a young, healthy bird, eyes bright and prominent, and legs not scaly. *To Pluck*—Scald in boiling water, drain, and then place on a piece of paper. Pluck feathers starting at legs and pulling feathers sharply towards head, then singe. Ducks and geese scalded and wrapped in a bag to steam makes plucking easier. *To Clean*—Have ready a dish of water, scissors, plate, and knife. Cut a slit in skin at back of neck, pull neck out and cut as close to the body as possible. Remove wind-pipe and crop and loosen inside. Cut a slit at the back of the bird between the vent and the tail and remove inside. Cut out vent and rinse bird under running water. Remove gall bladder from liver, cut half way through gizzard, removing centre, and wash well. Cut off legs at joints. *To Truss*—Place wings behind neck and tie legs down to tail. *To Season*—Sage and onion is used for ducks and geese and thyme and onion for fowls and turkeys, mixed with breadcrumbs and seasoned with pepper and salt, blended with an egg. *To Cook*—There are various ways of cooking and serving poultry. Steamed in a boiler until tender and then browned in the oven is especially suited for an old bird. Boiled fowl served with parsley sauce makes an excellent winter dish and the stock can be used for soup with vegetables and barley. Curried fowl is also a winter dish; joint the fowl and stew until tender with onions or other vegetables if desired. Thicken, flavor with curry, and serve with boiled rice. Fried sausages served with roast turkey are an improvement.” (Secretary, Mrs. E. Andrews.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Hope Forest and Dingabledinga	1/3/34	22	Address—Mrs. Fischer ..	Mrs. L. Fincher
Saddleworth ...	6/3/34	11	Conference Report	Miss G. Frost
Warramboe	22/3/34	8	“Lemons.” Mrs. Chilman	Mrs. A. Steer
Laura Bay	13/3/34	7	Question Box	Mrs. D. Morrison
Gladstone	20/3/34	35	Social Afternoon	Mrs. L. Sargent
Belalie	13/3/34	21	“Good Fellowship,” Mrs. Page	Mrs. A. Cummings*
Finbaroo	2/3/34	15	Discussion	Mrs. F. Atze

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All communications to be addressed:

“The Editor, Journal of Agriculture, Education Building, Adelaide.”

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A. P. BLESING,
Minister of Agriculture.

AGRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Agricultural Bureau Conferences.

District Conferences will be held as follows:—

River Murray, at Barmera, Friday, June 22nd, C. W. Till (Secretary).

Eyre's Peninsula (West), at Ceduna, Wednesday, July 4th, A. R. Maguire, Mudamuckla (Secretary).

Upper North, at Wilmington, Wednesday, July 18th, Chas. Cole (Secretary).

In each case the Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda.

Pruning Competitions.

McLaren Flat, at McLaren Flat, June 16th.

River Murray—Mypolonga (date to be fixed); Cadell, June 26th; Waikerie, June 27th; Moorook, June 28th; Barmera, June 29th; Berri, July 3rd; Renmark, July 4th; and the championship at Berri, July 5th.

Imperial Fruit Show, 1934.

Advice has been received by the Department of Commerce that the Spring Section of the Imperial Fruit Show has been discontinued. This decision has been reached in view of the lack of interest displayed by growers of apples and pears in Australia, New Zealand, and South Africa.

Rothamsted Experimental Station—Annual Report, 1932.

The answer to the question, "Why continue agricultural research at a time when many farmers cannot sell profitably what they do produce?" is to be found in the words of Sir John Russell in his Report for 1932 of the Rothamsted Experimental Station:—"Scientific investigations in agriculture are primarily for the purpose of obtaining information, and this will always be needed so long as farming continues. It is in times of difficulty that expert information about soils, crops, and animals is most valuable to farmers, for it enables them rapidly to alter their methods in accordance with the rapidly changing economic conditions." The work described in the Report shows the type of information that is being gained in order to deal with changes in modern conditions. The price of the Report is 2s. 6d.

Tobacco Instructor.

Mr. R. E. Courthorpe-Giles, who was recently appointed Tobacco Instructor in the Department of Agriculture, has had a wide experience in the Tobacco Industry both as a grower and on the commercial side. Prior to the Great War, he was engaged in the cultivation of tobacco on a large estate at Makwiro, Southern Rhodesia, and in 1920, after receiving his discharge from war service he continued his work in the industry until 1931.

He learnt tobacco grading at the extensive tobacco grading warehouse in Salisbury, Southern Rhodesia. All growers in the country utilise the services of the Company's Sales Service, including those growers who are competent to grade and classify leaf for export to the London market and who are permitted to re-order their own leaf and that belonging to other growers in their particular locality.

In the Lalapanzie district he built and conducted a warehouse in which the tobacco grown over a large area was graded and re-ordered.

Mr. Giles was Secretary of the Lalapanzie Tobacco Growers' Association, a member of the Rhodesia Tobacco Growers' Association which was responsible for the grading of all tobacco exported from the country, and correspondent for the principal Rhodesian papers on matters of interest to the industry and to the Association.



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Gold Seal 

In 1932 Mr. Giles came to Australia and spent 12 months with a leading growing and manufacturing company in Western Australia. There he had charge of the tobacco stocks, grading, re-ordering and handling Australian, American, Turkish, and Macedonian leaf and acted in an advisory capacity to growers connected with the company. The latter work necessitated visits to the fields, and in this way he became acquainted with the local conditions in relation to growing and curing.

His commercial knowledge of the industry together with his experience in field work, buildings and plant, soil selection, cultivation and curing of the leaf will be of material assistance to those growers with whom he will come in contact in South Australia.

VETERINARY INQUIRIES.

[Replies supplied by Veterinary Officers, Stock and Brands Department.]

Agricultural Bureau, Cherry Gardens, asks if stock chewing bones of poisoned rabbits are likely to suffer any harm.

Reply—The skeletons of poisoned rabbits would not contain such poisons as strychnine, phosphorus, &c., although the rabbit carcasses may contain sufficient to affect stock. It is not uncommon for cattle and occasionally sheep which are suffering from mineral deficiency in their search for mineral matter to chew bones or even eat the carcasses of animals (including rabbits). Such bones and carcasses frequently contain poisons which are not minerals like strychnine, but which are manufactured by certain germs. These poisons can cause the disease known as botulism or dry bible. It is usually fatal and there is no cure. For this reason, all stock-owners should as far as possible clean up their farms of bones and make proper provision (burning or deep burial) for the disposal of all carcasses.

Frayville Agricultural Bureau asks: "Is there any difference between impaction and dry bible?"

Reply—"Impaction" is the term used to describe any case of indigestion where the bowels are overloaded with food. In the case of the cow, the rumen or big paunch which fills up most of the left side of the belly is the part of the bowel most commonly affected. "Dry Bible."—This term is a loose one, and is used by the farmer to describe several conditions, such as:—(1) Any digestive trouble of the cow. (2) The unthrifty debilitated condition which occurs in the cow during the dry period of the year. It is usually accompanied by impaction of the rumen and a depraved appetite (chewing of bones, rotting carcasses, and other rubbish) is generally present. The cause is a want of proper nourishment and a deficiency of mineral matter, mainly phosphorus. Better feeding and the provision of a phosphate lick will give a cure. (3) "Botulism."—This disease occurs as a result of No. 2. Bones and rotting carcasses of any dead animal frequently contain a poison known as a toxin, which is manufactured under certain conditions by certain bacilli which invade the carcass. Cattle which have a depraved appetite and which, in their attempt to satisfy their craving for mineral matter, chew such infected material, will get botulism. The disease is usually fatal, and treatment is not satisfactory. Usually several cattle are affected, and generally the best ones contract the disease as their mineral requirements are greater. The affected animal goes down, is unable to rise, and frequently cannot chew or swallow its food, in which case there is considerable salivation and the tongue may protrude from the mouth. The animal may make attempts to feed, but cannot swallow. The only satisfactory way of dealing with this disease is by prevention, and this consists in:—(1) The provision of good feed. (2) Making available a suitable phosphatic lick:—*e.g.*, dicalcic phosphate (35-37 per cent. P_2O_5), 40 parts; salt, 60 parts. (3) The clearing of the farm of all bones and carcasses and their disposal by burning or burying deeply in a suitable place.

Miltalie Agricultural Bureau reports horses with recurring sores below ears.

Reply—The animals are affected with a form of strangles. Those affected should be spelled from work and kept in comfortable quarters, preferably isolated away from other healthy horses. The abscess formations should be fomented with hot water, and when ripe should be carefully opened with knife or scissors, &c., so that they can be effectively drained of their purulent contents and the abscess cavity thoroughly irrigated out daily with weak antiseptic solutions, such as lysol, 1 to 2 tablespoons to 1 pint warm water, followed immediately with weak tinct. iodine (tr. iod. 1 part, water 4 parts). The skin immediately underneath the opening of the abscess should be kept smeared with vaseline to protect it from the scalding effects of the discharges. The openings of the abscesses should be kept open and not allowed to heal over until all discharges have ceased, and it may be found necessary from time to time to insert the finger to do this. These abscesses have a tendency to heal over too quickly, and then after a time they break out again. This is apparently what has happened in one case.

Mindarie reports death of horse, heavy breathing, distressed appearance, throwing head up and down, and sweating profusely.

Reply—The symptoms shown by the mare were those of acute colic, and from the *post mortem* it would appear as if the animal's death was occasioned by a rupture of the bowel. It is more than probable that the heavy infestation of blood worms, together with the sand, were responsible for inducing the attack of colic. A useful remedy for sand is a drench of 1lb. honey and 1 pint of new milk or 1½ pints raw linseed oil and 4 tablespoons of turpentine can be given. The drench should be followed by giving draughts of strong black coffee or teaspoon doses of powdered nux vomica twice a day on back of the animal's tongue. The animal's diet should, if possible, include a regular allowance of green feed and a periodical bran mash. *Re* treatment of blood worms. The animal should be starved for 24-36 hours, then given the drench of linseed oil and turpentine mentioned above. Subsequently for a fortnight give 1 tablespoon of Fowler's solution of arsenic night and morning in damped feed.

Brentwood reports death of two-year-old colt. Testicles swollen, eyes sunken in head, hind legs very stiff. Also colt with sores on hock and heel.

Reply—I cannot state cause of death. The swelling of the testicles in the early stage points to some diseased condition there, *e.g.*, a rupture, and only a careful inspection of the part would determine the abnormality present. For the colt with hock and heel sores, dress sores with the following mixture for 4-5 days:—Creosote, 1 part; oil of turpentine, 6 parts; raw linseed oil, 20 parts; then apply an ointment of sulphur and lard. Further, give 1 tablespoon of Fowler's solution of arsenic in a small damped feed night and morning for 10 days. If any green feed available give a liberal ration daily. Regulate bowels by bran mash.

"FARM MACHINERY."

The Library of the Department of Agriculture acknowledges the receipt of "Farm Machinery," by Archie A. Stone, of the American Society of Agricultural Engineers. Profusely illustrated and covering a wide range of agricultural machinery, this volume should prove a valuable source of instruction to the student as well as to the practical farmer. It graphically shows the construction of the machines and gives useful hints when repairs are necessary.

Published by Messrs. Chapman and Hall, 11, Henrietta Street, London W.C. 2.
Price, 18s. 6d. net.

FEEDING GRAIN TO SHEEP AND LAMBS.

Appended are replies by Mr. W. J. Spafford (Deputy Director of Agriculture) to questions asked by the Clanfield Agricultural Bureau on feeding grain to sheep and lambs:—

1. *Which of the following grains have the greatest food value for the hand-feeding of sheep and lambs—Wheat, oats, and barley?*

The analyses and digestibility of the various constituents of the grains mentioned enable us to make comparison between them, and so the figures are submitted:—

COMPOSITION.

	Water.	Ash.	Crude Protein.	Fat.	Nitrogen-free Extracts.	Fibre.
	%	%	%	%	%	%
Plump wheat (63½lbs.)	10.0	1.6	8.5	1.8	75.7	2.4
Shrivelled wheat (51½lbs.) . .	10.0	1.7	9.6	1.9	73.7	3.1
Prior barley	10.0	2.8	8.3	1.3	73.4	4.2
Roseworthy Oregon barley . .	10.0	2.7	11.9	1.1	68.6	5.7
Early Burt oats	10.0	3.5	8.6	7.3	59.4	11.2
Algerian oats	10.0	3.5	9.7	5.0	58.9	12.9

DIGESTIBLE NUTRIENTS.

	Crude Protein.	Fat.	Nitrogen-free Extracts.	Fibre.	Starch Equivalent.	Nutrient Ratio.
	%	%	%	%	%	
Plump wheat (63½lbs.) . .	7.0	1.1	69.6	1.2	75.7	1 to 10.4
Shrivelled wheat (51½lbs.)	8.5	1.2	66.4	1.6	72.3	1 to 8.3
Prior barley	5.8	1.2	67.5	1.4	76.1	1 to 12.3
Roseworthy Oregon barley	8.3	1.0	63.1	1.9	72.7	1 to 8.1
Early Burt oats	6.5	5.8	45.2	3.1	62.0	1 to 9.1
Algerian oats	7.3	4.0	44.4	3.6	58.9	1 to 7.8

It is only possible to compare properly foodstuffs of similar nature, as, for instance, grains with grains, hays with hays, greenstuff with greenstuff, &c., and for the purpose it is necessary to know the Starch Equivalent and the Nutrient Ratio of each food. When the moisture-content is equal a comparison between the Starch Equivalents is a very reliable comparison between the foodstuffs as regards the fattening properties and the power to retain existing condition on the animals. The Nutrient Ratio, on the other hand, is a fair guide as to the value of the various foods for the production of milk, eggs, and growth in young animals.

The Starch Equivalent figures disclosed in the above table show that for the fattening and maintenance of sheep there is little to choose between wheat and barley, and that both of these are much better than oats for the purpose. There is also little difference in the Nutrient Ratios of the wheat and barley, so they are about as good as one another for lambs, as well as for mature sheep. Oats, with lower Starch Equivalent, and narrower Nutrient Ratio, is a little better as a Milk-producer than the other two cereals.

What the figures do show is that although shrivelled wheat has a lower fattening value than plump wheat, it has more value for the production of milk and eggs, and a similar thing applies to Roseworthy Oregon barley as against Prior barley.

2. *Would grains be better if soaked for 36 to 48 hours before feeding to sheep and lambs?*

The feeding value of grain is generally improved by soaking it, but it is not always economic to go to the trouble and expense of soaking, and great care is necessary to keep utensils clean, and to prevent the development of moulds or excessive acidity.

The value of soaking can be taken to approximate the following figures:—

5lbs. dry whole grain to produce 1lb. increase of live weight.

4½lbs. soaked grain to produce 1lb. increase of live weight.

4lbs. ground grain (dry) to produce 1lb. increase of live weight.

When soaking grain only sufficient water should be used so that it will all be absorbed by the grain, without leaving a surplus in the utensil.

3. *Which of the foregoing grains is recommended to hand-feed to lambs nearly fit for market?*

At ruling prices barley would probably give best results with forward store lambs.

4. *How much grain should be fed to ewes and lambs each day when there is plenty of roughage?*

For the first few weeks after the lambs are dropped, from 1lb. to 1½lbs. of grain per ewe per day should be ample where there is plenty of roughage, and this will gradually be increased, as the lambs grow, to 2lbs. per ewe per day.

5. *How much grain each day to lambs nearly fit for market?*

For lambs approaching marketable condition 1lb. to 1½lbs. per lamb per day will top them off quickly.

When starting to hand-feed strong sheep or lambs with grain it is essential to bring them on to full feeds very slowly. For instance, if they are to receive eventually 1½lbs. of grain per day, they should be started on 6ozs. to 8ozs. per day for three or four days, 10ozs. to 12ozs. for two or three days, 14ozs. to 16ozs. for a couple of days, and then on to full rations.

If the animals are on the weak side a longer period should be taken to get them used to the grain.

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RAISING FAT LAMBS ON SUBTERRANEAN CLOVER PASTURE LANDS.

[By L. J. Cook, R.D.A., Manager Kybybolite Experimental Farm.]

During 1933, at the request of the local Branch of the Agricultural Bureau, a small experiment on the raising of export fat lambs was conducted at the Kybybolite Experimental Farm.

The idea was primarily to compare the development of various crosses when grazed on our improved subterranean clover pastures, but the scope of the work was restricted by the funds and labor available. No attempt could be made to test the various breeds or crossbreeds of ewes as mothers, but a trial of four of the more important British breeds of rams used on Comeback ewes was carried out.



Comeback ewe: Type used for breeding fat lambs.

The Farm has for some seasons been breeding a good utility line of Comeback ewes, the result of mating Merino rams back to half-bred English Leicester x Merino ewes, and it was decided to use a selected line of these as mothers for the lambs. Four flocks, containing 46 ewes in each, were carefully selected, even in type, development, age, and live weight. Each flock consisted of 17 four-tooth and 29 six and eight-tooth ewes, and the average live weight at mating time was 116.8lbs. each. They were mated to the rams on February 18th, 1933.

The four sires used were of the following breeds:—Suffolk, Dorset Horn, Southdown, and English Leicester, and we were indebted to Messrs. C. Duval, H. B. Schinckel, and the Roseworthy College for the loan of typical two-tooth rams of the three former breeds.

Whilst being mated the flocks were grazed in fields of approximate equal area, and containing similar pasturage, but after mating all the ewes were run together as one flock, and grazed under the rotational system on good fertilised clover

pastures. Early in July the flock was divided into its four sections, and each run on similar type of clover pasture during the lambing period. Lambs commenced to arrive on July 15th.

After marking, lambs and ewes were again run together as one flock. During the whole period neither ewes nor lambs were handfed, and they existed and grew entirely on grazing.

The ewes received usual attention, being crutched a few weeks before lambing, and one case of foot-rot was treated.

The flocks were examined twice daily during lambing, and note of births was taken. Three ewes were given assistance, one each in lamb to the Suffolk, Southdown, and Dorset Horn. Two ewes died at lambing, one in lamb to Suffolk, and one in lamb to English Leicester. All the other ewes maintained good health, and no further losses occurred amongst the ewes whilst the lambs were mothered.

LAMBING RESULTS.

The following table shows the number of lambs born, died, marked, and marketed from each of the four flocks:—

Ewes Mated.	Ewes Failed to Breed.	Ewes Died.	Total Lambs Born.	Lambs Born Dead.	Lambs died between Birth and Marking.	Lambs Marked.		Lambs died between Marking and Marketing.	Lambs Marketed.
						No.	%		
46 Southdown x Comeback ..	1	—	61	6	5	50	108.7	3	47
46 Dorset Horn x Comeback .	2	—	65	8	7	50	108.7	5	45
46 Suffolk x Comeback ...	3	1	55	2	2	51	113.3	7	44
46 English Leicester x Comeback ...	2	1	64	3	7	54	120.0	3	51
Total ...	8	2	245	19	21	205	112.6	18	187

It will be noticed that the Dorset Horn and English Leicester crosses were approximately equal in prolificacy, with 65 and 64 lambs born respectively, and were closely followed by the Southdown cross with 61 births, whereas the Suffolk cross produced only 55 lambs. The latter, however, were the strongest lambs, and only 4 of them were either born dead or had died before marking; whereas the losses of others were considerably greater, namely, 15 Dorset Horn cross, 11 Southdown, and 10 English Leicester cross. The majority of these deaths were amongst the twins. Only one lot of triplets was recorded, and these were born and reared in the Southdown flock.

The marking was done at three periods, August 25th, September 21st, and September 28th, and a total of 205 of the 245 lambs born were marked, being an average of 112.6 per cent. over the four flocks. The English Leicester cross was highest with 120 per cent., the Suffolk cross second with 113.3 per cent., whilst the Dorset Horn and Southdown crosses both realised 108.7 per cent.

Rather many losses (18) occurred between marking and marketing, but these were much increased by several unfortunate attacks made by stray dogs during November. Nine good lambs, including 5 Suffolk, 2 Dorset, and 2 Leicester crosses, died suddenly, apparently from attacks of entero-toxaemia; but the rest

of deaths were principally due to the dog attacks. The final column shows that 187 lambs (103 per cent.) were marketed, the Leicester cross providing the most with 51, the Southdown 47, Dorset Horn 45, and the Suffolk cross 44.

MARKETING OF LAMBS.

With reference to the marketing of the lambs, as the Farm is situated such a distance from the freezing works, it was impossible to send lambs immediately they were prime, and we were forced to send them when sufficient were approximately in prime condition to fill a railway truck. The main lot of 116 lambs were forwarded to the freezers on November 7th. Quite a fair number were ready a week or two before this date, but it was essential to hold them on the Farm until the full truck load was ready. The balance were kept for a later consignment, but on account of the unfortunate attacks on these by dogs they had to be held much longer than anticipated.

They were weaned, and topped on a pea stubble during January, and consigned to market on February 1st, 1934.



Southdown x Comeback lambs.

WEIGHT OF LAMBS.

As a matter of interest, and for demonstration purposes, one lamb of each cross was sent to Naracoorte on October 3rd, dressed 4 hours after being removed from the ewes, and the carcasses exhibited at the local show. The weights of these lambs, when taken from the ewes, and their dressed carcasses, when cold, were as follows:—

	Live Weight.	Dressed Weight.	Percentage.
	lbs.	lbs.	
Southdown x Comeback.. . . .	60½	32	53
Dorset Horn x Comeback	63	33	52
Suffolk x Comeback.. . . .	73	37	51
English Leicester x Comeback	58	30	52
Average	63.6	33	52

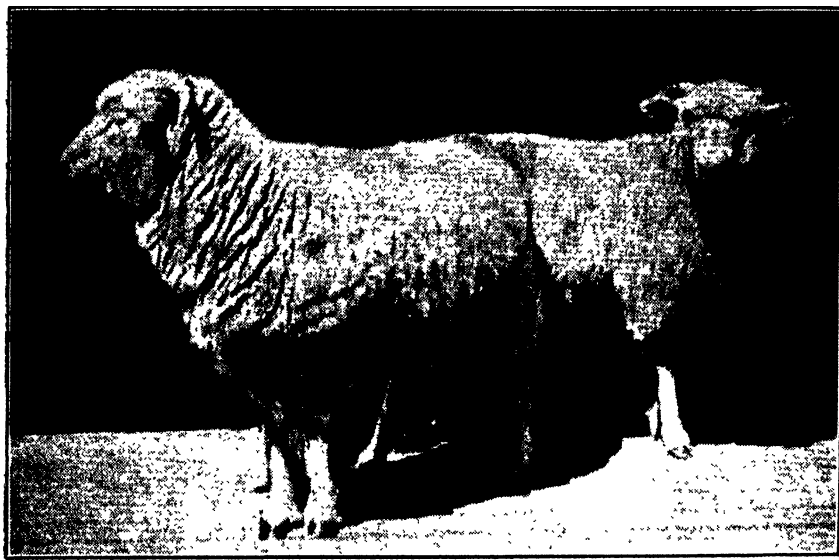
It is of interest to note that these young spring lambs, approximately 11 weeks of age, when killed only 4 hours after removal from the field, dressed 52 per cent. of their live weight. The Southdown cross with 53 per cent. dressed the best of the four, whilst the Suffolk cross with 51 per cent. was a little less than the Dorset

and Leicester crosses. However, the weights show the Suffolk cross to have been easily the heaviest lamb and quickest grower, followed by the Dorset Horn, Southdown, and English Leicester crosses in that order.

A fortnight later a further four representative lambs were sent to Mount Gambier and treated similarly, with the exceptions that the lambs were approximately 13 weeks old, had to travel considerably further, and were not killed until they had been 28 hours off their mothers. The weights of these four were as follows:—

	Live Weight.	Dressed Weight.	Percentage.
	lbs.	lbs.	
Southdown x Comeback.. . . .	62	30	48
Dorset Horn x Comeback	64	30	47
Suffolk x Comeback.. . . .	74	37	50
English Leicester x Comeback.. . .	60	31	51
	—	—	—
Average	65	32	49

From these weights it is noticeable that the lambs dressed only 49 per cent. of their live weight, due undoubtedly to the longer period of transport from field to



Dorset Horn x Comeback lambs.

slaughter. It is also apparent that both the Southdown and Dorset Horn cross lambs in this case were not quite as prime as the average of these crosses, because in all other results these have been better in comparison with the other crosses.

On the 7th November, when the bulk of the lambs would have averaged 14 weeks in age, the first consignment was sent to the nearest freezing works, a distance of 150 miles. The number and average weights of these lambs were as follows:—

	Average Live Weight.	Average Dressed Weight.	Percentage.	Weight Green Skins.
	lbs.	lbs.		lbs.
28 Southdown x Comeback ..	72.8	31.7	43.5	9.2
29 Dorset Horn x Comeback ..	75.3	30.76	40.9	8.6
33 Suffolk x Comeback .. .	75.1	30.7	40.9	7.7
26 English Leicester x Comeback	70.5	28.46	40.4	8.8
	—	—	—	—
116 Average	73.5	30.45	41.4	

On the 1st February, 1934, the second and final consignment was sent to the freezers, with the following numbers and weights:—

	Average Live Weight.	Average Dressed Weight.	Percentage.	Weight Green Skins.
	lbs.	lbs.		lbs.
17 Southdown x Comeback ..	75.3	32.19	42.7	10.1
13 Dorset Horn x Comeback..	90.2	37.08	41.1	11.07
9 Suffolk x Comeback	81.9	33.25	40.6	10.0
22 English Leicester x Comeback	83.5	32.95	39.5	11.4
61 Average	82.4	33.69	40.9	

These two tables show a greater loss of weight, due to the longer transportation, Approximately there were 7lbs. per head wastage on the 150 miles of transit. It is of special note that the Southdown cross lambs dressed appreciably better than the others in both cases. The lambs were all sold in the wool.

QUALITY OF LAMBS.

Regarding the quality of the lambs for export, the following table shows the number and percentages of carcasses of each cross, in each consignment, placed in grades by the purchasers (Messrs. Borthwicks Ltd.):—

	First Quality.	Second Quality.	Third Quality.	Rejects.
	No.	No.	No.	No.
Southdown x Comeback, 1st lot	28 } 93.3%	— } 4.5%	—	— } 2.2%
2nd lot	14	2	—	1
Dorset Horn x Comeback, 1st lot	18 } 66.7%	11 } 33.3%	—	—
2nd lot ..	10	3	—	—
Suffolk x Comeback, 1st lot	18 } 50%	13 } 40.5%	2 } 7.1%	— } 2.4%
2nd lot	3	4	1	1
English Leicester x Comeback, 1st lot	12 } 62.5%	10 } 29.1%	2 } 4.2%	2 } 4.2%
2nd lot	18	4	—	—
All breeds (totals), 1st lot	76 } 68.4%	34 } 26.5%	4 } 2.8%	2 } 2.3%
2nd lot	45	13	1	2

This table shows that of the 177 lambs sent to the freezers, 121 were classed as first quality, 47 as second quality, 5 as third quality, and only 4 were rejected. This result is quite satisfactory when it is remembered that every lamb reared in the flocks was sent to the freezers; none were held back on the Farm.

The outstanding fact is the excellent quality of lambs produced by the Southdown cross. In the first consignment this cross was 100 per cent. first quality. and the second consignment shows plainly that, although they were kept a comparatively long time on the Farm, they maintained their primeness extremely well. Only two lambs, a pair of twins that were dropped very late, and were under-sized, were put back to second quality. One lamb with a diseased joint was rejected. These Southdown cross lambs produced very fine shapely carcasses of prime quality, and comparatively even in weight.

For shape and conformation, the English Leicester cross lambs ranked next to the Southdown, but they were slower in maturing, and did not thrive quite as well as the other crosses; 50 per cent. of the first consignment of these lacked quality, mainly through immaturity, but the second consignment showed to advantage, in that 18 out of 22 lambs passed as first quality.

The Dorset Horn cross lambs were a fine lot, growing quickly, but they were lacking in conformation, and many were placed as second quality on that account; that



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is. the pins of the shoulders were not well covered, and there was a falling away at the hindquarters. These lambs, however, were all either first or second quality.

The Suffolk cross lambs show out to least advantage as regards quality. They were very strong, quick-growing lambs, but did not maintain their primeness well. Situated closer to the freezing works, so that the lambs could have been marketed as soon as ready, the percentage of first quality lambs amongst these would probably have been much higher. The carcasses lack in conformation more than the Dorset Horn cross.

VALUE OF THE LAMBS.

The prices paid in November at the freezers were:—

4½d. per lb. for first quality.

4d. per lb. for second quality.

3½d. per lb. for third quality.

As we were unfortunately unable to obtain separate skin valuations, we have had to base the values on an overall price, including value of skins, as follows:—

6½d. per lb. for first quality.

5½d. per lb. for second quality.

5¼d. per lb. for third quality.

The value of the first consignment was therefore as follows:—

No.	Breed.	Lamb. Lbs. Price		Total Value.	Value Per Lamb.	Less Charges 1s. 10½d. Each.
		d.	£ s. d.	£ s. d.	s. d.	s. d.
28	Southdown x Comeback ...	888 @ 6½	—	24 1 0	17 2	15 3½
18	Dorset Horn x Comeback ..	568 @ 6½	15 7 8	23 1 11½	15 11½	14 1½
11	Dorset Horn x Comeback ..	322 @ 5½	7 14 3½			
18	Suffolk x Comeback	559 @ 6½	15 2 9½			
13	Suffolk x Comeback	404 @ 5½	9 13 7	25 18 8½	15 8½	13 10½
2	Suffolk x Comeback	51 @ 5½	1 2 3½			
12	English Leicester x Come- back	364 @ 6½	9 17 2			
10	English Leicester x Come- back	273 @ 5½	6 10 9½			
2	English Leicester x Come- back	51 @ 5½	1 2 3½	18 4 10½	14 0½	12 2½
2	English Leicester x Come- back (rejects)	50 @ 3½	0 14 7			
116	All breeds	—	--	91 6 6½	15 9	13 10½

The prices in the final column show the net price per head for each cross received at Kybybolite after paying freight and commission on sale. The value of the Southdown cross, 15s. 3½d. each, was 1s. 2½d. greater than that of the Dorset Horn cross. The latter were worth 3d. each more than the Suffolk cross, whereas the value of the English Leicester cross was 1s. 8d. each less than the Suffolk, and 3s. 1½d. less than the Southdown.

The prices paid in February at the freezers were:—

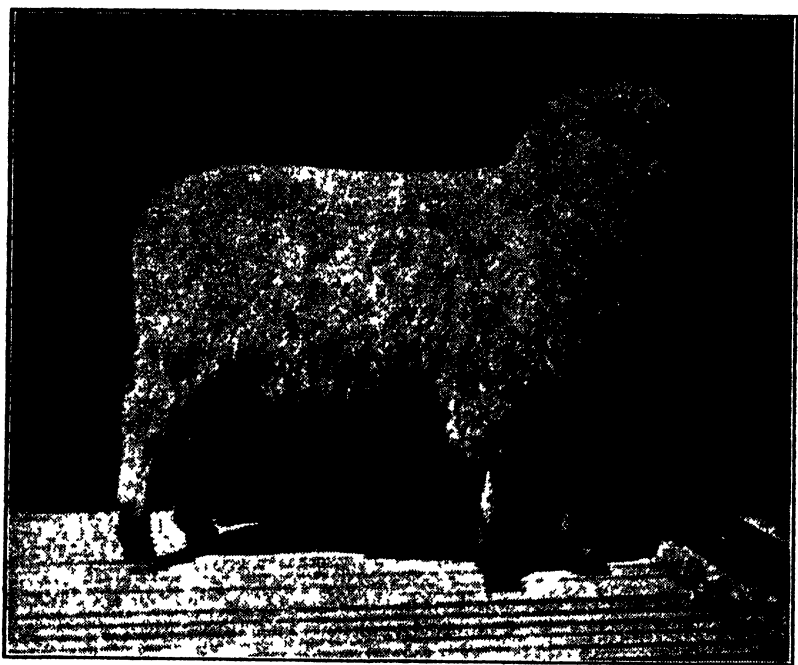
5½d. per lb. for first quality.

4½d. per lb. for second quality.

4¼d. per lb. for third quality.

2½d. per lb. for rejects.

Lambskins of 6.16lbs. average dry weight were sold at 5s. 6d. each.



Suffolk x Comeback lamb.

The value of the second consignment was as follows:—

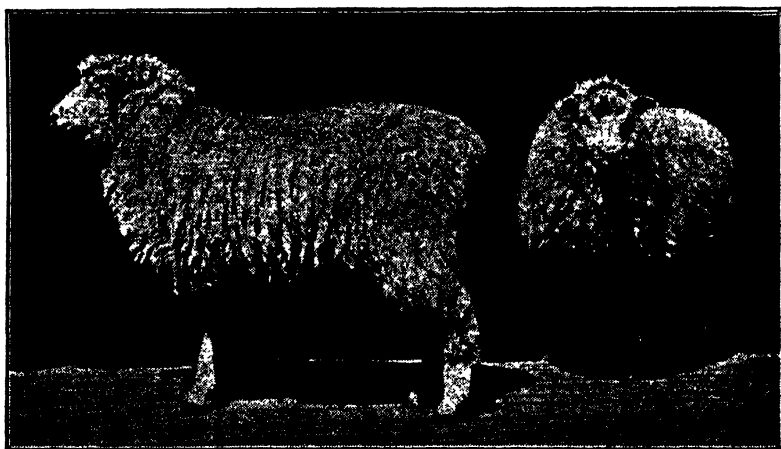
No.	Breed.	Lamb. Lbs. Price.	Value.	Value per Lamb.	Skin Value.	Gross Value.	Less Charges. 1s. 11½d.
		<i>d.</i>	<i>£ s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>
14	Southdown x Come- back	456 @ 5½	9 19 6				
2	Southdown x Come- back	59 @ 4½	1 2 1½				
1	Southdown x Come- back (reject)	21 @ 2½	0 4 4½				
			11 6 0	13 3½	5 4½	18 7½	16 8
10	Dorset Horn x Come- back	367 @ 5½	8 0 6½				
3	Dorset Horn x Come- back	115 @ 4½	2 3 1½				
			10 3 8½	15 8	5 7	21 3	19 3½
3	Suffolk x Comeback	107 @ 5½	2 6 9½				
4	Suffolk x Comeback	132 @ 4½	2 9 6				
1	Suffolk x Comeback	27 @ 4½	0 9 6½				
1	Suffolk x Comeback (reject)	27 @ 2½	0 5 7½				
			5 11 6	12 4½	5 4	17 8½	15 8½
18	English Leicester x Comeback	617 @ 5½	13 9 11½				
4	English Leicester x Comeback	108 @ 4½	2 0 6				
			15 10 5½	14 1½	5 7½	19 8½	17 9
61	All breeds		42 11 7½	13 11½	5 6	19 5½	17 5½

These returns show the Dorset Horn cross at 19s. 3½d. each net at Kybybolite to be the most valuable of the consignment. They were much heavier lambs, as shown in a previous table, and realised 1s. 6½d. more than the English Leicester cross, which were in turn 1s. 1d. greater value than the Southdown cross, and 2s. better than the Suffolk cross.

By combining the two consignments, the average prices for the season are as follows:—

	s. d.	£ s. d.	
Southdown x Comeback—			
1st Consignment 28 lambs @ 15 3½			
2nd Consignment 17 lambs @ 16 8		35 12 1	or 15s. 10d. per head.
Dorset Horn x Comeback			
1st Consignment 29 lambs @ 14 1½			
2nd Consignment 13 lambs @ 19 3½		32 19 6½	or 15s. 8½d. per head.
Suffolk x Comeback—			
1st Consignment 33 lambs @ 13 10½			
2nd Consignment 9 lambs @ 15 8½		29 18 9	or 14s. 3d. per head.
English Leicester x Comeback—			
1st Consignment 26 lambs @ 12 2½			
2nd Consignment 22 lambs @ 17 9		35 7 4½	or 14s. 8½ per head.
Total177		£133 17 9	15s. 1½d.

These figures show that the whole 177 lambs sent to the freezers realised an average price of 15s. 1½d. each at Kybybolite. The Southdown cross were the most valuable at 15s. 10d. each, and were also the most even line of lambs. The Dorset Horn cross averaged only 1½d. per head less, due to the high weight of lambs of this cross in the second consignment.



English Leicester x Comeback lambs.

VALUE OF THE FLOCKS.

Allowing average prices for the other 10 lambs that were utilised for demonstration purposes, the total return in value of lambs from each flock of 46 ewes has been as follows:—

47 Southdown x Comeback lambs at 15s. 10d.	£37 4 2
45 Dorset Horn x Comeback lambs at 15s. 8½d.	£35 6 10
44 Suffolk x Comeback lambs at 14s. 3d.	£31 7 0
51 English Leicester x Comeback lambs at 14s. 8½d.	£37 11 2

These figures show the greatest return of £37 11s. 2d. from the flock mated with the English Leicester ram, due to the extra lambs produced. The flock mated to the Southdown ram, with 4 lambs less marketed, produced only 7s. less in value.

However, as the English Leicester cross lambs were slower in maturing, some correction is perhaps necessary to allow for the extra time that lambs were pastured on the farm.

The following table shows deductions from the returns from each cross, allowing grazing of lambs at 2d. per week per head:—

	£	s.	d.	£	s.	d.	£	s.	d.
Southdown x Comeback returned	—	—	—	37	4	2			
Less 30 lambs for 12 weeks @ 2s. each	3	0	0	—	—	—			
Less 17 lambs for 24 weeks @ 4s. each	3	8	0	6	8	0			
							30	16	2
Dorset Horn x Comeback returned	—	—	—	35	6	10			
Less 32 lambs for 12 weeks @ 2s. each	3	4	0	—	—	—			
Less 13 lambs for 24 weeks @ 4s. each	2	12	0	5	16	0			
							29	10	10
Suffolk x Comeback returned	—	—	—	31	7	0			
Less 35 lambs for 12 weeks @ 2s. each	3	10	0	—	—	—			
Less 9 lambs for 24 weeks @ 4s. each	1	16	0	5	6	0			
							26	1	0
English Leicester x Comeback returned	—	—	—	37	11	2			
Less 29 lambs for 12 weeks @ 2s. each	2	18	0	—	—	—			
Less 22 lambs for 24 weeks @ 4s. each	4	8	0	7	6	0			
							30	5	2

With these allowances made, we find that the ewes mated to the Southdown ram have produced the greatest return, with £30 16s. 2d.; 11s. more than those mated to English Leicester ram, 25s. 4d. more than those mated to Dorset Horn ram, and 95s. more than those mated to Suffolk ram.

In conclusion, the experiment shows that the raising of fat lambs on the improved pastures during this season has been quite satisfactory. The return of wool from the Comeback ewes, used as mothers, was approximately 14s. per head, which, added to the 15s. 4½d. return of lamb per ewe, makes a total of close upon 30s. per ewe in gross return.

Finally, in handling fat lamb flocks on these lands, it is imperative to graze them on well-fertilised pastures. Drop the lambs sufficiently early to enable them to be marketed before the grass seeds become troublesome; otherwise late lambs should be grazed on mown areas, or, preferably, pea or oat stubbles.

It is proposed to continue the experiment over a number of seasons, with the inclusion of a flock mated to a Ryeland ram. Returns averaged over a number of seasons will provide more definite results.

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THE BAKING QUALITY OF AUSTRALIAN WHEAT— DEVELOPMENTAL ASPECTS.

[ALLAN R. CALLAGHAN, D.Phil., B.Sc. (Oxon.), B.Sc.Agr. (Syd.), Principal
Roseworthy Agricultural College.]

Although the objectives of economic plant breeding are diverse and numerous if considered one by one, they all radiate to one main central objective and that is to increase the monetary returns of the grower, and for the most part this great objective remains constant.

There is a subtle yet important distinction between the policy which calls for more bushels per acre and that calling for greater returns per acre, and although it may be argued that all other considerations should be rendered subservient to yield, there is a limit to the unreserved way in which such a policy should be advocated. Even from the general viewpoint of bulk wheat exported from Australia there has been reason to call a halt to the straightout policy of increased yield to the complete neglect of quality, and while it is absurd to become panic-stricken with regard to the quality of our Australian wheat, there is undoubtedly need for a careful review of the whither and how of our future development.

There are three main avenues of wheat marketing open to Australian producers and all three must enter into any discussion on future relationships of quality standards and wheat marketed. Firstly, there is the wheat used for home consumption; secondly, the wheat that is milled in Australia and sold as flour; and thirdly, the rest of the wheat which is parcelled together and sold on the world's market according to State f.a.q.'s. For clarity these are considered separately.

WHEAT FOR HOME HUMAN CONSUMPTION.

Considering Australia at large, the wheat absorbed for home human consumption was 31,000,000bush. annually for the period 1927-32. For the same period 161,000,000bush. was the average total annual production, so that approximately 20 per cent. of the total crop was utilised for home human consumption. From this it is apparent that the wheat so used has an important relationship to the total production. During the last few years there has been an almost universal and insistent demand from the millers for better quality, and while some have encouraged the propagation of better quality wheats by offering premium prices, it must be admitted that the supply has not been forthcoming. This is chiefly accounted for by the lack of capacity for yield in existing varieties of good quality. The slogan of yield per acre has seen to this, and millers, by premium payment, have been unable to make up the margin of loss accruing as a result of the disparity in yield between the "strong" varieties and the high yielding weak-flour varieties.

From personal contact with most of the millers of this State, I am perfectly satisfied that they are very sincere in their desire to obtain varieties of higher baking quality. It is evident, therefore, that there is a happy future for a variety, or varieties, of wheat possessing good quality, provided they have yielding ability sufficient at least to compete with high yielding varieties of poorer quality. On acceptance of these varieties by the farmers, there will be no need to direct such wheat into the channels of local milling, for the demand is already there, and the millers generally see to it that they get the best wheat available. Should it happen that a home consumption price for wheat be fixed, this demand, on the part of the millers, may be exaggerated. Having to pay more for their wheat will mean that they will make greater efforts to obtain the best quality that is available. Thus, from the viewpoint of local consumption alone, there is definitely room for increased quality, and there is little doubt that a variety combining good quality with average to good yielding capacity would find ready acceptance.

THE EXPORT TRADE IN FLOUR.

The second aspect is that of flour milled for export. A very noticeable rise in the amount exported has taken place in recent years, as shown by the following figures. For the decade 1916-25 the annual average export of flour, in bushel equivalents, was approximately 18,000,000bush. For the five years representing the period 1926-31, however, the average annual export of wheat, as flour, had increased to almost 25,000,000bush. Moreover, the flour exported appears to be in answer to a very steady demand, as no serious decline in the amount exported takes place from year to year, the chief fluctuations being in the nature of steady increase. Through these channels it seems there would always be a ready market for strong wheats. There is every possibility of this method of marketing our wheat increasing, especially if trade with the East can be judiciously and wisely exploited. If this market is to be gained and held then the millers must be in a position to supply flour of the quality desired. In fact, the standardisation of the gluten content of Australian flour shipped to the East at a level sufficiently high to compete with flours of high gluten content from the U.S.A. and Canada seems to be the most pressing need of the moment. Millers have been exhorted to do this, and the only way open to them is to choose higher quality wheats. Flour of indifferent, and especially varying, quality is of no use on the Eastern markets, and while the demand for Australian wheat and flour is there, every endeavour should be made to meet it.

From this it should not be concluded that the market in the East demands only flour of high baking quality. There is a big market there, as elsewhere, for weaker flour types. It is true, however, that standardisation of gluten content is fundamental, whatever the baking quality of the flour, and this calls for systematic handling of all flour sold, according to a definite brand, the brand being the assurance in itself of a definite and standard gluten content.

Other flour markets stipulate in no uncertain manner the necessity for good baking quality, the notable case being that of Egypt, where protective legislation was passed to assure at least 12 per cent. gluten content of all flour imported, and although this legislation has been lifted, it should be taken as unmistakable evidence of their requirements.

The marketing of our wheat overseas as flour, therefore, offers a way for the marketing of better quality wheat. When better quality wheats can be offered in large quantities to our millers there is every reason to believe that they will endeavour to exploit more lucrative markets abroad. Should the market expand, consistency of flour quality, as well as continuity of supply, will depend upon increased production of better quality wheat. It is clear that this aspect offers further incentive for the planning of wheat-breeding programmes on a quality basis.

AUSTRALIAN F.A.Q. WHEAT.

Having indicated the need and advisability of developing better quality wheats from the aspects of the local market and the overseas marketing of flour milled in Australia, there remains for consideration the largest portion of our wheat crop, which is disposed of on the world's markets as Australian f.a.q. A quality survey of this wheat must be confined to the consideration of huge bulks of wheat which are handled, shipped, and sold according to f.a.q. standards set down by each State every season. Unfortunately the Australian wheat industry has grown up without casting aside these strappings of its infancy. The system of marketing on a "fair average quality" basis, which was developed and was highly suitable when our exportable surplus was very limited and small, has outgrown its usefulness now that we have taken our place among the four greatest exporting countries of wheat in the world. If a purely impartial attitude on the part of all concerned with our wheat industry could be obtained, there is little doubt that a better

system of marketing our wheats on overseas markets would eventually be adopted. Interests, however, are not impartial, and there is a very strong opposition to any departure from the f.a.q. system.

The opposing faction to marketing reform is better organised and has greater backing, unity, and driving force than those who know and feel that some reform at least would directly benefit the primary producer. This alone makes marketing reform rather a remote possibility. Further, as handling reform is an imperative precursor of grade marketing, the chances of an all-Australian policy of grading on a quality basis being realised has been further delayed as a result of the present parlous position of the industry as a whole. For some considerable time yet, therefore, good, medium, and poor quality Australian wheats will continue to be dumped together and sold as f.a.q. One naturally looks to an alternative line of approach to the problem of raising, or at least maintaining, the quality of Australian wheat sold in this manner. This responsibility is wholly in the hands of the wheat-breeders of the Commonwealth, and, if through the development of high yielding, weak flour wheats, the price of Australian wheat on overseas markets declines, then the plant-breeder may have to admit failure in attaining the objective of increasing the monetary returns of the grower. Fortunately, those responsible for the wheat-breeding in the Commonwealth are alive to this fact, but there still remain the tendency, overwhelming desire and danger, of breeders releasing for general cultivation very high yielding wheats of definitely inferior quality. If all the official wheat-breeders of the Commonwealth were to agree that no variety of wheat of definitely weak-flour strength should be released for general culture in wheat-belt areas, even though it may promise to be superior in yield to existing varieties, then the present tendency of regression in the general quality of Australian wheat would be allayed and the position eventually improved.

It is fully recognised that in certain areas, and in Tasmania in particular, only weak-flour wheats are likely to be of value. These areas, however, are limited, requiring varieties usually later maturing and very different from those which thrive in the true wheat lands of the Commonwealth. It is quite permissible, and, indeed, laudable for these areas to concentrate on high yielding, weak-flour wheats, for there is a specific market for such in the biscuit and pastry flour trade. Breeders could still concentrate on weak-flour wheats for these areas without jeopardising the quality of wheat from the main areas, for varieties bred for such special climates would never succeed competitively under the shorter-seasoned, hotter and drier regions of the wheat belt proper.

A policy, prohibiting the release of varieties other than those possessing a recognised standard of quality, not necessarily high, but definitely above the lower limits as defined by the most outstanding weak-flour varieties at present in cultivation, namely, Nabawa, Free Gallipoli, Waratah, and Early Gluyas, would undoubtedly have a beneficial effect upon the general quality of our wheat in the future. To me this is of national importance, and State jealousies, precedence, and other ambiguous hindrances should be made subservient to the need of the moment, and if an agreement could be arrived at and put into immediate operation, certainly no harm could accrue and it would safeguard the baking standard of Australian f.a.q. for the future, and, incidentally, pave the way for a more advanced system of marketing.

In an article published in this *Journal* last year I expressed the intentions of putting such a policy into operation at Roseworthy Agricultural College, where the major portion of the wheat-breeding work of the State is being carried out. At the present time the economic position overshadows all other considerations in the wheat world, but when supply and demand again take control of the market, a more exact picture of World requirements on a quality basis will be portrayed.

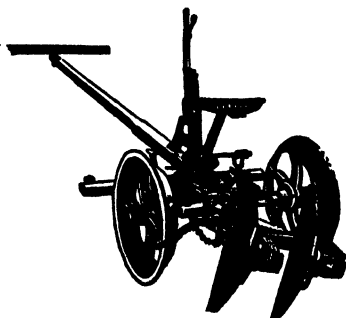
Whether the demand for better baking quality wheats increases or not it would definitely be to the advantage of Australia to be in a position of being able to produce large quantities of wheat of better quality at short notice to meet possible changes in demands.

In summarising the position, therefore, it must be admitted that the quality of our wheat must be studied in the future, and it would be short-sighted and damaging to frame any wheat-breeding programme without incorporating selection on a quality basis. There is evidence to show that varieties possessing strong flour characteristics would find a ready market with local millers, and that the grower would, in this way, receive the credit for this higher grade wheat. From the standpoint of our f.a.q. wheat all efforts on raising the quality of it would mean a readier sale overseas, which would probably be accompanied by better prices.

WHEAT BREEDING IN RELATION TO BAKING QUALITY.

The work of breeding wheats is, without doubt, complicated immediately the quality factor is introduced, and as quality in wheat is a very elusive character, the chief difficulty encountered by the breeder is to assess the comparative "quality" values of his selections. There is no known method whereby the exact quality of small quantities of wheat may be measured with accuracy and absolute certainty, and, until comparatively recent times, there was no method available which was even helpful to the plant-breeder in the early and most important stages of his work. The fact of the matter is that quality so far has evaded scientific definition, and while it is known that both chemical and physical phenomenon are involved, their exact nature is not clear. The final and crucial test is a baking test, and for this reason the definition of strength remains linked inseparably with

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the practical capacity of a certain flour to produce large, well-shaped loaves of bread, of good colour and texture. It is known, however, that while quantity of gluten is fundamental the quality of the gluten is also of distinct importance. Thus, quantity and quality of gluten, if measurable, should give evidence of actual quality of baking ability. The wheat-breeder has been seriously handicapped for the want of some measure of quality of small samples, and in 1930 a German worker published a paper outlining a whole-meal fermentation test designed to guide the work of the plant-breeder in sorting out wheat selections on a quality basis. This test is commonly referred to as the Pelschenke Test, and it endeavours to measure the quality and the quantity of the gluten, then to combine the two factors in such a way as to express the comparative baking qualities of wheat samples under review. The test is by no means infallible, and is definitely limited in value, but to the wheat-breeder it is without question a very useful guide, which should narrow the range of selection sufficiently to enable elimination of hundreds of selections as useless from the quality viewpoint in the early stages of the work, thus avoiding congestion and confusion of innumerable fixed lines awaiting selection on baking results.

It will be argued that environment is a very potent influence on the baking quality of wheat, but it is also certain that the hereditary constitution of a given variety defines its baking quality, even though it may vary from season to season, or climate to climate. The environment chiefly affects quantity of gluten, and in countries such as Australia, where the ripening period from flowering to full maturation of the grain is short and sharply defined by warm, dry conditions, the percentage of nitrogen, which is closely correlated with the quantity of gluten, is higher than would be the case were similar varieties grown in an environment such as England, where the ripening period is prolonged, moist, and cool. The character of the endosperm is very largely affected by finishing conditions, and the longer and better the conditions the greater the percentage of starch translocated to the grain; and, correspondingly, the lower the percentage of protein which, in this case, may be termed gluten. The quality of the gluten is more dependent upon the hereditary constitution of the variety than is the quantity, and it is this factor which chiefly concerns the wheat-breeder. It is maintained, and not without good reasons, that the whole-meal fermentation test now available will act as a very useful guide for the breeder in this regard, for it will enable him to test, in a comparative way, small samples of all his selections in the initial stages of his breeding work.

The breeding of wheats at Roseworthy College, in future, embodies breeding with the object of not allowing the good name of South Australia's wheat to be lost on the score of diminished quality. The objects are to breed higher quality wheats if possible, and in all cases to breed wheats which will be acceptable in quality as in other characters when treated as f.a.q. In this way, no further retrogression may be expected, and the requirements of the local and export flour trade should be filled. The importance, therefore, of knowing as much as possible about the test being used is evident, and, for this reason, work on the subject has been undertaken at the College. If, through this work, the test can be developed and used for more extensive work than as a guide to selections in the plant-breeder's plots, and the actual limits of its reliability can be defined accurately, some very useful service will be done. With this in mind, this article, and those to follow by officers of the College Staff, have been written.

Finally, it is wise at this juncture to emphasise the fact that no claims are made with regard to the test other than it is likely to be a very useful and acceptable guide to all the wheat-breeding work being conducted at the College in the future.

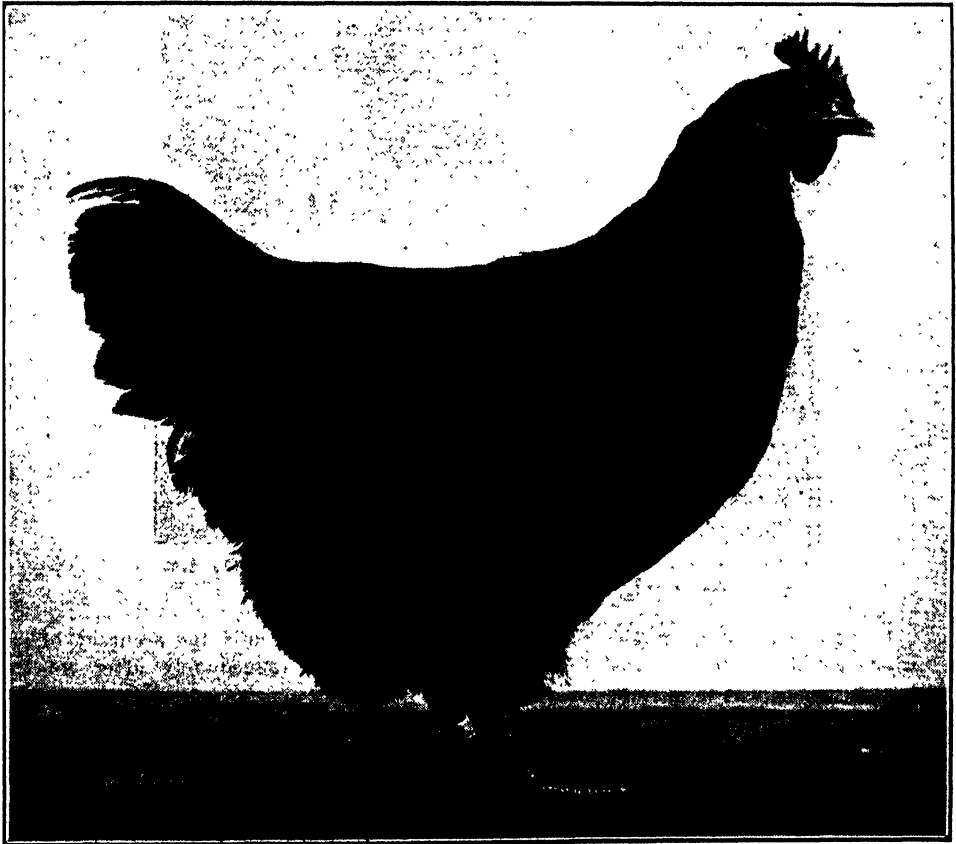
PARAFIELD EGG LAYING COMPETITION, 1933-34.

A GENERAL REVIEW OF THE COMPETITION.

[By C. F. ANDERSON, Government Poultry Expert.]

The Competition was conducted at Parafield Poultry Station, and was all Single Testing. The test commenced on April 1st, 1933, and terminated on March 31st, 1934.

The principal feature of the Competition was the complete revision of the system of weighing. The previous practice of weighing the eggs was to weigh all eggs laid during the month of July, and if 60 per cent. of the eggs weighed were 2ozs. in weight or over the bird was eligible to continue in the test.



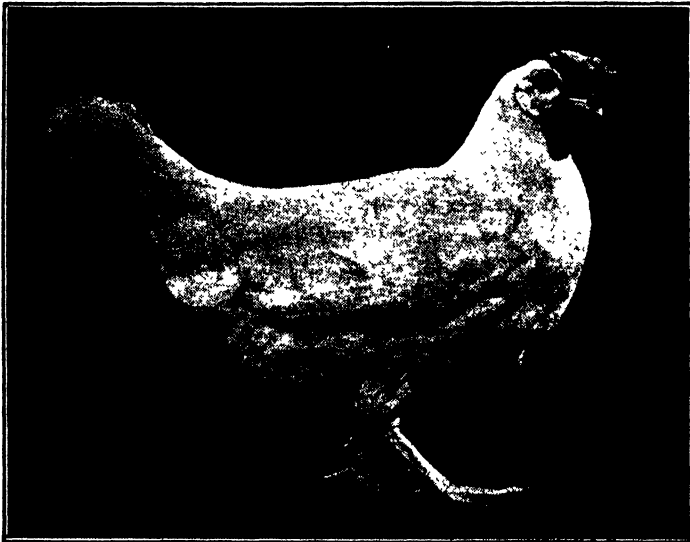
Winning Bird, Section 3, Black Orpington. Highest score in all breeds. Total, 214 first grade eggs, also highest weight of eggs for year of all birds competing. Total weight: 28.8lbs. Owned by Mr. N. F. Richardson, Woodville Park.

This method of weighing had several disadvantages, the principal objection being that a bird might have laid heavily from the commencement of the test, and by the time of the weighing might be going off in production, the size of the egg also declining. Frequently such birds, although probably some of the best birds, would fail to qualify as to the weight of eggs.

Another possibility was that a bird might lay only 3 eggs during the month of July, and if 2 of these eggs were 2ozs. in weight or over, she would be eligible to continue in the test; while a bird might lay 20 eggs or more during the same period, and just fail by 1 or 2 eggs to draw the weight. From a breeding point of view the results were not very satisfactory, as the breeder did not know the number of first-grade eggs the competing birds actually laid.

Like the majority of our other primary industries to-day, the future of the poultry industry is obscure, but if the position of quotas, &c., with regard to our surplus production does come to fruition, it is certain that the first eggs to come under the ban will be the smaller eggs, probably from 1½ozs. downwards. It is therefore essential that every attention be given to the selection of breeding stock, so that the progeny will produce a large number of standard size eggs.

With this object in view, the rules with regard to the weighing of eggs were drastically revised, and it was decided that every egg laid throughout the whole test would be individually and accurately weighed.



Winning Bird, Section 1, White Leghorn, with a total of 184 first grade eggs. Owned by Mr. F. F. Welford, 1, Ludgate Circus, Colonel Light Gardens.

For the purpose of weighing, a special set of scales was built, the accuracy of which could not be disputed. The eggs were weighed immediately after collection, which was usually between 4 and 4.30 p.m.

The following were the conditions of weighing for first grade eggs. All results of the Competition were decided in all sections on the greatest number of first grade eggs laid:—

From 1st April to 31st May a first grade egg was 1½ozs. in weight or over.

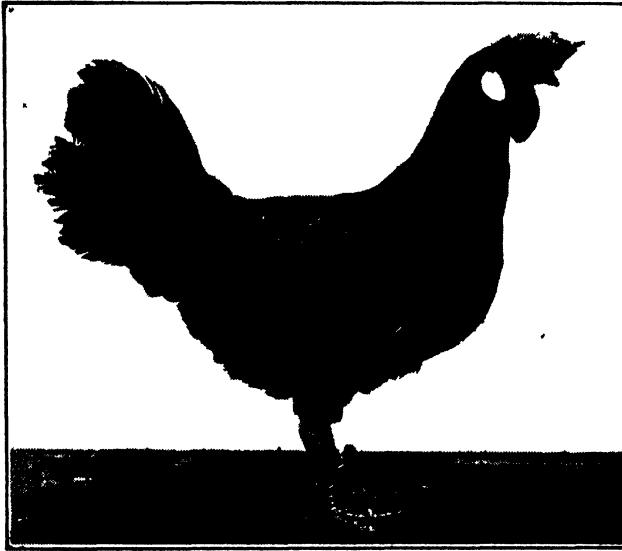
From 1st June to 30th June a first grade egg was 1½ozs. in weight or over.

From 1st July to 31st March a first grade egg was 2ozs. in weight or over.

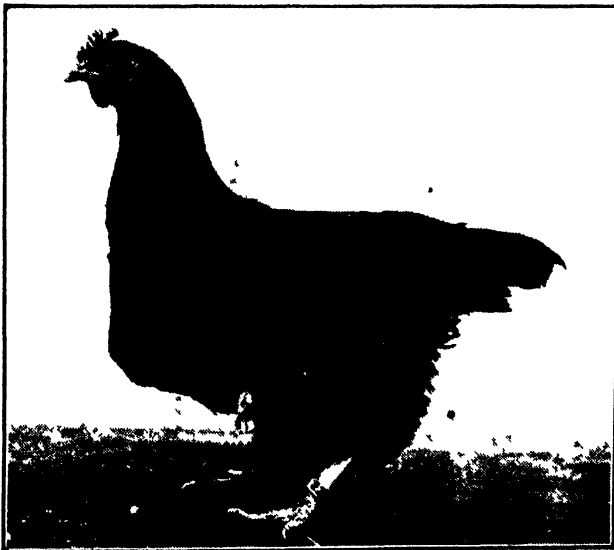
These conditions were very different from the previous system of weighing, and competitors were therefore a little doubtful as to the class of bird to select.

On a general scrutiny of the birds when penned it was very obvious that the majority of competitors had selected birds well forward in laying so as to get as many first grade eggs as possible during the early period of the test, with the

result that a big percentage of the birds went into a moult from the middle of May, and did not come back to satisfactory production until towards the end of July. This fact clearly showed that the majority of the birds were too forward



Black Minorca. Winning Bird, Section 2 Any Other Light Breed, with a score of 156 first grade eggs. Owned by Mr. V. F. Gameau, Findon Road, Woodville.



Rhode Island Red. Winning Bird, Section 4. Score 170 first grade eggs. Owned by Mr. H. J. Mills, Edward Street, Edwardstown.

at the commencement of the test, with the result that the moult was a prolonged one. This position, of course, seriously affected the scores, and the general averages were low.

The season was not generally a good one for high production, especially during the latter two months of the test, when record hot weather was experienced, which also seriously affected the scores. Parafield temperatures are from 2 to 3 degrees higher than those registered in Adelaide.

It should be remembered, however, that with the revision in the method of weighing, which necessitated the selection and breeding of a better class of bird, that high scores could not be expected in the first year of the test. As the tests progress, and the breeders learn the type of bird to breed, the averages will undoubtedly improve.

The final results are a little disappointing to the majority of competitors, but when all conditions are carefully considered, it will be realised that a definite start has been made to raise the standard of the flocks of the State, an effort the necessity for which cannot be over-stressed.

The Competition was divided into 4 sections:—No. 1, White Leghorns; No. 2, Any Other Light Breed; No. 3, Black Orpingtons; No. 4, Any Other Heavy Breed.

The following birds competed:—

No. 1 Section—138 White Leghorns.

No. 2 Section—6 Black Minorcas.

No. 3 Section—75 Black Orpingtons.

No. 4 Section—15 Rhode Island Reds; 3 Barnevelders; 2 Welsumers.

Owing to the method of weighing of eggs, no birds were disqualified for short weight of eggs, only the actual number of first grade eggs being credited to the bird.

Deaths.—During the currency of the Competition 17 birds died, equal to 7 per cent. of the competing birds. The deaths of the breeds were as follows:—

White Leghorns, 3.

Black Orpingtons, 12.

Rhode Island Red, 1.

Barnevelder, 1.

Considering the extreme heat experienced during the last two months of the Competition, the death rate was not high.

The usual Winter Test was conducted, and the leading scores for that period (from 1st April, 1933, to 31st July, 1933) were:—

WHITE LEGHORNS.		Eggs Laid.	Bird No.
<i>Singles—</i>			
F. F. Welford	62	128	
H. H. Hefford	61	67	
A. G. Dawes	59	136	
<i>Trios—</i>			
A. G. Dawes	128	136-138	
R. C. Crittenden	126	34-36	
F. F. Welford	122	127-129.	
B. Cooke	122	19-21	

WHITE LEGHORNS—Continued.

Teams—

F. F. Welford	226	127-132
H. A. Rasmussen.....	214	94-99
H. L. Twartz	192	121-126

MINORCAS.

Singles—

V. F. Gameau	31	139
M. O. and C. A. Roberts	26	143

BLACK ORPINGTONS.

Singles—

A. G. Dawes.....	69	176
W. H. L. Wittenburg	67	208
S. E. Reedman	66	195

WINTER TEST.

Trios—

A. G. Dawes.....	167	202-204
H. J. Mills	155	184-186
N. F. Richardson	148	205-207

Teams—

A. G. Dawes.....	284	175-177 and 202-204
H. J. Mills	284	184-189
W. H. L. Wittenburg	223	208-213
S. E. Reedman	223	193-198

ANY OTHER HEAVY BREEDS.

*Rhode Island Reds.**Singles—*

H. J. Mills	55	229
H. J. Mills	48	230
W. R. Williams	48	232
W. R. Williams	45	233
V. F. Gameau	45	228

Trios—

H. J. Mills	128	229-231
W. R. Williams	123	232-234
W. R. Williams	103	235-237

Teams—

W. R. Williams	226	232-237
V. F. Gameau	151	223-228

The table following shows the average of the various birds for each four week period during the test, the last period is 4 weeks and 1 day.

TABLE I.—*Showing Averages of the Various Breeds for Each Four-week Period.*

Date.	Breed.	No. Birds.	Total Eggs Laid.	No. of First Grade Eggs Laid.	Second Grade Eggs Laid.	Average Eggs Laid per Bird.	Average No. of First Grade Eggs Laid per Bird.	Average No. of Second Grade Eggs Laid per Bird.
1933.								
April 1st to 28th.	White Leghorns.....	138	1,105	973	132	8.00	7.05	.95
	Black Minorcas	6	16	16	—	2.66	2.66	—
	Black Orpingtons	75	576	538	38	7.67	7.17	.50
	Rhode Island Reds ..	18	98	98	—	5.44	5.44	—
	Barnevelders	3	—	—	—	—	—	—
April 29th to May 26th.....	Welsumers	2	—	—	—	—	—	—
	White Leghorns.....	138	1,063	980	83	7.70	7.10	.60
	Black Minorcas	6	17	17	—	2.83	2.83	—
	Black Orpingtons	75	677	622	55	9.02	8.29	.73
	Rhode Island Reds ..	18	139	139	—	7.72	7.72	—
May 27th to June 23rd.	Barnevelders	3	—	—	—	—	—	—
	Welsumers	2	—	—	—	—	—	—
	White Leghorns.....	138	1,006	803	203	7.28	5.81	1.47
	Black Minorcas	6	27	27	—	4.5	4.5	—
	Black Orpingtons	75	767	607	160	10.22	8.09	2.13
June 24th to July 21st.	Rhode Island Reds ..	18	123	118	5	6.83	6.55	.27
	Barnevelders	3	10	10	—	3.33	3.33	—
	Welsumers	2	4	3	1	2	1.5	.5
	White Leghorns.....	138	1,089	793	296	7.89	5.74	2.14
	Minorcas	6	24	24	—	4	4	—
July 22nd to August 18th	Black Orpingtons	74	754	481	273	10.18	6.5	3.68
	Rhode Island Reds ..	18	163	133	30	9.05	7.38	1.66
	Barnevelders	3	7	7	—	2.33	2.33	—
	Welsumers	2	21	13	8	10.5	6.5	4
	White Leghorns.....	138	1,620	1,363	257	11.73	9.87	1.86
	Black Minorcas	6	52	50	2	8.66	8.33	.33
	Black Orpingtons	74	953	686	267	12.87	9.27	3.60

TABLE I.—continued.

Date.	Breed.	No. Birds.	Total Eggs Laid.	No. of First Grade Eggs Laid.	Second Grade Eggs Laid.	Average Eggs Laid per Bird.	Average No. of First Grade Eggs Laid per Bird.	Average No. of Second Grade Eggs Laid per Bird.
1933. August 19th to September 15th	Rhode Island Reds ..	18	188	164	24	10.44	9.11	1.33
	Barnevelders	3	36	36	—	12	12	—
	Wesumers	2	27	16	11	13.5	8	5.5
	White Leghorns	138	1,981	1,707	274	14.35	12.36	1.98
	Black Minorcas	6	54	49	5	9	8.16	.83
	Black Orpingtons	74	1,117	889	228	15.09	12.01	3.08
	Rhode Island Reds ..	18	248	223	25	13.77	12.38	1.38
	Barnevelders	3	45	45	—	15	15	—
	Wesumers	2	32	29	3	16	14.5	1.5
	White Leghorns	138	2,135	1,891	244	15.47	13.70	1.76
September 16th to October 13th	Black Minorcas	6	68	65	3	11.33	10.83	.5
	Black Orpingtons	72	1,184	956	228	16.44	13.27	3.16
	Rhode Island Reds ..	18	233	213	20	12.94	11.83	1.11
	Barnevelders	3	48	48	—	16	16	—
	Wesumers	2	33	21	12	16.5	10.5	6
	White Leghorns	137	2,095	1,621	474	15.29	11.83	3.45
	Black Minorcas	6	78	75	3	13	12.5	.5
	Black Orpingtons	72	1,154	874	280	16.02	12.13	3.88
	Rhode Island Reds ..	18	223	193	30	12.38	10.72	1.66
	Barnevelders	3	44	44	—	14.66	14.66	—
October 14th to November 10th.	Wesumers	2	34	18	16	17	9	8
	White Leghorns	136	2,139	1,627	612	15.72	11.22	4.5
	Black Minorcas	6	73	66	7	12.16	11	1.16
	Black Orpingtons	71	1,061	744	317	14.94	10.47	4.46
	Rhode Island Reds ..	18	224	168	56	12.44	9.33	3.11
	Barnevelders	3	43	42	1	14.33	14	.33
	Wesumers	2	32	16	16	16	8	8
	White Leghorns	136	2,139	1,627	612	15.72	11.22	4.5
	Black Minorcas	6	73	66	7	12.16	11	1.16
	Black Orpingtons	71	1,061	744	317	14.94	10.47	4.46
November 11th to December 8th	Rhode Island Reds ..	18	224	168	56	12.44	9.33	3.11
	Barnevelders	3	43	42	1	14.33	14	.33
	Wesumers	2	32	16	16	16	8	8
	White Leghorns	136	2,139	1,627	612	15.72	11.22	4.5
	Black Minorcas	6	73	66	7	12.16	11	1.16
	Black Orpingtons	71	1,061	744	317	14.94	10.47	4.46
	Rhode Island Reds ..	18	224	168	56	12.44	9.33	3.11
	Barnevelders	3	43	42	1	14.33	14	.33
	Wesumers	2	32	16	16	16	8	8
	White Leghorns	136	2,139	1,627	612	15.72	11.22	4.5

TABLE I.—continued.

Date.	Breed.	No. Birds.	Total Eggs Laid.	No. of First Grade Eggs Laid.	Second Grade Eggs Laid.	Average Eggs Laid per Bird.	Average No. of First Grade Eggs Laid per Bird.	Average No. of Second Grade Eggs Laid per Bird.
December 9th, 1933 to January 5th 1934.	White Leghorns.....	136	2,118	1,580	538	15.57	11.61	3.95
	Black Minorcas	6	57	51	6	9.5	8.5	1
	Black Orpingtons	70	1,010	697	313	14.44	9.95	4.47
	Rhode Island Reds ..	18	144	112	32	8	6.22	1.77
	Barnevelders	3	49	47	2	16.33	15.66	.66
	Wesumers	2	29	18	11	14.5	9	5.5
1934. January 6th to February 2nd. ..	White Leghorns.....	136	2,051	1,291	760	15.08	9.49	5.58
	Black Minorcas	6	70	65	5	11.66	10.83	.83
	Black Orpingtons	65	862	489	373	13.26	7.52	5.73
	Rhode Island Reds ..	18	150	108	42	8.33	6	2.33
	Barnevelders	2	29	28	1	14.5	14	.5
	Wesumers	2	29	16	13	14.5	8	6.5
February 3rd to March 2nd	White Leghorns.....	136	2,064	1,367	697	15.17	10.05	5.12
	Black Minorcas	6	54	48	6	9	8	1
	Black Orpingtons	65	946	520	426	14.55	8	6.55
	Rhode Island Reds ..	18	129	80	49	7.16	4.44	2.72
	Barnevelders	2	28	27	1	14	13.5	.5
	Wesumers	2	32	18	14	16	9	7
March 3rd to March 31st	White Leghorns.....	135	1,679	1,229	450	12.43	9.10	3.33
	Black Minorcas	6	28	28	—	4.66	4.66	—
	Black Orpingtons	63	653	391	262	10.36	6.20	4.15
	Rhode Island Reds ..	17	165	111	54	9.70	6.52	3.17
	Barnevelders	2	30	28	2	15	14	1
	Wesumers	2	15	3	12	7.5	1.5	6

TABLE II.—Average Number of Eggs Laid for the 12 Months by all Competing Birds.

Period: 1st April, 1933, to 31st March, 1934.

Breed.	No. Birds that Completed Test.	No. First Grade Eggs Laid.	Average Number First Grade Eggs Laid.	No. of Second Grade Eggs Laid.	Average No. of Second Grade Eggs Laid.	Average No. of All Eggs Laid.
White Leghorns.....	135	16,823	124 61	4,988	36 94	161 56
Black Minorcas	6	581	96 83	37	6 16	103
Black Orpingtons	63	7,551	119 85	2,897	45 98	165 84
Rhode Island Reds ..	17	1,777	104 52	367	21 58	126 11
Barnevelders	2	290	145 00	5	2 50	147 50
Welsumers	2	171	85 50	117	58 50	144 00

FEEDING.

The method of feeding was similar to that adopted in the previous year, and one that could be readily practised by egg producers.

Morning.—Wet mash, composed of equal parts by weight of bran, pollard, and wholemeal 1lb. meatmeal per 100 birds, and chaffed greenfeed, 40% to 60%, according to the period of the year.

The principal greenfodders used were :—Summer—Lucerne and maize. Winter—Mustard and barley.

Mid-day: Wheat.

Night: Wheat.

The quantities fed per day per bird were:—

Bran, $\frac{1}{2}$ oz.; pollard, $\frac{1}{2}$ oz.; wholemeal, $\frac{1}{2}$ oz.; wheat, 2ozs.

The following table shows the average monthly price of the various foodstuffs delivered at Parafield:—

TABLE III.—Average Monthly Price of Foodstuffs.

Month.	Wheat, per bush.	Bran, per ton.	Pollard, per ton.	Wholemeal, per 60lbs.	Meatmeal, per ton.	Onions, per cwt.
1933.	<i>s. d.</i>	<i>£ s. d.</i>	<i>£ s. d.</i>	<i>s. d.</i>	<i>£</i>	<i>s. d.</i>
April	2 8	4 17 6	4 17 6	4 0	12	3 6
May	3 1 $\frac{1}{2}$	5 2 6	5 2 6	4 0	12	4 6
June	3 1 $\frac{1}{2}$	5 2 6	5 2 6	4 0	12	4 6
July	3 4	5 2 6	5 2 6	4 0	12	4 6
August	3 7	5 2 6	5 2 6	3 6	12	4 6
September	3 4	5 2 6	5 2 6	3 6	12	4 6
October	3 4	5 2 6	5 2 6	3 4	12	2 9
November	3 0	5 2 6	5 2 6	3 4	12	2 9
December	2 6	4 15 0	4 17 6	3 0	12	3 6
1934.						
January	2 6	4 15 0	4 17 6	3 1	12	2 0
February	2 5	4 12 6	4 15 0	3 0	12	2 0
March	2 5	4 12 6	4 15 0	2 10	12	4 6
	Aver. price. 35 33d.	Aver. price. £4 19 2	Aver. price. £5 0 0	Aver. price. 41 58d.	Aver. price. £12	Aver. price. 3s. 7 $\frac{1}{2}$ d.
		= 11 9d. per bushel.	= 1s. per bushel.	or 13 86d. per bushel. of 20lbs.		

The average cost of feeding per bird was 4s. 6d.

The average monthly prices received for eggs were:—

TABLE IV.—Average Monthly Prices for Eggs.

Month.	1½ozs. and Over.	1½ozs.
1933.	per dozen.	per doz.
	<i>s. d.</i>	<i>s. d.</i>
April	1 5	1 2-83
May	1 4	1 3-25
June	1 1½	1 3
July	0 11½	0 8-83
August	0 11	0 8½
September	0 11	0 8½
October	0 11	0 8½
November	0 10	0 7½
December	0 9	0 7
1934.		
January	0 8½	0 7
February	0 11	0 7½
March	1 0	0 8-66

The average price for the year of eggs 1½ozs. in weight and over was 11.802d. per dozen, as compared with 11.33d. per dozen for the year 1932-1933. The average price for 1½oz. eggs was 9.77d. per dozen.

PROFIT OVER COST OF FEEDING.

The average number of all eggs laid by birds under test was 140. This average is very low, being the lowest on record, and is probably due to a part to the revision of the conditions with regard to the weighing of the eggs, combined with the general unfavorable season for egg production.

Allowing for 75 per cent. to be first grade from a marketing point of view, that is, 1½ozs. and over, and 25 per cent. 1½oz. eggs, the return per bird was 10s. 11½d., and the cost of feeding 4s. 6d., leaving a profit over the cost of feeding of 6s. 5½d.

The following were the winning birds in each section:—

FINAL LEADING SCORES, APRIL 1st, 1933, TO MARCH 31st, 1934— FIRST GRADE EGGS ONLY.

WHITE LEGHORNS.		Eggs Laid.	Bird No.
<i>Singles—</i>			
F. F. Welford		184	130
L. A. G. Pitt		181	92
H. H. Hefford		180	67
A. G. Dawes		180	136
<i>Trios—</i>			
A. G. Dawes		464	136-138
L. A. G. Pitt		460	91-93
B. Cooke		453	19-21
T. Duhring		453	43-45
<i>Teams—</i>			
L. A. G. Pitt		879	88-93
W. A. Carter		874	13-18
B. Rowe		844	103-108

MINORCAS.

<i>Singles—</i>			
V. F. Gameau		156	139
M. O. and C. A. Roberts		111	143

BLACK ORPINGTONS.

Singles—

N. F. Richardson	214	205
A. G. Dawes	213	176
H. H. Hefford	206	171

Trios—

N. F. Richardson	532	205-207
H. J. Mills	520	187-189
H. J. Mills	507	184-186

Teams—

H. J. Mills	1,027	184-189
L. H. Crawford	743	151-156
		(only 5 birds competing).
S. E. Reedman	713	193-198

RHODE ISLAND REDS.

Singles—

H. J. Mills	170	229
B. Rowe (Barnevelders)	159	238
V. F. Gameau	153	228

Trios—

H. J. Mills	388	229-231
V. F. Gameau	381	223-225
W. R. Williams	299	232-234

Teams—

V. F. Gameau	629	223-228
		(only 5 birds competing).
W. R. Williams	593	232-237

The greatest weight of eggs were laid by Bird No. 205, a Black Orpington owned by Mr. N. F. Richardson, with a weight of 28.8lbs.

A.—GENERAL SUMMARY OF THE RESULTS.

Number of birds that completed test	225
Average number of all eggs laid	140

Averages of various birds competing :—

	Birds.	Eggs.
Black Orpingtons	63	165-84
White Leghorns	135	161-56
Rhode Island Reds	17	126-11
Minorca	6	103
Barnevelder	2	147-5
Welsumer	2	144

Highest score of individual breeds, only first-grade eggs :—

	Eggs..
Black Orpington	214
White Leghorn	184
Rhode Island Red	170
Black Minorca	156
Barnevelder	159
Welsumer	134

	s. d.
Average cost of food per hen	4 6
Average return per hen	10 11½
Average gross return over cost of feeding	6 5½

FINAL SCORES OF ALL BIRDS, INCLUDING FIRST AND SECOND GRADE EGGS.

Section I (1-138) White Leghorns.

Competitor.	Bird No.	1st Grade	2nd Grade	Total.
E. F. Ashmeade, 398 Magill Road, Kensington Park	1 2 3	150 76 108	— 104 2	150 180 170
L. R. Badcock, 77, Findon Road, Woodville	4 5 6	131 164 131	11 26 37	142 190 168
C. J. C. Burton, Mallala	7 8 9 10 11 12	105 150 75 111 67 159	64 9 137 72 66 3	169 159 212 183 133 162
W. A. Carter, 2, Grosvenor Street, Glandore	13 14 15 16 17 18	142 167 122 146 173 124	9 30 4 28 14 5	151 197 126 174 187 129
B. Cooke, Kanmantoo	19 20 21	162 161 130	21 2 2	183 163 132
H. F. Cox, Samson Rd., Glandville Blocks	22 23 24 25 26 27	85 * 26 120 95 174	21 * 96 1 26 3	106 * 122 121 121 177
L. H. Crawford, Military Road, Grange	28 29 30 31 32 33	71 168 143 77 16 95	20 8 1 84 140 58	91 176 149 161 156 153
B. C. Crittendon, William Street, Kilkenny North	34 35 36	129 162 94	83 33 9	212 195 103
Chas. H. Day, Box 21 Salisbury	37 38 39	175 112 130	— 3 1	175 115 131
J. H. Dowling, Glossop	40 41 42	133 140 125	77 15 12	210 155 137
T. Duhring, Mallala	43 44 45 46 47 48	152 138 163 154 97 115	7 21 2 18 6 —	159 159 165 172 103 115
H. Fidge, 313, Cross Roads, Clarence Park	49 50 51	131 78 104	3 127 15	134 205 119
V. F. Gameau, Findon Road, Woodville	52 53 54	108 147 143	17 28 8	125 175 151
W. Chas. Slape, Magill Road, Magill	55 56 57	164 165 *	3 18 *	167 183 *
G. C. Gavin, Salisbury	58 59 60 61 62 63	129 98 175 150 108 127	7 — 6 25 85 —	136 98 181 175 188 127
Competitor.	Bird No.	1st Grade	2nd Grade	Total
H. H. Hefford, McHenry Street, Murray Bridge	64 65 66 67 68 69	78 84 13 180 120 71	126 92 189 40 47 20	204 176 202 220 167 91
W. H. A. Hodgson, Commercial Rd., Salisbury	70 71 72 73 74 75	135 158 109 118 115 117	31 13 3 24 3 2	166 171 112 142 118 119
E. A. Lamerton, Cross Roads, Edwardstown	76 77 78	128 46 167	— 178 13	128 224 180
C. H. Lines, jun., Box 75 Gladstone	79 80 81 82 83 84	134 157 48 143 151 143	1 72 86 12 42 19	135 229 134 155 193 162
V. F. Gameau, Woodville	85 86 87	137 93 77	30 58 76	167 151 153
L. A. G. Pitt, 24, John Street, Payneham	88 89 90 91 92 93	175 124 120 133 181 146	2 41 23 78 12 17	177 165 143 211 193 163
H. A. Rasmussen, Swan Terrace, Ethelton	94 95 96 97 98 99	38 160 116 148 * 50	56 7 94 3 * 159	94 167 210 151 * 209
S. E. Reedman, 51, Gilbert Street, Gilberton	100 101 102	93 142 79	111 85 4	204 227 83
Bruce Rowe, "St. Kevern," Two Wells	103 104 105 106 107 108	128 146 177 156 110 127	22 4 21 — 80 37	150 150 198 156 190 164
H. J. Stacey, Uraldia	109 110 111 112 113 114	112 146 158 156 137 44	40 12 4 24 55 125	152 158 162 180 192 169
Thomas & Elson, 53, Clifton Street, Hawthorn	115 116 117 118 119 120	25 57 149 121 155 145	150 151 35 21 3 4	175 208 184 142 158 149
H. L. Twarts, Gawler	121 122 123 124 125 126	83 166 160 117 77 149	127 1 19 26 126 18	210 167 179 143 208 167

* Dead.

FINAL SCORES—Continued.

Competitor.	Bird No.	1st Grade	2nd Grade	Total.
F. F. Welford, 1 Ludgate Circus, Colonel Light Gardens	127	141	15	156
	128	140	7	147
	129	76	2	78
	130	184	13	197
	131	172	24	196
	132	42	1	43
A. P. Urlwin, Box 80, Balaklava	133	98	78	176
	134	178	10	188
	135	170	13	183
A. G. Dawes, 230, Portrush Road, Glenunga Gardens	136	180	44	224
	137	138	59	197
	138	146	15	161

Section II. (139-144)—Any other Light Breed.

V. F. Gameau, Findon Road, Woodville (Minorcas)	139	156	2	158
	140	91	1	92
	141	84	3	88
M. O. and C. A. Roberts, Torrens Road, Kilkenny (Minorcas)	142	62	3	65
	143	111	8	119
	144	77	20	97

Section III. (145-219)—Black Orpingtons.

Arthur Cook, 187, Goodwood Road Colonel Light Gardens	145	148	1	149
	146	*	*	*
	147	*	*	*
B. Cooke, Kanmantoo	148	35	175	210
	149	11	114	125
	150	71	135	206
L. H. Crawford, Military Road, Grange	151	118	61	179
	152	111	42	153
	153	159	16	175
	154	176	19	195
	155	179	4	183
	156	*	*	*
Les. Darvy, Mypolonga	157	173	16	189
	158	119	31	150
	159	*	*	*
	160	77	91	168
	161	126	42	168
	162	60	70	130
J. H. Dowling, Glossop	163	93	51	144
	164	56	59	115
	165	23	75	98
H. Fidge, 313, Cross Roads, Clarence Park	166	*	*	*
	167	70	57	127
	168	76	80	156
H. H. Hefford, McHenry Street, Murray Bridge	169	100	78	178
	170	*	*	*
	171	206	9	215
F. J. Hudson, 54, Willcox Avenue, Prospect	172	83	107	190
	173	149	65	214
	174	38	164	202
A. G. Dawes, 230, Portrush Road, Glenunga Gardens	175	*	*	*
	176	213	7	220
	177	77	67	144
C. H. Lines, jun., Box 75, Gladstone	178	117	80	197
	179	*	*	*
	180	127	5	132
	181	109	13	122
	182	81	71	152
	183	141	19	160

* Dead.

Competitor.	Bird No.	1st Grade	2nd Grade	Total
H. J. Mills, Edward Street, Edwardstown	184	168	12	180
	185	187	—	187
	186	152	1	153
	187	178	40	218
	188	167	23	190
	189	175	16	191
J. Rawe, Honeyton Street, Seaton Park	190	173	10	183
	191	83	43	126
	192	*	*	*
S. E. Reedman, 51, Gilbert Street, Gilberton	193	130	82	212
	194	87	99	186
	195	125	71	196
	196	81	21	102
	197	158	19	177
	198	132	23	155
H. L. Twartz, Gawler	199	47	168	215
	200	125	86	211
	201	125	40	165
A. G. Dawes, 230, Portrush Road, Glenunga Gardens	202	182	9	191
	203	144	70	214
	204	*	*	*
N. F. Richardson, 60, Beaufort Street, Woodville Park, Kilkenny	205	214	5	219
	206	166	30	196
	207	152	15	167
W. H. L. Wittenberg, 3, Rushton Street, Goodwood	208	128	27	155
	209	41	2	43
	210	62	33	95
	211	76	78	154
	212	135	11	146
	213	174	1	175
W. Woodley, Tailem Bend	214	24	3	27
	215	*	*	*
	216	116	28	144
	217	167	4	171
	218	155	3	158
	219	*	*	*

Section IV. (220-243)—Any other Heavy Breed.

H. Fidge, 313, Cross Roads, Clarence Park (Rhode Island Reds.)	220	51	34	85
	221	62	52	114
	222	54	11	65
V. F. Gameau, Findon Road, Woodville (Rhode Island Reds)	223	146	3	149
	224	109	2	111
	225	126	6	132
	226	95	5	100
	227	*	*	*
	228	153	4	157
H. J. Mills, Edward Street, Edwardstown (Rhode Island Reds)	229	170	6	176
	230	129	1	130
	231	89	31	120
W. R. Williams, 28, Avenue Road Frewville (Rhode Island Reds.)	232	91	54	145
	233	108	1	109
	234	100	—	100
	235	108	20	128
	236	42	103	145
	237	144	34	178
Bruce Rowe, "St. Kevern" Two Wells. (Barnevelders.)	238	150	4	163
	239	131	1	132
	240	*	*	*
Bruce Rowe, "St. Kevern," Two Wells. (Welsumers.)	241	37	117	154
	242	184	—	184
	243	†	†	†

† Did not compete.

RECORD OF EGGS LAID BY BIRDS THAT DIED DURING CURRENCY OF TEST

SECTION 1.—WHITE LEGHORNS.

Competitor.	Bird No.	Date of Death.	First Grade Eggs Laid.	Second Grade Eggs Laid.	Total Eggs Laid.
H. F. Cox, Glanville Blocks	23	25/8/33	39	15	54
W. C. Slape, Magill	57	3/3/34	164	3	167
H. A. Rasmussen, Ethelton	98	12/11/33	77	16	93

SECTION 3.—BLACK ORPINGTONS.

Arthur Cook, Colonel Light Gardens	{ 146	5/3/34	173	5	178
	147	23/1/34	98	45	143
L. H. Crawford, Grange	156	23/1/34	152	29	181
Les. Darcy, Mypolonga	159	2/2/34	116	6	122
H. Fidge, Clarence Park	166	16/3/34	150	41	191
H. H. Hefford, Murray Bridge....	170	17/1/34	17	93	110
A. G. Dawes, Glenunga	175	16/11/33	34	86	120
C. H. Lines, jun., Gladstone.....	179	17/1/34	48	10	58
J. Rawe, Seaton Park	192	12/10/33	—	—	—
A. G. Dawes, Glenunga	204	6/7/33	42	2	44
W. Woodley, Taillem Bend	{ 215	12/10/33	40	4	44
	219	23/11/33	80	1	81

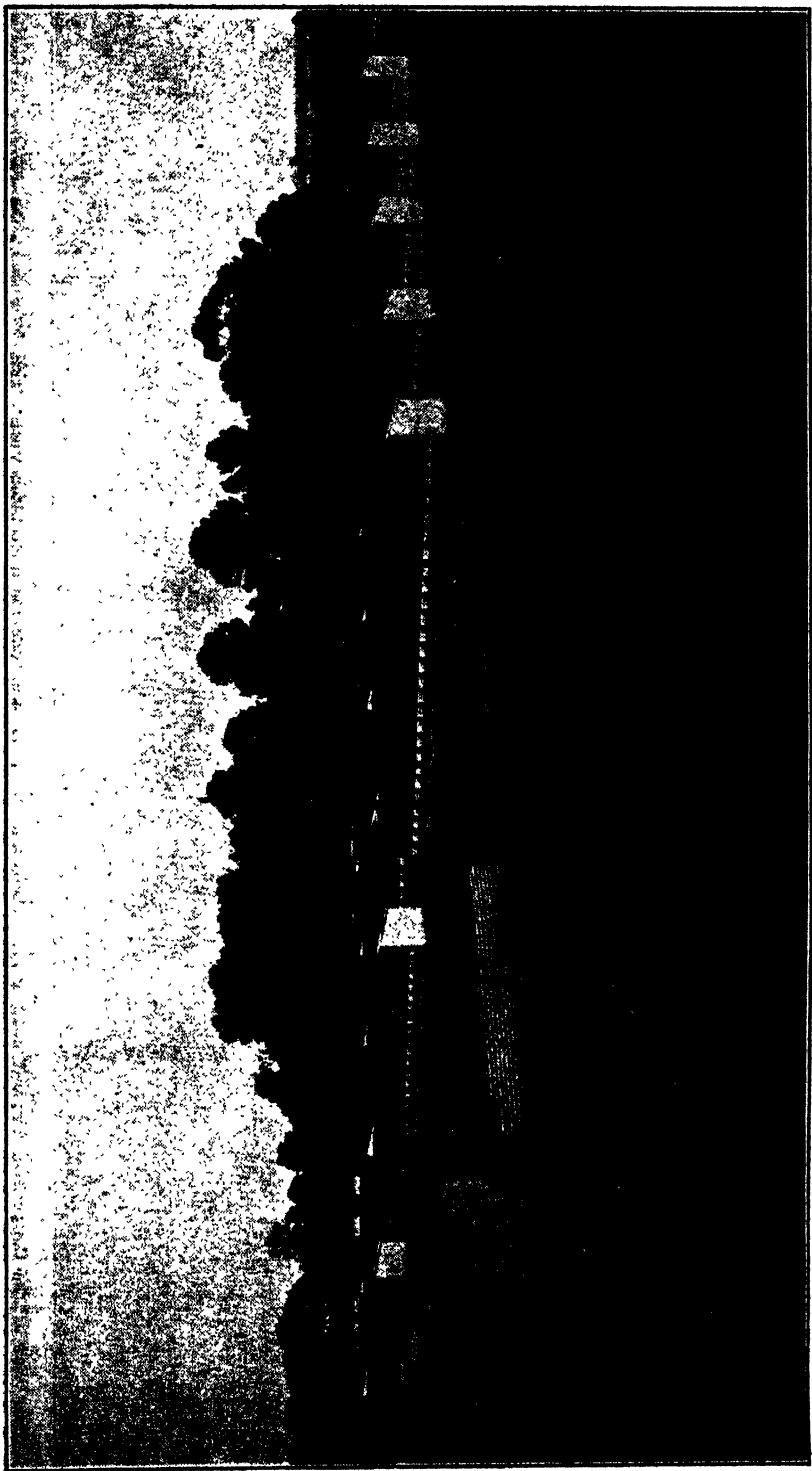
SECTION 4.—ANY OTHER HEAVY BREED.

V. F. Gameau, Woodville (Rhode Island Red)	227	16/3/34	83	—	83
Bruce Rowe, Two Wells (Barnevelder)	240	5/1/34	72	1	73

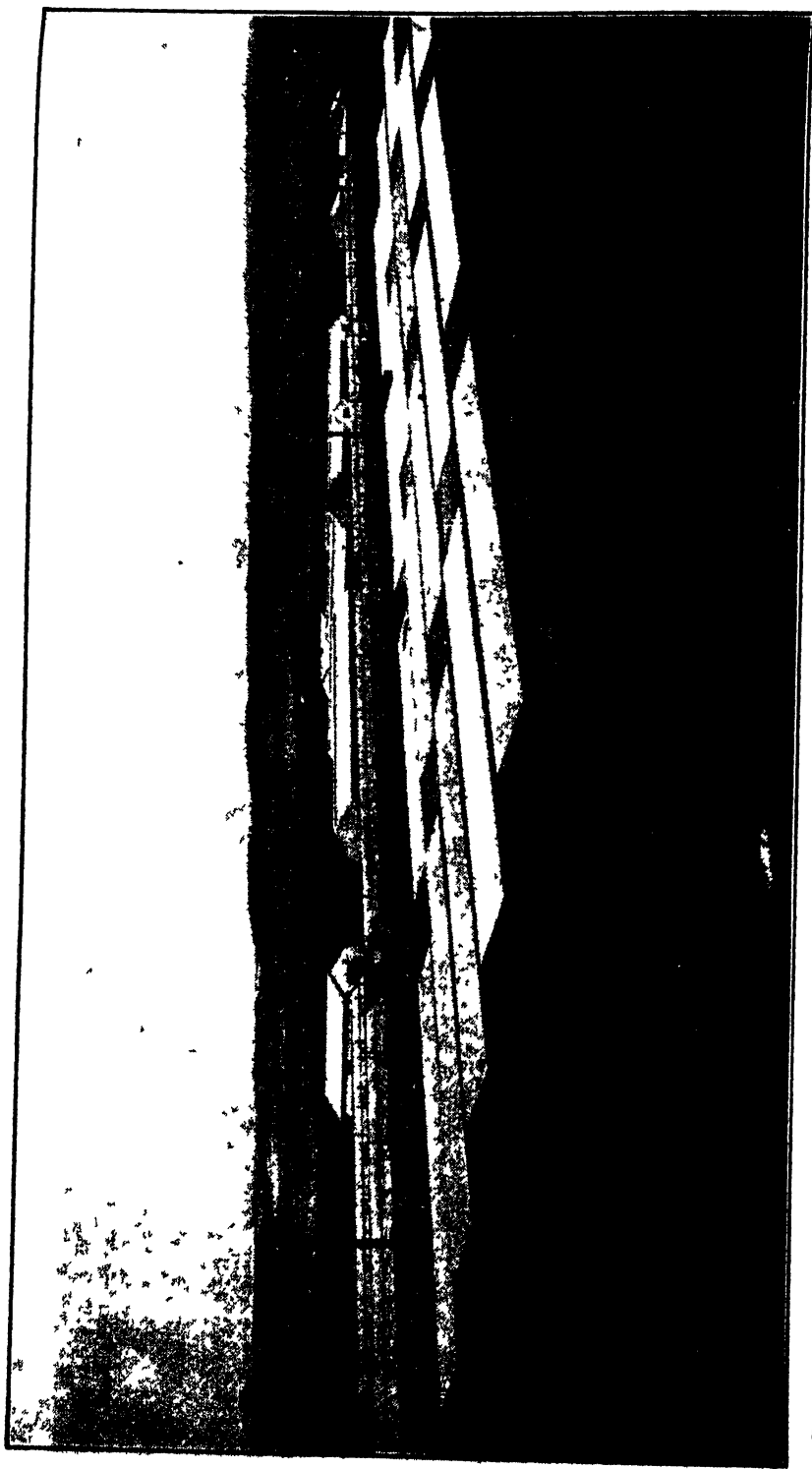
THE 1934-1935 TESTS.

To encourage further the official testing of stock, the Government erected an additional 258 single testing pens for the tests, and the following entries were received:—

White Leghorns.....	364
Cuckoo Leghorns.....	3
Black Orpingtons	75
Rhode Island Reds	25
Black Minorcas	12
Barnevelders	3
Langshans	3
Total	485



Front view of Competition Pens, showing the general design of pens, also feeding troughs on the doors.



Rear view of the Competition Single Testing Pens. There are 501 pens available for competition work. This view shows the watering system and ventilation. There is a space of 14ft between each row of pens.

SINGLE TEST EGG-LAYING COMPETITION, 1934-35.

SECTION 1.—WET MASH.

Class No 1—White Leghorns.

Competitor	Bird No	First Grade Eggs for Month Ending April 30th, 1934 Progressive Totals	Competitor	Bird No	First Grade Eggs for Month Ending April 30th, 1934 Progressive Totals
A. J. Hill, Sunraysia Poultry Farm, Greensborough, Victoria	1	7	C. Guthridge, Yundi	49	4
	2	10		50	20
	3	4		51	16
	4	—		52	1
	5	5		53	9
	6	—		54	3
		26			53
A. H. Matthews, Bridgewater	7	18	S. Lambert, Echunga	55	10
	8	11		56	11
	9	13		57	3
	10	16		58	10
	11	14		59	—
	12	7		60	1
		79			35
G. W. T. Symes, Echunga	13	12	A. Young, Bridgewater	61	18
	14	4		62	12
	15	—		63	9
	16	3		64	15
	17	14		65	12
	18	8		66	16
		41			82
E. B. Gliddon, Yundi	19	11	D. J. Foxwell, Echunga	67	2
	20	13		68	—
	21	3		69	18
	22	—		70	—
	23	—		71	12
	24	7		72	2
		34			34
T. Cleaver, Bridgewater	25	13	J. C. Normandale, Yundi	73	4
	26	5		74	—
	27	11		75	—
	28	3		76	18
	29	15		77	13
	30	—		78	14
		47			49
J. E. Assender, Echunga	31	10	L. W. Sando, Echunga	79	7
	32	2		80	9
	33	12		81	7
	34	13		82	15
	35	6		83	11
	36	10		84	9
		58			58
S. Hill, Bridgewater	37	—	J. O. Marshall, Yundi	85	12
	38	7		86	17
	39	18		87	15
	40	12		88	6
	41	12		89	12
	42	10		90	3
		59			65
W. Rostall, Echunga	43	13	Murray Powell, Jupiter Creek	91	9
	44	7		92	11
	45	8		93	16
	46	13		94	2
	47	—		95	10
	48	16		96	7
		57			55

EGG-LAY

Competitor.	Bird No.	First Grade Eggs for Month Ending April 30th, 1934. Progressive Totals	Competitor.	Bird No.	First Grade Eggs for Month Ending April 30th, 1934. Progressive Totals.
S. Bridge, Yundi	97	11	H. F. Muirson, Yundi	151	2
	98	17		152	17
	99	11		153	4
	100	3		154	2
	101	2		155	12
	102	10		156	8
		54			45
C. T. Rodger, Echunga	103	20	K. Pennack, Pooraka	157	—
	104	3		158	4
	105	12		159	14
	106	—		160	15
	107	14		161	17
	108	—		162	5
		49			55
R. H. Smith, Yundi	109	2	C. A. L. Sandstrom, Yundi	163	5
	110	4		164	—
	111	13		165	8
	112	—		166	16
	113	5		167	8
	114	2		168	—
		26			37
Willow Bend Stud Poultry Farm, North Walkerville	115	6	G. A. Bielby, Pooraka	169	3
	116	6		170	5
	117	12		171	8
	118	—		172	15
	119	13		173	3
	120	13		174	15
		50			49
C. MacDonald, Echunga	121	1	W. M. Field, Yundi	175	4
	122	12		176	6
	123	19		177	11
	124	16		178	4
	125	9		179	1
	126	17		180	11
		74			37
T. R. Smart, Yundi	127	12	T. Duhring, Mallala	181	16
	128	14		182	13
	129	10		183	13
	130	2		184	17
	131	1		185	6
	132	16		186	12
		55			77
Raymoor Poultry Farm, William Street, Kilkeny	133	—	W. R. Hedger, Yundi	187	18
	134	—		188	18
	135	—		189	6
	136	11		190	14
	137	8		191	15
	138	10		192	—
		29			71
B. B. Whittington, Yundi	139	8	A. & H. Gurr, Bradbury	193	6
	140	14		194	7
	141	17		195	2
	142	3		196	10
	143	9		197	14
	144	16		198	—
		67			39
W. A. Halseal, 11, Rosetta Street, Rosewater	145	—	J. V. McGinnis, Yundi	199	3
	146	15		200	6
	147	—		201	2
	148	—		202	—
	149	17		203	—
	150	5		204	—
		37			11

EGG-LAYING COMPETITION—Continued.

Competitor.	Bird No.	First Grade Eggs for Month Ending April 30th, 1934. Progressive Totals.	Competitor.	Bird No.	First Grade Eggs for Month Ending April 30th, 1934. Progressive Totals.
A. G. Dawes, 230, Portrush Road, Glenunga Gardens	205	20	W. R. Williams, 28, Avenue Road, Frewville	259	19
	206	6		260	6
	207	17		261	5
	208	1		262	14
	209	—		263	9
	210	16		264	13
		60			66
W. C. Jones, Yundi	211	1	R. W. McAllister, Yundi	265	4
	212	14		266	—
	213	2		267	2
	214	18		268	6
	215	12		269	8
	216	—		270	15
		47			35
Langmaid & Bettison, Parahfield, Salisbury	217	—	G. W. Sykes, Yundi	271	14
	218	—		272	14
	219	9		273	12
	220	6		274	16
	221	1		275	7
	222	8		276	11
		24			74
A. Jarvis, Yundi	223	0	A. P. Urlwin, Balaklava	277	4
	224	5		278	6
	225	—		279	7
	226	11			17
	227	—	A. V. Dupen, Melton Street, Glenelg	280	1
	228	2		281	17
		27		282	4
S. Eyles, Clarendon	229	4			22
	230	7	F. F. Welford, Ludgate Circus, Colonel Light Gardens	283	11
	231	10		284	14
	232	16		285	8
	233	16			33
	234	5	Thomas & Elson, Clifton Street, Hawthorn	286	7
		58		287	5
Woodbury Poultry Farm, Stirling East	235	2		288	15
	236	—			27
	237	1	J. H. Dowling, Glossop, River Murray	289	11
	238	—		290	6
	239	—		291	17
	240	—			34
		3	E. Pape, Wynarka	292	—
V. F. Gameau, Findon Road, Woodville	241	12		293	1
	242	5		294	2
	243	5			3
	244	5	L. S. Ekers, Mount Jagged Farm, Mount Compass	295	14
	245	—		296	6
	246	10		297	9
		37			29
Geo. Lomax, Yundi	247	14	V. E. Williams, 57, Fairford Terrace, Semaphore Park	298	4
	248	5		299	1
	249	1		300	14
	250	7			19
	251	—	L. R. Badcock, 77, Findon Road, Woodville	301	1
	252	6		302	18
		33		303	16
H. L. Bastin, Southern Cross Poultry Farm, Pooraka	253	8			35
	254	16			
	255	12			
	256	1			
	257	6			
	258	5			
		48			

EGG-LAYING COMPETITION *Continued*

Competitor.	Bird No.	First Grade Eggs for Month Ending April 30th, 1934. Progressive Totals.	Competitor.	Bird No.	First Grade Eggs for Month Ending April 30th, 1934. Progressive Totals.
W. H. A. Hodgson, Commercial Road, Salisbury.	304 305 306	6 5 18	V. F. Gameau, Findon Road, Woodville (Minorcas)	328 329 330	— 3 3
		29			6
Gallagher & Aslin, Pooraka	307 308 309	16 10 11	A. Heysman, Government Road, Eden Hills (Cuckoo Leghorns)	331 332 333	7 9 5
		43			21
R. C. Crittenden, William Street, Kilkenny North	310 311 312	19 6 2	Langmaid & Bettison, Parafield, Salisbury (Black Minorcas)	471 472 473	— 1 11
		27			12
C. H. Lines, Junr., Gladstone	313 314 315	— 3 —	Total Class No. 2.		47
		3	Class No. 3.—Black Orpingtons.		
A. J. Monkhouse, Woodside	316 317 318	12 3 4		334 335 336 337 338 339	11 12 17 2 1 16
		19			59
B. Cooke, Kanmantoo	319 320 321	18 19 16		340 341 342 343 344 345	15 2 11 3 15 9
		53			55
Gallagher & Aslin, Pooraka	464 465 466	7 7 5		346 347 348 349 350 351	14 4 — — — —
		19			18
The above birds are White Leghorns, and together with Nos. 307 and 309, will constitute a team in this class.			Willow Bend Stud Poultry Farm, North Walkerville		
	467 468 469	1 8 7		352 353 354 355 356 357	— 1 13 1 14 —
W. C. Slape, Magill		16			29
	474 475 476 477 478 479	18 7 15 9 16 15		358 359 360 361 362 363	3 2 3 1 — 5
		80			14
Total Class 1. . .		2,709	A. C. Byrne, 114, Rose Terrace, Wayville West		
				364 365 366	4 7 10
Class 2.—Any Other Light Breeds.					21
M. O. & C. A. Roberts, Torrens Road, Kilkenny (Minorcas)	322 323 324	— — —	W. R. Williams, 28, Avenue Road, Frewville		
		—		367 368 369	— — —
G. Frisby Smitn, Fulham (Minorcas)	325 326 327	5 1 2			—
		8			—

EGG-LAYING COMPETITION—Continued.

Competitor.	Bird No.	First Grade Eggs for Month Ending April 30th, 1934.	Progressive Totals.
J. H. Dowling, Glossop, River Murray	270 371 372	— — 2	2
F. F. Welford, Ludgate Circus, Colonel Light Gardens	373 374 375	10 2 19	31
Mrs. M. Specht, Holder Avenue, Richmond	376 377 378	14 1 15	30
W. Rentoul Christie, Claremont Avenue, Mitcham	379 380 381	1 3 —	4
G. Frisby Smith, Fulham House, Fulham	382 383 384	— — —	—
B. Cooke, Kanmantoo	385 386 387	18 18 22	58
Willow Bend Stud Poultry Farm, North Walkerville	480 481 482 483 484 485	14 8 6 2 14 —	44
F. F. Welford, Ludgate Circus, Colonel Light Gardens	458 459 460	19 16 24	90
The above birds are Black Orpingtons and, together with Nos. 373-375, will constitute a team in Class No. 3.			
Total Class No. 3.			424
Class No. 4.—Any other Heavy Breed.			
A. G. Dawes Portrush Road, Glenunga Gardens (Rhode Island Reds.)	388 389 390 391 392 393	9 13 17 — 14 2	55
A. G. Dawes, Portrush Road, Glenunga Gardens (Rhode Island Reds.)	394 395 396 397 398 399	— 20 17 9 8 13	67
E. F. Snow, 18, Mt. Barker Road, Glen Osmond (Rhode Island Reds.)	400 401 402	14 2 19	35
W. R. Williams, Avenue Road, Frewville (Rhode Island Reds.)	403 404 405	— — —	—
Woodbury Poultry Farm, Stirling East (Rhode Island Reds.)	406 407 408	13 21 16	50
V. F. Gameau, Findon Road Woodville (Rhode Island Reds.)	409 410 411	6 — 1	7
K. Pennack, Pooraka (Barnevelders.)	412 413 414	16 10 18	44
G. W. Lindsay, Torrens Road Kilkenny (Langshans)	461 462 463	14 1 1	16
Total Class No. 4.			274
Class No. 5—White Leghorns.			
A. O. Dawkins, Gawler	415 416 417 418 419 420	4 6 13 15 13 9	63
A. V. Dupen, Melton Street, Glenelg	421 422 423	6 6 11	23
A. J. Monkhouse, Woodside	424 425 426	15 14 12	41
Total Class No. 5.			127
Class No. 7.—Black Orpingtons.			
A. C. Byrne, 114, Rose Terrace, Wayville West	427 428 429 430 431 432	— — — — — —	—
G. Frisby Smith, Fulham House, Fulham	433 434 435	— 18 14	32
Total Class No. 7.			32

EGG-LAYING COMPETITION—Continued.

Competitor.	Bird No.	First Grade Eggs for Month Ending April 30th, 1934. Progressive Totals.	Competitor.	Bird No.	First Grade Eggs for Month Ending April 30th, 1934. Progressive Totals.
<i>Home Project Utility Section.—Wet Mash.</i>			Kevin Angus, Mallala School	449	2
John Plummer, Virginia School	436	—	Alwin Scott, Wellington Road School	450	10
Dudley Harper, Murray Bridge School	437	2	Jack Dietman, Wellington Road School	451	10
Jack Beauchamp, Murray Bridge School	438	1	Milton Smith, Salisbury School	452	20
Jack Beauchamp, Murray Bridge School	439	11	Owen Robinson, Ascot Park School	453	—
George Bielby, Abattoirs School	440	17	Paul Mundy, Girrae High School	454	18
Eric Pratt, Abattoirs School	441	5	Max Couche, Thebarton School	455	17
Stanley Pratt, Abattoirs School	442	7	Robert Swift, Murray Bridge School	456	16
Mervyn Steer, Sturt School	443	12	Bruce Dooland, Thebarton Central School	457	3
Donald Welford, Westbourne Park School	444	3	Ian Slec, Two Wells School	470	4
E. Zbierski, Gawler School	445	16	Total		199
J. McInerney, Gawler School	446	5	All birds in this section are White Leghorns, with the exception of 455 (Rhode Island Red) and 444, 456, and 457 (Black Orpingtons).		
F. Martin, Gawler School	447	12			
Darcy Coleman, Mallala School	448	8			

DEPARTMENT OF AGRICULTURE.

SINGLE TEST EGG-LAYING COMPETITION, 1934-35.

Conducted at Parafield Poultry Station.

LEADING SCORES TO WEEK ENDING APRIL 28th, 1934.—FIRST GRADE EGGS ONLY.

SECTION 1.—WET MASH.

Class 1.—White Leghorns.

Singles—

	Eggs Laid.	Bird No.
C. T. Rodger	20	103
C. Guthridge	20	50
A. G. Dawes	20	205

Trios—

B. Cooke	53	319-321
J. C. Normandale	45	76-78
J. O. Marshall	44	85-87

Teams—

A. Young	82	61-66
Willowbend Stud Poultry Farm	80	474-479
A. H. Matthews	79	7-12

SECTION 1.—WET MASH—continued.

<i>Singles—</i>	Eggs Laid.	Bird No.
<i>Class 2.—Any other Light Breeds.</i>		
<i>Singles—</i>		
Langmaid & Bettison (Black Minorcas)	11	473
A. Heaysman (Cuckoo Leghorn)	9	332
A. Heaysman (Cuckoo Leghorn)	7	331
<i>Trios—</i>		
A. Heaysman (Cuckoo Leghorn)	21	331-333
Langmaid & Bettison (Black Minorcas)	12	471-473
<i>Class 3.—Black Orpingtons.</i>		
<i>Singles—</i>		
F. F. Welford	24	460
B. Cooke	22	387
F. F. Welford	19	458
F. F. Welford	19	375
<i>Trios—</i>		
F. F. Welford	59	458-460
B. Cooke	58	385-387
H. J. Mill	40	334-336
<i>Teams—</i>		
F. F. Welford	90	373-375 & 458-460
H. J. Mills	59	334-339
A. G. Dawes	55	340-345
<i>Class 4.—Any other Heavy Breed.</i>		
<i>Singles—</i>		
Woodbury Poultry Farm (Rhode Island Red)	21	407
A. G. Dawes (Rhode Island Red)	20	395
E. F. Snow (Rhode Island Red)	19	402
<i>Trios—</i>		
Woodbury Poultry Farm (Rhode Island Red)	50	406-408
K. Pennack (Barnevelders)	44	412-414
A. G. Dawes (Rhode Island Red)	39	388-390
<i>Teams—</i>		
A. G. Dawes (Rhode Island Red)	67	394-399
A. G. Dawes (Rhode Island Red)	55	388-393

SECTION 2.—DRY MASH.

Class 5.—White Leghorns.

<i>Singles—</i>		
A. O. Dawkins	18	418
A. J. Monkhouse	15	424
A. J. Monkhouse	14	425
<i>Trios—</i>		
A. J. Monkhouse	41	424-426
A. O. Dawkins	40	418-420
<i>Teams—</i>		
A. O. Dawkins	63	415-420

Class 7.—Black Orpingtons.

<i>Singles—</i>		
G. Frisby Smith	18	434

HOME PROJECT UTILITY SECTION.

Name.	School.	Breed.	Eggs Laid.	Bird No.
Milton Smith, Salisbury .. .		White Leghorn .. .	20	452
Paul Mundy, Urrbrae High .. .		White Leghorn .. .	18	454
Max Couche, Theberton .. .		Rhode Island Red .. .	17	455
George Bielby, Abattoirs .. .		White Leghorn .. .	17	440
Robert Swift, Murray Bridge .. .		Black Orpington .. .	16	456

GRASS HAY COMPETITION.

SOUTH-EASTERN DISTRICT—SEASON, 1934.

(Judged by Mr. E. S. Alcock, Agricultural Instructor.)

DETAILS OF ENTRIES.

Position.	Name.	Address.	Suitability of Plants. 25	Curing. 25	Stage of Cutting. 15	Apparent Nutritive Value. 25	Storing. 10	Total. 100
1	Wookey, R. .	Robe . . .	24	24	14	24	9	95
2	Sims, I. . . .	Glencoe ..	23	24	14	23	8	92
3	Chambers, W. K.	Mil Lol ...	21	22	13	22	8	86
4	Fartch Bros..	Burrungule	23	20	11	20	7	81
5	Kemp, A. C..	Hatherleigh	20	20	12	21	7	80

THE WINNING ENTRY.

Mr. Alcock's remarks on the winning entry were as follows :—

A very good entry. The hay was cut from a fine paddock, comprising portion of a reclaimed swamp, in which Strawberry Clover, King Island Melilotus, Rib Grass, Black Medic and various grasses, including Perennial Rye Grass, were growing. The weather had delayed the carting, but nevertheless the material was in good condition, and except for being a little dry and brittle, had cured out to a fodder of satisfactory quality and colour. This hay had been cut before the grasses were too far advanced. It was well stacked and thatched with cutting grass.

MAIZE CROP COMPETITION AT MOUNT GAMBIER.

The following are the results of the maize crop competition judged by Mr. W. H. Downes (Dairy Instructor) and conducted under the auspices of the local Agricultural Bureau and the Agricultural and Horticultural Society :—

Competitor.	Variety.	Date Sown.	Date Judged.	Previous Crop.	Apparent Yield.	Germination	Cultivation and cleanliness.	Foliage and general appearance.	Evenness.	Freedom from Disease.
M. E. A. Kannenberg (3)	Ninety Day .	Jan. 6	April 21	Maize	(35) 25	(15) 12½	(15) 14	(15) 12	(10) 8	(10) 10
S. Norman.....	Hickory King	Oct. 23	Feb. 16	Grass	27	12	13	11	8	10
J. Hyde	Flat Red ...	Nov. 25	Mar. 1	Maize	28	11	14	9	7½	10
E. E. A. Kannenberg (2)	Ninety Day .	Dec. 13	Mar. 28	Maize	22	13½	14	10	8½	10
E. E. A. Kannenberg (1)	Hickory King	Nov. 22	Mar. 28	Maize	25	12	14	9	7	10

In commenting on the Competition Mr. Downes states:—"The foregoing results indicate the close nature of the Competition with a limited number of entries. The season was not an ideal one for the growing of green maize crops on account of the scarcity of rain during the principal growing period. Despite this fact, however, each of the entries was a well-grown crop, in every way worthy of competition. The winning crop, Mr. E. E. Kannenberg's No. 3 entry, consisted of an excellent stand of 'Ninety Day.' This was the final crop judged, and therefore secured some benefit from the March and early April rains. An excellent germination was secured, and the crop was of good medium height, with an abundance of slender stalks well covered with good green leafage and well-formed cobs. Cultivation was also very clean. Mr. S. Norman secured second place with a nicely grown crop of Hickory King. This crop was the first one to be judged in the Competition, so it probably secured less rain than any of the other entries. Its achievement in securing second position is all

the more meritorious. The fact that it was grown on land of practically virgin character, possessing a good sound subsoil, may have helped considerably. When judged on February 16th it presented a nice green appearance, with a few withered leaves. A crop of medium height, slightly uneven, which should yield well, but showed a little weed growth, chiefly 'fat hen.' A crop of Flat Red owned by Mr. J. Hyde occupied third position. This was of good height, and should yield well, though a little uneven. Cultivation was well done, and a fair germination had been secured, but the crop was commencing to wither badly on account of drying winds experienced and lack of rain. If anything, this crop was inclined to be a little coarse stemmed for grain fodder purposes. Mr. E. E. A. Kannenberg's No. 1 entry was a fair crop of fine-stemmed plants, but showed evidence of dry conditions in the withered condition of leaves. His No. 2 entry was in slightly better condition and germinated exceptionally well, but would yield poorly.'

PARAFIELD POULTRY STATION.

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WHITE LEGHORNS.

EGGS.—7s. 6d. per Setting of 15 Eggs. Incubator Lots, £2 per 100.

DAY OLD CHICKENS.—15s. per dozen; £4 per 100.

BLACK MINORCAS.

EGGS.—7s. 6d. per Setting of 15 Eggs. Incubator Lots, £2 per 100.

DAY OLD CHICKENS.—15s. per dozen; £4 per 100.

**Free on Rail,
Salisbury.**

**DELIVERY.—CHICKS—July to September.
EGGS—July to September.**

Intending breeders should recognise the importance of establishing their flocks with only the very best of stock also, pay particular care to the size of the egg. The future of the poultry industry in South Australia is almost entirely dependent on the export trade; the size of the egg for export is of the greatest importance. The breeding stock at Parafield is carefully selected and every egg set or sold is of a minimum weight of 2ozs., and a large percentage considerably over.

All Eggs and Chickens sold from Parafield Poultry Station are guaranteed to be produced at Parafield.

EARLY BOOKING IS ADVISABLE.

Further particulars can be obtained from the Manager, Parafield Poultry Station, Salisbury, or Poultry Expert, Department of Agriculture, Flinders Street, Adelaide.

G. F. ANDERSON, Poultry Expert.

LAKE ALBERT AND JERVOIS HERD TESTING ASSOCIATION (formerly Lake Albert).

RESULTS OF BUTTERFAT TESTS FOR MARCH, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during March.	Per Cow during March.	Per Cow December to March.	Per Herd during March.	Per Cow during March.	Per Cow December to March.	
			Lbs	Lbs	Lbs	Lbs	Lbs	Lbs	%
6/B ..	17-39	12-19	3,411½	196-17	1,672-96	186-19	10-71	84-52	5-46
6/C ..	20-68	16-87	7,896½	381-84	2,216-76	365-31	17-66	94-82	4-68
6/H ..	23	7-32	3,477½	151-19	1,524-92	176-21	7-66	78-95	5-07
6/Y ..	15	13-55	6,919½	462-23	2,135-44	315-16	21-03	93-49	4-48
6/I ..	23-84	22-23	17,205	721-68	3,111-88	745-64	31-28	133-30	4-38
6/LL ..	24	16-16	11,097½	462-39	2,304-22	415-76	17-32	89-11	3-75
6/O ..	20	17-61	12,044	602-20	2,886-74	577-28	28-86	134-71	4-79
6/PP ..	15	11-84	7,161½	477-43	2,467-04	375-50	25-03	123-83	5-14
6/RR ..	29	24-68	19,508½	672-71	3,462-46	808-59	27-88	142-09	4-14
6/TT ..	18-65	15-39	12,649	678-23	2,972-09	582-94	31-26	132-40	4-61
6/XX ..	24-42	22	14,900	610-15	2,985-14	671-72	27-51	131-37	4-51
6/ZZ ..	28-06	21-94	15,912	545-89	2,537-13	788-34	27-13	120-70	4-97
6/BBB ..	23-77	19-81	14,946½	628-79	2,700-86	678-12	28-53	119-90	4-54
6/CCC ..	21	17	10,257½	488-45	2,258-67	469-98	22-38	100-73	4-58
6/DDD ..	20	17-16	13,417	670-85	2,903-61	566-92	28-35	122-46	4-23
6/EEE ..	26-23	20-03	17,822	679-45	3,015-07	764-39	29-14	122-68	4-29
6/FFF ..	22-90	19-52	15,220½	664-65	3,180-54	640-99	27-99	134-09	4-21
6/GGG ..	25-61	22-77	22,597½	882-37	3,417-49	822-17	32-10	132-84	3-64
6/HHH ..	17	16-90	9,992½	587-79	2,513-19	498-74	29-34	118-14	4-99
6/III ..	22	20-26	16,206½	736-66	3,349-61	662-15	30-10	136-96	4-09
6/JJJ ..	25	20-84	12,357	494-28	2,367-75	627-94	25-12	114-60	5-08
6/KKK ..	39	34-94	22,867	586-33	3,201-17	908-62	23-30	125-42	3-97
6/LLL ..	21	17-13	10,860	517-14	2,146-18	480-54	22-88	97-60	4-42
Means	22-72	18-61	12,988-11	571-67	2,714-35	570-83	25-13	117-75	4-40

SOUTHERN DISTRICTS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR MARCH, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.		Butterfat.		Average Test.
			Per Herd during March.	Per Cow during March.	Per Herd during March.	Per Cow during March.	
			Lbs	Lbs	Lbs	Lbs	%
9/A	25	20-65	11,538½	461-54	585-79	23-43	5-08
9/B	16	14	6,913	432-06	332-92	20-81	4-82
9/C	12	8	3,565	297-08	162-15	13-61	4-55
9/D	24-26	23-52	11,648	480-13	573-25	23-63	4-92
9/E	13	13	6,742½	518-65	281-31	21-64	4-17
9/F	16	9-87	3,180½	198-78	130-47	8-15	4-10
9/G	32	31	13,655½	426-73	678-93	21-22	4-97
9/H	19	8-06	4,568½	240-45	206-86	10-89	4-53
9/I	36	11-55	5,027	139-64	200-13	5-56	3-98
9/J	45-87	33-42	10,822½	285-94	476-34	10-38	4-40
9/K	22	20	6,076	276-18	290-53	13-21	4-78
9/L	24	11-26	4,727	199-96	181-11	7-55	3-83
9/M	17	2	279	16-41	13-00	7-6	4-66
9/N	29	26-71	8,380½	288-98	344-63	11-88	4-11
9/O	21	19	6,804½	324-02	293-08	13-96	4-31
9/P	48	15-03	5,352	111-60	271-99	5-67	5-08
Means	25-01	16-69	6,880	273-11	313-91	12-55	4-60



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be ‘starving’
...use *Laurel*, the Perfect
‘food’ for your Lamp & Stove”**

says the Laurel housewife



These pictures show flames after a 24-hour burning test. The lamp on the left burned Laurel. Note the steady flame, and the soft white light, without smoke, soot or flicker ! The other two burned so-called “cheap,” inferior kerosenes. Clogged by dirt and carbon they were **STARVED** for fuel, causing smoke and soot. Guard your wicks from **STARVATION** ! Insist on **LAUREL**.

Wise housewives always say

LAUREL

not just “Kerosene”

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THE HILLS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR MARCH, 1934

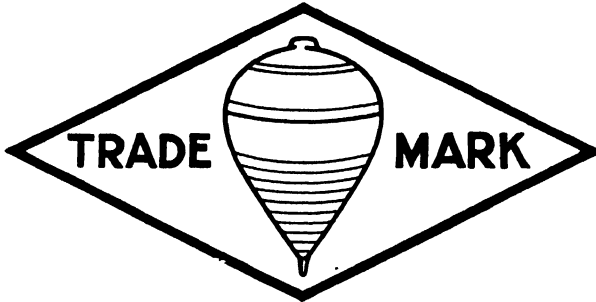
Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during March.	Per Cow during March.	Per Cow July to March.	Per Herd during March.	Per Cow during March.	Per Cow July to March.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
7/E ..	30-06	24-48	13,120	436-46	4,460-41	509-32	16-94	174-92	3-88
7/H ..	7	6	3,115½	445-07	4,079-30	142-22	20-32	234-05	4-56
7/L ..	35-32	31-19	14,328½	405-67	4,736-31	651-02	18-43	218-69	4-54
7/P ..	27-23	14-68	5,725½	210-26	5,382-46	286-10	10-51	253-25	5-00
7/T ..	16-90	12-97	4,800½	284-05	3,617-88	213-87	12-66	157-97	4-45
7/Y ..	28	19	5,502½	196-52	4,346-36	229-39	8-19	189-48	4-17
7/AA ..	12-94	7-61	2,277	175-96	4,167-98	110-03	8-50	180-94	4-83
7/KK ..	23-26	17-90	10,283	442-09	6,412-39	430-29	18-50	262-86	4-18
7/MM ..	40	29-71	10,463	261-58	5,392-92	426-06	10-65	204-30	4-07
7/PP ..	20	16-87	9,640	482-00	5,080-61	463-49	23-17	254-71	4-81
7/TT ..	16-94	16-94	9,904	584-99	5,332-26	409-30	24-17	220-98	4-15
7/UU ..	20-97	13-71	5,345	254-88	3,696-24	246-61	11-76	168-60	4-61
7/VV ..	18-94	16-26	8,242½	435-19	6,286-48	377-86	19-95	284-53	4-58
7/XX ..	19-90	17-00	10,712	538-29	5,885-67	577-62	29-03	308-23	5-39
7/YY ..	25	18-08	5,466	218-64	2,931-44	252-71	10-11	128-99	4-62
7/BBB ..	67-97	56-35	27,466	403-99	4,582-48	1,168-35	17-18	206-70	4-23
7/CCC ..	23-58	19-94	7,780½	329-96	4,691-77	311-29	13-20	209-73	4-00
7/DDD ..	12-90	9-68	4,288	332-40	4,783-70	211-55	16-40	224-11	4-93
7/EEE ..	12	9-39	4,675	389-58	4,072-78	237-74	19-81	198-33	5-09
7/FFF ..	19-84	11-87	5,389	271-62	2,729-83	241-80	12-10	121-14	4-49
7/GGG ..	17	13-13	3,256	191-53	1,748-17	152-81	8-99	83-04	4-69
Means	23-61	18-30	8,179-98	346-50	4,749-11	364-26	15-43	210-27	4-45

NARRUNG HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR MARCH, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during March.	Per Cow during March.	Per Cow October to March.	Per Herd during March.	Per Cow during March.	Per Cow October to March.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
5/C ..	33	22-55	11,790½	357-29	2,914-40	616-41	18-68	148-88	5-23
5/D ..	33-84	21-48	7,867½	232-49	2,727-56	471-69	13-94	147-97	6-00
5/E ..	36-35	25-13	10,842½	298-28	2,601-07	567-10	15-60	136-60	5-23
5/P ..	35-32	29-55	22,820	646-09	3,898-08	1,089-71	30-85	183-22	4-78
5/R ..	61	42-13	10,993½	180-22	2,255-51	493-78	8-09	95-03	4-49
5/S ..	14-26	10-23	7,067	495-58	2,964-09	336-64	23-61	144-42	4-76
5/EE ..	17	15-19	6,109	359-35	3,611-90	330-87	19-46	177-21	5-42
5/GG ..	16-97	13-94	4,745	279-61	2,287-54	248-60	14-65	111-10	5-24
5/KK ..	20	16-61	8,653	432-65	3,273-00	403-38	20-17	151-82	4-66
5/NN ..	17-19	10-94	3,933½	228-82	2,800-84	191-10	11-12	137-60	4-86
5/QQ ..	15-39	9-35	3,833½	249-09	2,349-02	192-28	12-49	117-55	5-02
5/RR ..	21-10	14-45	5,067½	240-16	1,809-89	250-26	11-86	96-67	4-94
5/SS ..	17	7-19	3,146	185-06	2,379-43	184-97	10-88	116-13	5-88
5/TT ..	12	11	5,425	452-08	3,792-44	278-11	23-18	186-70	5-13
5/VV ..	14-90	3-32	2,185½	146-68	2,107-57	95-67	6-42	97-24	4-38
5/WW ..	23	14-52	7,703½	334-93	2,303-12	346-63	15-07	106-77	4-50
5/XX ..	18-39	15-10	4,060	220-77	2,724-23	208-19	11-32	134-07	5-13
5/YY ..	14	10-10	4,648	332-00	2,331-25	229-52	16-39	114-93	4-94
5/ZZ ..	30	25-68	9,758½	325-12	Nov.-Mar.	393-51	13-12	Nov.-Mar.	4-03
5/AAA ..	19	14-23	3,814½	200-76	2,174-51	214-26	11-28	109-25	5-62
5/BBB ..	16-58	14-29	3,430½	206-90	1,818-48	175-13	10-56	91-13	5-10
5/CCC ..	13	5-90	1,273	97-92	Jan.-Mar.	414-65	74-66	Jan.-Mar.	5-86
Means	22-70	16-04	6,780-10	298-75	2,692-94	336-02	14-81	129-42	4-96

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THE ADDITION OF TWO CRUCIFEROUS WEEDS TO THE LIST OF THESE PLANTS IN SOUTH AUSTRALIA.

[By WORSLEY C. JOHNSTON, R.D.A., Agricultural Instructor.]

INTRODUCTION.

During the inspection of a field of Canary Grass (*Phalaris canariensis*), two weeds of the cruciferous family were found. These were subsequently submitted to Mr. J. M. Black, who identified them as *Conringia orientalis* and *Barbarea praecox*, both introduced weeds. The former had not been previously recorded in this State.

As there appears to be reason to believe that either or both may prove serious agricultural weeds, it is proposed to give a short description of each, with any information that can be gathered as to their habits. The former of the two was found over the greater area, and it can be reasonably assumed that it has established itself as a naturalised plant in this country. The other plant has made its appearance over an area of approximately 90 acres. Admittedly, the number of specimens was very limited, but as it was found over such an area, it was only justifiable to assume that it had been there for several seasons. Because of the lack of ideal conditions of soil and climate it had not spread greatly. Whether in the future the plant will become acclimatised and then become widespread can only be proved by time.

***Conringia orientalis*.** (L.) Andrz. Hare's-Ear Mustard.

(Also known under *Erysimum orientale*. (L.) Miller.)

Description.—A free growing annual, reaching a height of 4ft. The young leaves form a thick tuft 3in. to 6in. in length; smooth, broadly oval, with a rounded tip, and tapering towards the base; edges almost entire, although the lower ones are slightly sinuate. The whole plant is covered with a glaucous bloom, similar to that on a cabbage. The young plants greatly resemble a cabbage. The branch leaves are thick, oblong, glaucous, resembling the shape of hare's ears. Those near the top of the branches are more clasping on the stem than those lower down the branch. The flowers are about 1in. in width, of a creamy-whitish color, borne on a short stem, which elongates as the seed pod grows. The seed pods are thin, smooth, and almost square in section, almost 4in. in length, containing upwards to 50 seeds, which are small and of a brown color. When they become wet they exude a gelatinous substance, which gives them the power to adhere to the feet of animals, or to the wheels of farm implements, a fact that has great possibilities in the distribution of the plant.

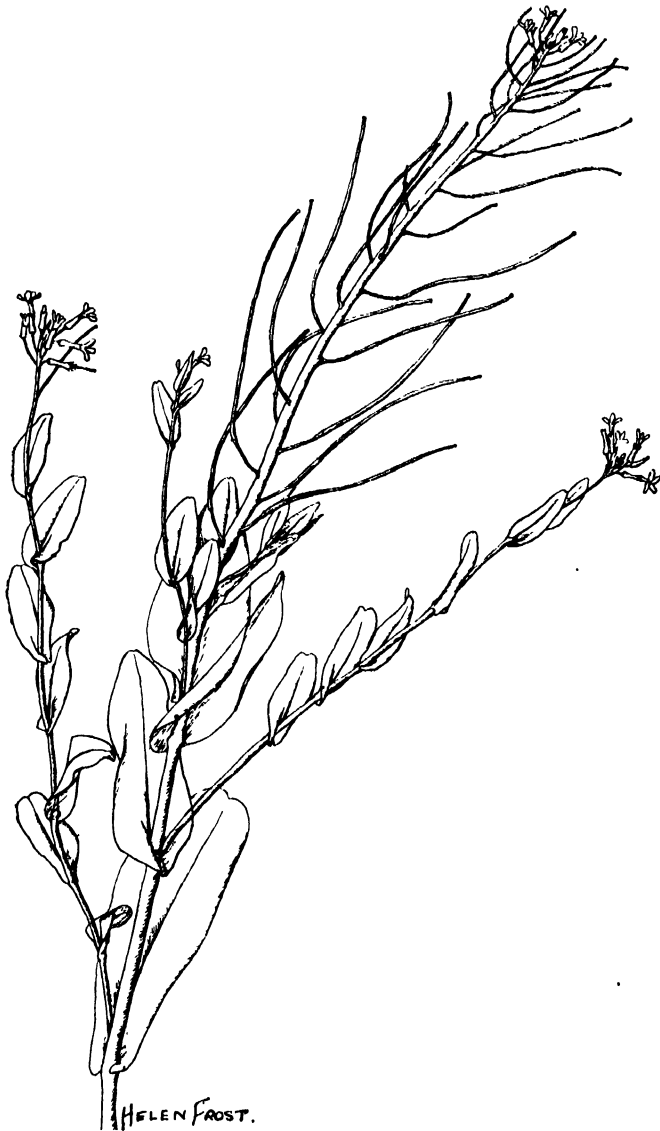
Origin.—This is an Old World species which, according to Georgia (1), has established itself in the wheat-growing states of America. It is also recorded from the north-west of Victoria.

Localities Where Found.—As far as can be ascertained, this plant has never been recorded in this State before, and at present it is only known on a farm at Hamilton. It is extended over a considerable area on this place, which only goes to show that it has been unnoticed for a number of years.

Its Agricultural Importance.—Local knowledge of the plant is very limited, and until it was pointed out to the landholder during a crop inspection it had not been realised that it was a new weed for the district or the State.

American experience appears to indicate that, if not held in check, this weed will materially operate against the possibility of growing satisfactory crops of any cereals, and so every effort should be made to control the plant while it is young.

Its free seeding habit, together with the adhesive power of the damp seeds, make it a plant beset with grave possibilities as to its rapid spread; hence a vigilant watch should be maintained for the weed, and every endeavour made to eradicate it.



Conringia orientalis. (L) Andr. Hare's Ear Mustard.

The palatability of the plant has not been subjected to any form of criticism, and local opinion has nothing to offer in this regard; but from the taste and smell of the leaves there does not appear to be anything to suggest that it would be obnoxious to farm animals. It must be borne in mind, however, that definite feeding tests have not been conducted.

Control.—As the plant is an annual, it would appear that much can be achieved in the way of control by the early preparation of each fallow. In fact, great care should be exercised to see that the field on which the weed is known to occur is broken up as early as practicable. In this way many of the young seedlings will be killed, but when shifting from one field to the next precautions are necessary to see that none of the seeds are adhering to the implements. In a general way the weed does not offer any greater difficulties than most of the annual cruciferous weeds.

The action of sprays will prove to be most disappointing, as the waxy nature of the leaves will shed all liquids very quickly, and thus any spray will not remain on the leaf for sufficient time to allow of enough absorption taking place.



Barbarea verna. Asch. Early Winter Cress.

Soils Suitable.—Local experience, as far as it goes, would suggest that the plant requires a friable, well-aerated soil for its maximum growth. It was significant that on the farm where the weed has occurred its greatest growth was found on the black soil patches, whereas any plants found on the red soils were much less robust—in fact, many plants in such soils were decidedly stunted in appearance.

Barbarea verna. Asch. Early Winter Cress.

This plant was recorded by Black (2) under the name of *Barbarea praecox* as having made its appearance near market gardens at Bridgewater. It is significant that the same author deleted the species from his later work. (3)

Description.—The plant is smooth, being devoid of hairs of any description. Leaves of a dark green, being divided into about eight lateral lobes, auricled and stem clasping. The flowers are large, and of a bright yellow color, about $\frac{1}{2}$ in. wide; seed pods very numerous, carried on thick short stems, about $\frac{1}{2}$ in. in length. The pods are about $1\frac{1}{2}$ in. in length, are stiff, and rather sharply four-sided. Seeds are numerous, small, and of a brownish color, rather flattened in shape, and covered with minute tubercles. The plant is given as a biennial or perennial by several authorities, but there is every reason to believe that, under the conditions of our agricultural areas, the plant has an annual habit.

Origin.—A native of Southern Europe, which has made its appearance in most temperate parts of the world.

Localities Where Found.—Other than the record of the species given by Black, there does not appear to be any further locality records for this State except the present case. The plant was found on a farm at Hamilton, where it was distributed over a considerable area. Previous records of it have been in such a situation as to suggest the escape from a garden, but in the present case there is nothing to give that impression. The plants were distributed over agricultural land.

Its Agricultural Importance.—The fact that this plant was recorded in 1909 by Black (2), and that in his later work (3) he saw fit not to record the plant, would lead one to the belief that the species does not find the climatic conditions of this State congenial to its rapid spread. It would seem that between 1909 and the present time there has not been any specimens of it taken. If this is so, there is no reason to have apprehension as to the agricultural possibilities of the weed. There is evidence to show that the species is grown in some parts of the world as a salad vegetable, a fact which indicates that there are no serious taints or flavours attached to the plant. There is every reason to believe that stock will find this plant palatable, and that under conditions where they have access to it there will be none of it to go to seed.

Control.—The careful cultivation of any land on which this plant has made its appearance seems to be all that is necessary to keep it in check.

Soils Favored.—From the limited amount of observation available it would appear that this plant shows a preference to the more friable types of soil. A few specimens were found on the red type of land, and in such cases the growth was far from robust.

Literature Cited:—

- (1) Ada Georgia, "Manual of Weeds."
- (2) J. M. Black, "Naturalised Flora of S.A."
- (3) J. M. Black, "Flora of S.A."

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PAPERS READ AT CONFERENCES.

DAIRY CONFERENCE, MILANG, MAY 9th, 1934.

DEHORNING—AN ASSET TO PRODUCTION.

[J. Y. HUDD, Adelaide.]

In these times when every man is trying to increase production, without increasing his herd and without increasing costs, most men have neglected the greatest asset in the business, namely, contentment of the herd.

During the last decade great strides have been made in the scientific feeding for production, in the mating of the right type of cattle of any particular breed, and rigid testing and culling of all animals that do not come up to a desired standard of production. We boast to-day of the lack of violence in our country; is it the result of education? More, I should say, it is the result of contentment instilled by education. We do not see men continually committing acts of violence, and it is safe to go anywhere within reason without fear of molestation. This is not so with our dairy herds. Confine them in any small area for only a short time and watch results; they very soon become a milling, horning, moving mass, the weaker and more timid animals becoming more and more agitated through fear. This state of nervous strain does not tend to improve the producing qualities of an animal.

Again, watch animals feeding in a field, especially if feed has been put out to them. The "bullies" in the herd immediately move from place to place hunting and disturbing those more timid than themselves. This tends against production, as the timid animals have to keep a constant watch against the horns of the aggressor, and be ever ready to run. Also, an animal that is more or less of a bully never milks up to expectations; she spends too much of the time she should be feeding in disturbing others. This breeds a habit of discontent, always wanting what some other cow has.

This matter of contentment is a thing that has to be given serious consideration in the near future. We have interfered in many ways with Nature, many of them to our advantage and some to our ill-content. When Nature made cows, she gave them horns for protection against other animals who were the natural enemies in an age when the law of the survival of the fittest was the supreme law. Man also at that time was governed in the same way, but in the course of enlightenment he has not applied the same laws to his cattle as he has to himself. No man to-day is allowed to assault his neighbour, much less use lethal weapons against him, or he is immediately put under restraint, and his weapons confiscated; yet dairymen allow this to be a daily occurrence among their dairy cattle, with a consequent loss of production.

It is said by some that horns are necessary to define a type, but cows give milk from their teats, not from their horns. At the 1933 Royal Show the champion bull in the Jersey Class was a dehorned animal; that does away with the argument that it spoils them for Show purposes. The hardest obstacle in this world to remove is tradition, and this is the main cause to-day why cattle dehorning is not more popular.

Now, let us deal with the most important article, especially in regard to the pure breeds, namely, the Herd Master. Many of these men—although they will not admit it—go in daily fear of their lives when dealing with the male animals of their breed. These men, because of their ability and knowledge, are a great asset to the Dairying Industry, yet how many of them have been cut off suddenly at the peak of their careers by a bull's horns? Before me as I write I have a list of Press cuttings of accidents, fatal and otherwise, during the last two years, and the list is appalling. Horns are not required in a country where wild beasts do not roam. Try and picture what would happen at the Royal Show parade if a rusty bull was to get away from his attendant and start looking for trouble?

[Papers Read at Conferences.]

We pay too high in risks in many ways, simply to see a nice pair of horns on an animal at Show time. No fence—especially in the country districts—is bull-proof, and an animal running in a paddock adjacent to a road is a potential menace to children and pedestrians if he has his horns on.

Then there is the loss which is sustained by cattle that are used for slaughter. Ask any butcher what his loss is through bruised meat, and it is tremendous. Our Trade Commissioner, Mr. McCann, in a recent article, stated that in the Argentine none of the exporting firms in chilled beef would handle an animal that had not been dehorned as a calf, and the dehorning of calves was a simple matter.

Increase production by adding contentment to your herds, which can only be done by removing the source of discontent, namely, the horns.

MANAGEMENT OF THE DAIRY HERD.

[A. KELLY, Milang.]

In these times of depression and low butter fat prices the management of the herd calls for a good deal of attention if one is to receive the best results with as little expense as possible. The bull—as is often said—is half the herd. The bull should be always in a yard or tied up, with a ring in his nose, preferably in a yard where he has more chance for exercise, which is absolutely necessary. He should be fed similarly to the cows. I feed chaff, with a change of sometimes bran, crushed oats, or a little linseed meal. These changes are relished by the bull, and have not had any injurious effects in keeping the bull fit and getting the cows in calf. He is also supplied with a salt lick, and an occasional sheaf of hay. One of the main reasons for keeping a bull yarded is that the services to each cow can be regulated, which in a large dairy herd with a young bull means a great deal to the life of a bull. One or two services to each cow is quite sufficient and does not harm the bull.

I advocate a pure-bred bull from high-producing stock of whatever breed the dairyman desires; he costs no more to feed and will raise the butterfat standard of the herd, which is the main factor these times.

As regards the cows, there is only one sound method by which to carry out dairying successfully—that is, the testing of all cows. This is the first matter of importance, for it gives some idea of how to feed the cows economically, which information is absolutely necessary. For instance, dairymen cannot afford to, nor is it right, that a cow giving between 100lbs. and 200lbs. fat a year should have the same ration as cows giving between 400lbs. and 500lbs. fat; hence the reason for testing. Once testing is started, each cow can, and should, be fed according to her production. Personal supervision may show that cows require a change of food to maintain high production, therefore I make a practice of always feeding chaff (hay feeding is too wasteful). For a change of food they have at different times crushed oats, bran, linseed meal, with a good supply of bone meal or super. A little salt in the food is helpful.

A cow should be mated to calve about every 12 months. I also find it necessary for a cow to have not less than six weeks, preferably eight weeks, dry. There is a wide difference of opinion regarding the best time for cows to calve. I endeavour to have some come in all the year. Of course, green feed is necessary, and should be grown as much as possible.

Dispose of the culls or low producers. Do not sell them just as soon as they are dry, but if sound, carry them on, put a little condition on them, and sell them with calf at foot.

To replace these cows, breed from the high producers and avoid going to the sale ring as much as possible. While there are some good clean cows obtained that way, there is always the possibility of introducing disease. If cows are urgently wanted, go to someone who is reliable and will recommend a cow, even if it costs a little more.

[Papers Read at Conferences.]

Calf feeding is most important, so far as the heifers are concerned, for these are the future herd. The best method is for the first week give whole milk, then after six weeks feed half whole milk and half separated milk. Do not over-feed; it leads to scours. Because of the low price of butterfat, this feeding is preferable to buying other foods. Calves should be kept on milk until about six months old, but should have chaff, or some long hay, as soon as they will eat. This has a tendency to keep a calf from scouring.

Regularity should be practised in dairying, both in milking and feeding stock.

To give some idea how the yield per cow can be improved by testing, culling, and feeding, I quote my testing figures:—In four years I have brought the lowest cow in the herd from 138lbs. to 324lbs. fat, average 241lbs., while the highest cow has risen from 352lbs. to 497lbs. fat, average 357lbs. By this method we have learnt if a cow is not worth feeding she is not worth keeping.

PASTURE DEVELOPMENT.

[E. L. GOODE, Narrung.]

When the extent of pastures and pasture production is considered, it is obvious that grassland studies, designed with a view to the improvement of the pastures, are of great importance. Of Australia's overseas exports something in the region of 60 per cent. in monetary value is directly derived from her grasslands. Similarly, of Queensland's and Victoria's exports 80 and 70 per cent., respectively, are said to be the products of grasslands in those States. These are striking figures when one realises the importance and variety of non-grassland products, wheat and other cereals, fruit and fruit products, metals, minerals, and manufactured goods. Any improvement in technique, which has as its design the more economic production of wealth from a given area of grassland, must reflect itself, therefore, upon national well-being.

There are four main avenues along which attention must be directed, namely, those of species, strain, soil fertility, and pasture management.

The strain work on pasture plants which is being conducted in Australia is of a most encouraging kind. Critical trials with various forms of Rye grass, Cocksfoot, *Phalaris*, Lucerne, and Subterranean clover, and many other species are under way.

It is probable that the acreage of the class known as "improved pastures" could be added to considerably if seed representing more suitable strains were available.

There is evidence in Australia of the success which has attended the initiation of the New Zealand Rye grass seed certification scheme. Trials have shown that Perennial Rye grass of a good pasture type can be grown over an extremely wide range of conditions in Australia. The requirements looked for in high class pasture strains are the abilities to withstand a series of successive dry summers, to make vigorous growth with the advent of autumn rains, and to maintain a high standard of production throughout the rest of the year. Other grasses, such as cocksfoot, *Phalaris tuberosa*, Wimmera Rye grass and *Paspalum* are being widely sown and tested in many parts of Australia.

CLOVERS,

The value of clovers as a constituent element of pastures is well recognised. They not only enhance the general fertility of the soil, improve its texture and darken its colour, but in so doing they indirectly improve the growth of the grasses growing in association with them. This is particularly true in regard to those grasses which require a reasonably high standard of soil fertility—grasses that in general are the more valuable among our grazing plants. The clovers are, furthermore, richer in food materials than are the grasses; not only richer in proteins, but also in many essential minerals.

The grasslands of Australia are deficient in minerals, and it is interesting to note that when soil and other conditions become conducive to the growth of clovers, mineral deficiency quite often becomes corrected, at least in so far as evident symptoms in

[Papers Read at Conferences.]

the health of stock are concerned. An adequate proportion of clover in any pasture must be regarded as being essential to the well being of the grasses in that pasture as well as to the health of the livestock that browse upon it.

It has been estimated that some 4,500,000 acres in Australia have been sown with introduced pasture plants. While this acreage only represents about 0.25 per cent. of the total area of the Commonwealth, it forms, however, an important proportion of the country on which dairying is being conducted. Any improvements of this nature would need to be accompanied by the maintenance of adequate soil fertility, correct pasture management being equally important.

Well planned research work on pasture problems is essential, and it is the cheapest way in which the community can gain new knowledge, ultimately to be put to economic advantage.

THE IDEAL PASTURE.

This should contain an admixture of grasses and clovers—a leguminous content is important in any pasture, it is essential in dairy pastures. Legumes serve a second useful purpose in Australian grasslands, namely, they increase the soil fertility. A profuse growth of pasture legumes, such as that usually associated with a dense cover of well manured Subterranean clover builds up soil condition so that it is made more conducive to the growth of high grade perennial pasture plants.

The ideal dairy pasture is one where high production perennial grasses and clovers are dominant.

For the profuse growth of legumes on Australian soils the application of phosphatic manures is essential. There are many examples where nitrogen, lime, and potash have given good results.

SOIL FERTILITY.

The upbuilding of soil fertility is of particular significance on a number of Tasmanian soils where, in the past, there has been a long continued drain upon plant

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foods in the soil under a system of farming which involved the removal of a succession of cash crops. This has taken place without adequate or any regard being paid to soil replenishment.

The fertility of these soils has therefore undergone depletion, and means will have to be found to make good the deficiency. The Tasmanian Department of Agriculture during recent years has encouraged the growing of leguminous crops, and the practice is spreading throughout the dairy districts of the State. As a factor likely to influence the rate of improvement in pasture standards this practice is to be commended from every angle.

The principle of all fertility upbuilding per medium of clovers is sound. There are extensive areas in South Australia, particularly in the Adelaide Hills and in the South-Eastern portions of the State, where intensive development of sown pastures is proceeding. The use of Subterranean clover, together with superphosphate, has provided the key to this development.

Improved strains of Perennial Rye grass and *Phalaris tuberosa* must play an important part in the further improvement of existing sown grasslands in this State.

EXPERIMENTAL WORK.

There is evidence that high grade permanent pastures can be profitably developed under irrigation. The experiments of the Waite Agricultural Research Institute, near Murray Bridge (Wood's Point), have shown that improved strains in the perennial grasses are extremely useful elements in irrigated pastures. The use of those strains will help to keep the clovers in check and is calculated to improve the balance of grasses and clovers in the pastures. Considerable difficulty has been found on those pastures because the proportion of clover has shown a tendency to become too high, and this has made efficient grazing difficult because of the danger of bloating in livestock.

A recent inspection by the South Australian Committee of the Australian Dairy Council was made at Greenock, where fields of Perennial Rye grass and Subterranean clover had been sown. Here 31 cows and heifers had been grazing for nine months, and evidenced that rapid growth was made after the first rains by the Rye grass, and this pasture could be sown with confidence on a 20in. rainfall.

At Eden Valley were four plots sown with various grasses and clovers, but the opinion expressed was that the Perennial Rye grass and Subterranean clover was the best pasture—a herd of 18 Shorthorn cows was quite unable to cope with the feed; an interesting demonstration of what top dressing will do on natural pasture was seen here, where a field of 14 acres was dressed at the rate of 90lbs. of superphosphate to the acre for three years, during which period not less than 60 sheep has ever been carried on it, and at the time of inspection there were 114 sheep in the field, all of which were in good condition, and the feed, chiefly Subterranean clover and Soft Brome, was, if anything, too rank. The application of sulphate of ammonia had decreased the Subterranean clover pastures to a minimum, but had in the early stages of the experiment assisted the Rye grass.

The general opinion seemed to be that the most economical fertiliser to use was a good grade superphosphate applied at the rate of 1cwt. to the acre. A crop on a very light soil was inspected at Mount Pleasant on which only Subterranean clover appeared to flourish, and it is expected that by enriching the soil with this other grasses will be established.

At Mount Barker a field was inspected consisting of four paddocks, each 2½ acres, sown with various mixtures, Perennial Rye grass, White clover, Subterranean clover, *Phalaris tuberosa*—all fields were dressed annually with 2cwt. superphosphate per acre, and two of the plots received an application of sulphate of ammonia. From September 1st to October 1st 22 cows were carried for four hours a day on the

[Papers Read at Conferences.]

pastures, being placed in a different field each day, so that each plot was fed off every four days, and later 24 cows were carried to November 24th, at time of inspection. It was noticed that the fields dressed with sulphate of ammonia showed less growth on the clover; and it was thinner than those dressed with superphosphate only. All the pastures were in splendid heart, as also were plots inspected at Bugle Ranges and Shepherd's Hill, where excellent fields of clover were seen just on the border of heavily timbered forests.

For local conditions on soil around the Lakes, as at Narrung, lucerne holds pride of place; sown at the rate of 4lbs. to 5lbs. per acre, with a cover crop of oats or barley at the rate of ½bush. to 1bush. per acre, splendid results have been obtained. It has been found necessary to cultivate the pastures when established with a tine cultivator, dress with 90lbs. to 1cwt. superphosphate, and sow with oats or barley at the rate of not more than 1bush. to the acre every other year. The addition of cereals improves the growth of lucerne rather than otherwise, and a good mixed hay for cows is obtained. Too much stress cannot be laid on the value of the cultivator, drill, and harrows on lucerne pasture. This does almost as much good in opening up the soil to the plants as does the action of superphosphate in forcing new growth.

[Portion of report to Australian Dairy Council by Mr. J. Proud, Manager of the Camperdown Cheese and Butter Factory, and Mr. A. E. Sweaney, Manager Inverell Co-operative Butter Factory, N.S.W.]

PASTURES AND THEIR MANAGEMENT.

There is no doubt that the basis of the great wealth of the Dominion lies in the scientific management of the pastures. From these an almost incredible return is yielded, due to top dressing. In general, the country was, in its virgin state, of very poor character. Thousands of acres possess but a few inches of soil on poor pumice formation, and on this originally grew ti-trees and bracken fern. Nothing could be more uninviting. These conditions also obtain in the famous Waikato district, where as late as 20 years ago land could not be sold for £1 per acre. Now such land could not be bought for less than £50 per acre, the returns being so phenomenal. This transformation has been effected by the application of fertilisers in the form of top dressing, which has clothed the land in excellent permanent pastures. These consist of Rye, Cocksfoot, Prairie, Fescue, and White clover. Up till quite recently it was thought essential to plough the pastures periodically, and after taking a crop off the land to relay in pastures. This has since been proved a fallacy. The cropping of dairy land has become obsolete, the new science of grassland farming succeeding it. It is now found that a permanent pasture can be maintained at its highest state of perfection by top dressing with fertilisers and the hard use of chain and tripod harrows. It is also claimed that, when the pastures cannot be grazed short enough to prevent any suspicion of running to seed, the mower should be employed. Research concerning pastures has proved that their highest value of milk production is in the young grass shoots which are high in protein content. Consequently, pruning by short grazing, harrowing, and mowing is essential. Evolution is likewise taking place in the methods of top dressing. Until quite recently the system was to top dress the pastures of the entire farm in one, and later in two, annual applications, viz., in early autumn and early spring. Such a course produced an excessive growth in the spring and early summer months which could not be grazed down. Thus a considerable amount would run to seed and not only lose its highest nutritive value as feed, but also have a damaging effect on the pasture land. To obviate this the modern system is to top dress the paddocks in rotation and likewise graze them. In this way they obtain and utilise the maximum nutritive value of the pastures. Superphosphate and smaller amounts of basic slag are the universal fertilisers, and are used at the rate of from 2cwts. to 4cwts. per acre per year. The fertilisers cost 5s. per cwt. at the farms. Broadcasting from the back of a motor lorry, where the machine is connected

[*Papers Read at Conferences.*]

and worked from a sprocket on the back wheel, is the latest and quickest method of spreading. It is a significant fact that the application of superphosphate on any of the land immediately encourages the growth of clover. While none is sown with the other grass seeds all pastures are well stocked with it. In fact, it is so superabundant that experiments are being made with mixtures of nitrate of soda and other nitrogenous manures with a view to curtailing its growth in the pastures south of Auckland.

In the north of Auckland Province *Paspalum* is the staple pasture, and the superphosphate top dressing of it, likewise, stimulates clover growth, which is, however, most desirable in this pasture. We were supplied with the returns of one North Auckland dairyman, who, on a 60-acre farm of *Paspalum*, produced 20,000lbs, butter from 60 cows during last season. As quite a considerable amount of Australian butter is produced from *Paspalum* pastures, where in many cases the clover is gradually dying out, we wish to emphasise these results in the hope that top dressing will be employed, believing that like results can be obtained here.

So universal is pasture management as above described, and so much faith have they in its ability to carry them through even a severe winter, that it is not surprising that we were unable to find any supplementary winter crops. In fact, we rarely saw an acre of ploughed ground throughout the whole tour. A noteworthy feature in the Dominion is the general adoption of hedge fences. These serve the dual purpose of protecting stock and pastures in bleak weather, and add much of the picturesqueness to their rural scenery.

THE CARE AND MANAGEMENT OF CREAM AND DAIRY PRODUCE.

[J. M. YELLAND, Milang.]

In the production of first class butter it is necessary that great care and attention should be given to all details in connection with the article produced, from beginning to completion. In order to do this it is very necessary that all participants should have a knowledge of their part of the business, so that a complete circle of efficiency may be obtained. Before the salesman can sell the butter the manufacturer must produce a first class saleable product. Before the manufacturer can produce a first class product the raw material must be of standard quality. Hence, in reality, the marketing of butter depends as much on the man who produces the cream as on the man who manufactures and markets the butter. It is also necessary that a knowledge of the needs of each unit of the industry should be acquired in order that it should be maintained at a high level. Let me deal with each as briefly as possible.

THE DAIRYMAN'S RESPONSIBILITY.

He should be clean, careful, and thoughtful in his work. His premises, including cowyard and separator-room, should be kept as clean as possible. The buildings should be of stone, iron, or sawn timber, with an iron roof; the manger and bails of sawn timber, so that they can be painted and, if necessary, washed or whitewashed. The floor should be cemented and have a slope of about 1 in 30. Plenty of ventilation should be in evidence, as fresh air and as much sunlight as possible are the best known bacteria destroyer.

The utensils, such as separator, cans, buckets, &c., should be well washed in plenty of hot water and then thoroughly drained.

The cows' udders should be well washed and wiped. It is necessary to have in each bail a utensil—a half-gallon galvanised dipper is most suitable—containing a good cloth and warm water, or preferably a weak solution of Condyl's fluid.

The most important part for which the dairyman is responsible is the care and attention he gives to his cream. Separate at about 44 to 46 test. The large percentage of milk present in thin cream accelerates the action of the harmful bacteria, thus

[Papers Read at Conferences.]

causing premature staleness. The cream should be cooled as quickly as possible and kept at a low temperature. This also is necessary to retard the action of harmful bacteria. It is best to stir the cream daily, and on no account should warm cream be mixed with cold.

Deliver to the factory as often as possible. The present system of motor vehicles running around the country carting the cream long distances is both expensive and injurious to the quality of the cream. This will be rectified when the dairyman has sole control of his products. It is encouraging to know that cream suppliers are organising in this direction. As soon as the industry is placed under one large co-operative control, South Australia—in which choicest butter constitutes less than 30 per cent. of her total butter production—will be able to raise her standard to equal that of the Eastern States. The difficulty, however, is that the cream supplier has become apathetic; his position seems hopeless, and he has lost confidence in the manufacturing and handling of his products, and that confidence, under present conditions, can never be regained.

After the cream has been delivered to the factory in good condition, the onus of responsibility rests with the manager. We now have a considerably higher standard of efficiency in factory management than previously. All managers have to hold a certificate in grading, testing, and butter or cheese-making. This naturally gives a better opportunity of competing with other countries in the disposal of our products.

THE MANUFACTURING OF BUTTER.

At the receiving platform, after taking delivery, the cream is weighed and entered into the cream book. It is then sampled by placing the sampler from the top to the bottom of the cream; the reverse action to that of a pump is applied—that is, the barrel, not the plunger, is moved. This action takes a representative sample, but seeing that the sample is taken from top to bottom, beware of that milk which may have settled in the concave at the bottom.

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Journal of Agriculture, January and July, 1921.

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The cream, after being sampled and graded, is tipped into a sieve. The cream having been tipped into a neutralising vat, is mixed with the addition of water, by means of rotating coils, as the butterfat content is too high for churning purposes without the addition of water. A test is now taken to determine the amount of lactic acid present in the cream. A specified amount (9 c.c.) is drawn into a pipette and blown into a white cup, and a few drops of phenolphthalein indicator added. A graduated burette containing 1/10th solution of caustic soda is filled to the "O" mark and the solution is allowed to drip into the cream until the caustic soda has neutralised the lactic acid. This indicated by the phenolphthalein colouring the cream a faint pink. The burette is read to ascertain the percentage of acid present in the cream. A chart is then consulted which specifies the amount of sodium bicarbonate in pounds and ounces, necessary to neutralise to a certain extent the acid contained in the full quantity of cream present in the fat. The whole of the acid is not neutralised, as this would affect the flavor of the butter. After neutralisation has taken place the cream is pasteurised. This particular operation has been accused of robbing butter of its old-time flavour; it certainly has robbed it of a lot of impurities. If this purification had not been wanted, money would not have been spent in this direction.

Pasteurisation consists of heating milk or cream to at least 140° F. for not less than 10 minutes to destroy bacterial life. The heating is followed by rapid cooling to check spore-formation. The temperature to which most factories raise the cream is between 190° and 200° F. Most food flavours are vaporised and pass off in the steam, and also most of the bacteria are destroyed. Care must be taken not to scald the cream, thus imparting a "cooked" flavour.

The cream is then subjected to rapid cooling known as the "shock principle." This is attained by allowing the cream to gravitate over coils which have first the ordinary water flowing through them. Next it passes over the brine coils of temperature about 20° F., and finally over the ammonia expansion coils to further reduce the temperature, and by regulating the flow of cream it is possible to freeze.

It is then pumped into holding vats and held at a desired temperature for several hours to ripen. This is an improvement on the results achieved by Pasteur when he first employed pasteurisation.

After the cream has been ripened it is ready for churning. The temperature for this can be lowered if necessary. The churning is usually done at approximately 45° F. Before the cream is passed into the churn, the latter is scalded and cooled. The cleanliness of the churn is the greatest difficulty, as it is made entirely of wood, having crevices in the joints, which would be a breeding ground for bacteria and mould. Mould is the biggest trouble in wood, and to counteract it, "chlorize," a disinfectant and germicide, is used. This has no effect on the flavour of the butter.

The cream is churned until it changes into butter granules and buttermilk. Care is exercised to have the granules about the size of corn. All the buttermilk must be allowed to run off as the retaining of any of this may leave mottles in the finished article.

The butter is then thoroughly washed in water of temperature of about 40° F., to eliminate any remaining buttermilk. Salt is then added in the proportion of 2 per cent. and the butter is worked to cause the salt and moisture to be incorporated in it. Government restrictions allow only 16 per cent. moisture in butter, so that care must be exercised not to exceed that amount.

The scoring of butter is as follows:—

A second grade butter made from cream grading 36, 37, 38 points would, if the manufacture were perfect, grade as butter 86, 87, 88.

First grade butter made from first grade cream would be 89, 90, 91.

Choice would be 92 upwards.

THE HAY ITCH MITE, *Pediculoides ventricosus* (Newport) (Acarina, Pediculoididae) IN SOUTH AUSTRALIA.

[By D. C. SWAN, B.Sc., Waite Agricultural Research Institute,
University of Adelaide.]

I. INTRODUCTION.

During the past few years reports have reached the Waite Institute from various sources of a skin affection occurring amongst workers handling certain agricultural products, notably grain, hay, and chaff. The trouble manifests itself chiefly as an irritating itch, and the information which has been obtained indicates that it is widespread. Its association with these farm products has been long recognised by farmers, as the term "hay itch" is well known in the agricultural areas of the State. The occurrence of "hay itch" appears to be due to the presence of a minute mite (*Pediculoides ventricosus*) in the materials. The mite, which is an ectoparasite on the larvae of many insects, may be present in very large numbers.

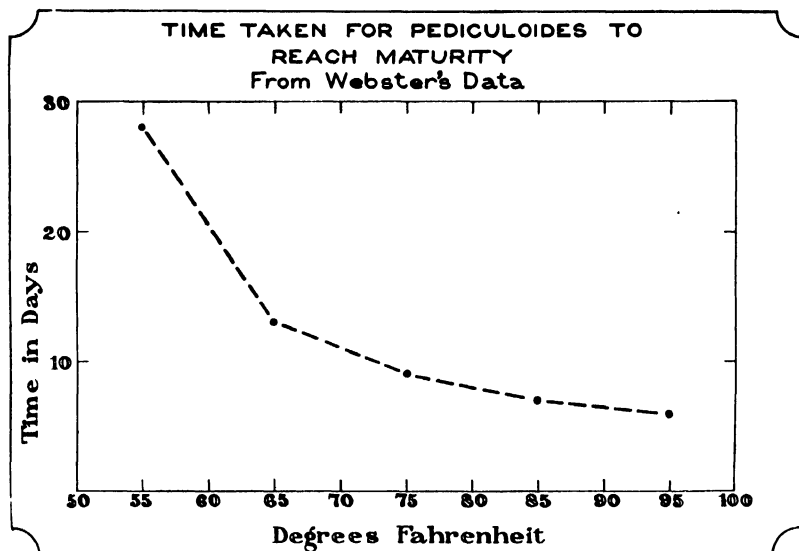


Fig. 1.—Time taken from the birth of a female mite until it produces young, in relation to temperature. Derived from data given by Webster (1910), p. 22.

An account of observations and experiments which have been made on this subject are presented in the present paper.

II. THE EXISTENCE OF *P. ventricosus* IN AUSTRALIA.

In South Australia "hay itch" has been usually reported after operations which involved the handling of hay taken from stacks a year or more old. In May, 1932, in consequence of such reports, samples of hay were obtained from several localities near Adelaide. Each lot of material was beaten out, and the resulting dust examined under the binocular microscope. In several cases a small mite was found in considerable numbers, which proved to be *Pediculoides ventricosus* (Newport). This mite has not been reported previously from Australia, though H. Womersley, now Entomologist at the S.A. Museum (unpublished data),

isolated it for the first time in June, 1931, from chaff being loaded on to a ship at Fremantle, Western Australia. This cargo came under notice due to an outbreak of dermatitis among the humpers who were engaged in handling the material. In Western Australia an itch of workers engaged in chaff-cutting operations has long been known in the cereal belt. The writer has been informed that this is also known to occur in the Eastern States. The only reference in the literature to the presence of the mite in Australia is in a note by Strong (1922), commenting on a communication by Hone (1922). Hone discussed "A series of cases closely resembling Typhus fever" in Adelaide, of which pathogen and vector could not be decided, but a relation with weevils and weevil-infested wheat was indicated. Strong's suggestion that *P. ventricosus* might be the vector of the infection, was inferred from the account given by Hone; the presence of the mite was not demonstrated.*

III. OCCURRENCE OF *P. ventricosus* IN OTHER PARTS OF THE WORLD.

Pediculoides ventricosus has been long associated by various authors with the occurrence of an itching, urticarial rash in man. The mite has been reported from many European countries, particularly those bordering the Mediterranean Sea. A number of references to it occur in British medical literature. It was recorded from the United States early in this century in association with a number of widespread cases of itch of the human skin.

Goldberger and Schamberg (1909), working in U.S.A., reproduced the symptoms experimentally by applying mites to the skin. They showed that dust from straw was not, in itself, capable of producing the itch. Webster (1910) reviewed the position in the United States, and Willcocks (1914) discussed it in relation to Egyptian cotton seed, in view of a skin affection occurring amongst London dock laborers engaged in unloading certain cargoes of this commodity. More recently the mite has been recorded in association with dermatitis of dockers, mill-workers, and agricultural labourers in various countries (England, France, Italy, Germany, Rumania, Algeria, Morocco).

IV. BIOLOGY OF *P. ventricosus*.

Pediculoides ventricosus is normally an ectoparasite of the larvae and less commonly of the pupae and adults, of a number of insects, particularly those which attack certain crops and stored products. Thus "boll-worms" are its usual hosts in cotton. It may occur on insects in the field. Newport's original specimens were found in the nests of an Anthrophorid bee, attacking the larvae. In Australia, as in parts of U.S.A., the larvae of the Angoumois Grain Moth (*Sitotroga cerealella*), a world-wide insect, is apparently the chief host. The larvae of this moth feed in the grains of various cereals, either in store or in the ear. They eat out the interior of the grain, and pupate within it, the adult moth emerging through a hole in the side; in haystacks, the grain in the ripened ears of the hay provides favourable food. Temperatures of about 80° F., and high humidity (up to 80 per cent. R.H.) are very favourable for the development of the moth, and large numbers rapidly develop under these conditions. In a haystack such conditions often occur. The mite when present in these situations attacks the larvae, and rapidly increases in numbers, as a result of the favourable environment and adequate supply of food (hosts). Mites of succeeding generations move through the material in search of fresh hosts, and persons handling it may become infested

* Mr. Womersley has kindly drawn my attention to a record of the genus *Pediculoides* by Rainbow (1906) who lists *P. alastoris* Frogg., a species from N.S.W. Froggatt (1894) describes this species as *Heteropus alastoris*; it was found attacking the larvae of the Eumenid wasp *Alastor* (= *Paralastor*). Froggatt's description of this mite is purely formal, and contains no details of critical value. From his remarks upon the mode of its occurrence it seems very probable that the species was *P. ventricosus*.

with mites. The rate of development of the mite, in relation to temperature, is indicated in the accompanying graph (Fig. 1) drawn from data given by Webster (1910).*

In haystacks the mite is commonest during hot summer weather. The unfed female succumbs rapidly in the absence of a host when the humidity is low and the temperature high, usually living only about one day. In low temperatures (less than 20° C.) it can survive much longer without food.

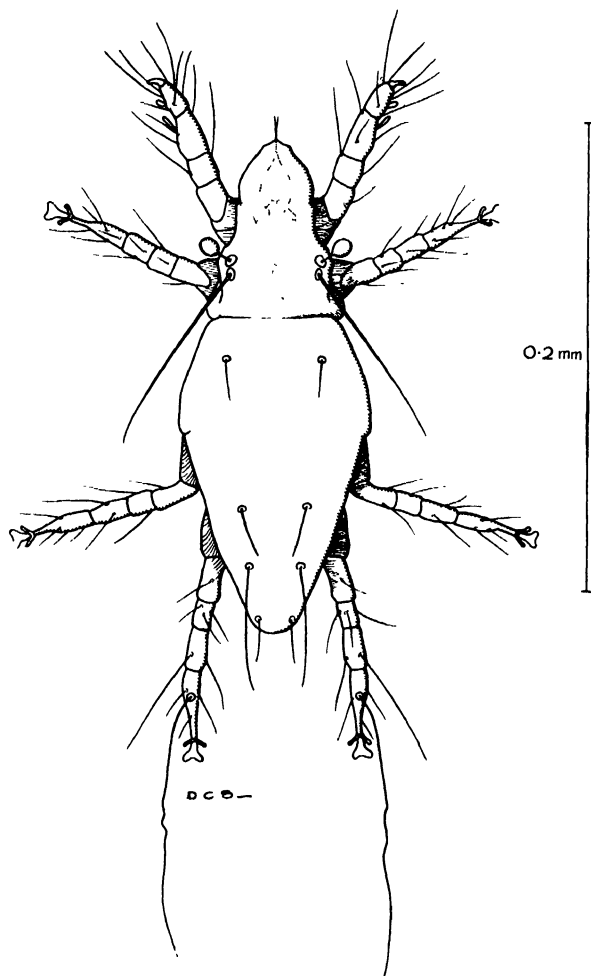


Fig. 2.—*Pediculoides ventriosus*. Non-gravid female. The broad basal portions of the chelicerae (mandibles) and the anterior part of the two tracheal trunks, are shown by broken lines.

The fact that the mite attacks various pests of agricultural products has been investigated with reference to its possible value in controlling the numbers of these insects. Evidence in support of significant control is lacking. The position is reviewed by Willcocks (1914) and Herfs (1926).

* The data are not presented by Webster in sufficient detail to allow of the complete velocity curve of development being given.

V. LIFE HISTORY AND HABITS.

The general details of the life history are well known (Webster, 1910; Willcocks, 1914; Berlese, 1925; Herfs, 1926). The writer obtained a supply of mites from an infested stack in 1933 and was able to breed them in great numbers in the laboratory. The following details are derived from observations made upon this material.

The life history is one of the most remarkable occurring in the Acarina. Both males and females are produced viviparously, and are sexually mature at birth. The female mite at this time is very small, measuring 0.25 mm. (1/100 inch).

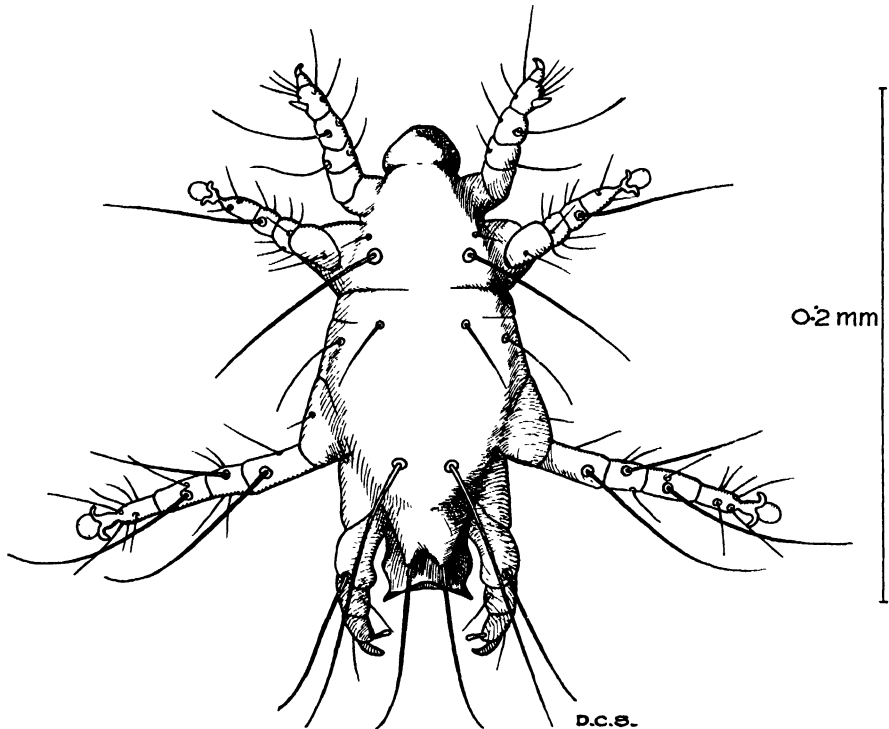


Fig. 3.—*P. ventricosus*. Male. Note difference in chaetotaxy compared with the female, also modification of the hind legs as claspers. The external genital structures are ventral in life.

After fertilisation by the male, which occurs immediately after birth, the female seeks out a suitable host (in our conditions a grain moth larva), pierces it with its needle-like mouthparts, and begins feeding immediately. Before feeding it is slender and widest at the middle (Fig. 2). It is the developments subsequent to the commencement of feeding that make the life history so unusual. The mite feeds by sucking the body fluids (blood) of its insect host, with the aid of a well-developed pharynx. Shortly after sucking begins, a slight swelling is seen, almost at the tip of the abdomen of the mite. (Fig. 6.) This increases in size until it becomes globular. At first the mite is able to move about, but eventually the abdomen becomes so distended that movement becomes impossible. The mite then remains at one place on the surface of the larva, and continues to engorge; the abdomen develops into a glistening sphere which is visible to the unaided eye. Ultimately this sphere may attain a diameter of more than a millimetre (Figs. 4, 5, 7). The process is reminiscent of the engorgement of a tick with blood. The rate of engorgement depends on the prevailing temperatures. It takes less than a week at temperatures above 90° F., but may take two weeks or more at

lower temperatures. The eggs of the mite develop within the swollen abdomen and the embryos may be seen through the delicate chitin. The developing young complete their immature (nymphal) stages while within the parent, and are not born until they are fully mature.

The birth process is complex. The first young produced are males; only a small number are produced by any one female (3.6 per cent. of the progeny, Herfs 1926). The writer has not made quantitative studies, but my observations agree very well with those reported by Herfs. The males feed very little and pierce the parent sphere in order to obtain food. They are shorter and broader than the female, and more convex dorsally (Fig. 3). Their movements are slow and deliberate, and they do not leave the spherical body of the mother, but remain in a cluster around the genital aperture. (Fig. 4.) They fertilize the female mites as soon as the latter are born. Females are produced at a rate which varies with the temperature. At higher temperatures it is greatly accelerated. If the

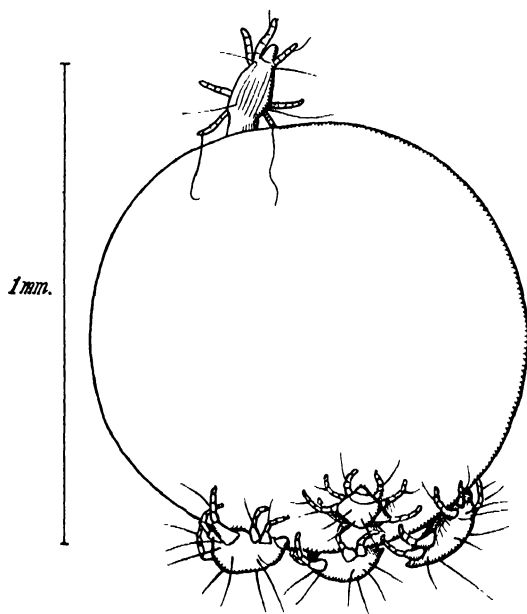


Fig. 4.—Camera-lucida sketch of a gravid female, showing four males grouped around the genital aperture.

food supply is adequate, a female engorges to a size often greater than 1mm. before young are produced. Where a great number of unfed females attack a single host larva they may develop to a much smaller size due to shortage of food. Some individuals may be dislodged from the host when only partly engorged, and their cumbersome shape and weight prevents them from regaining a feeding place. With these individuals, young are still produced, the numbers necessarily being much smaller. In fact, any slight engorgement appears sufficient to enable some young to be produced. The number of young produced by a full-sized gravid female varies from 200-300 (Webster, Herfs). The process is spread over a period of a week or more. At the end of that time the abdomen becomes collapsed and transparent, due to the loss of its contents. The body of the parent mite retains its vitality throughout, which is evidenced by the continued movement of the legs.

The newly-born females at once begin their search for a new host. They progress in a characteristic fashion. The forelegs are chiefly sensory in function, and play little part in locomotion; walking is practically quadrupedal, being performed almost entirely by the second and third pairs of legs; the hind legs are dragged rather stiffly behind, and are of little assistance in walking. The general effect is an awkward and automaton-like movement.

The mites readily swarm over a larva placed with them, and make attempts to feed immediately (Fig. 6). A firm grip of the surface of the host is taken with the legs, the "head" is then lowered, the mouthparts being forced into the host, sometimes with perceptible effort. If the host is an insect larva, it reacts quickly to their presence, wriggling frantically, but the mites hold on tenaciously. If a number of mites attack a single larva, it may become immobilized in about 24 hours; with few mites the period is longer. At first the mites feed at random, moving on from time to time. No mark is left at the seat of the bite. When the end of the abdomen has become so much distended as to make movement difficult, the female completes its engorgement without moving to a new site. If the infestation of the host larva is heavy, it becomes almost obliterated by the mass of swollen mites, and ultimately shrivels, owing to the loss of its body fluids. At this stage it presents the appearance of a bunch of grapes (Fig. 7). With the commencement of the next generation of mites, such a collection presents an animated appearance, each sphere supporting a group of males, while unfed females swarm in all directions. An infestation as dense as that illustrated in Fig. 7 is probably unusual in nature.

VI. METHODS OF BREEDING THE MITES.

Two methods of breeding the mites were used. For food supply the larvae of the grain moth (*Sitotroga*) were employed. In the first method a quantity of wheat was placed in a phosphor-bronze gauze cylinder (3½ in. diameter x 3½ in. high), which stood in a large petri dish. The inside face of the wall of the petri dish was greased to prevent the escape of mites. The cylinder was closed by a sheet of glass, which fitted closely. A number of grain moths were introduced and allowed to oviposit. When their larvae were well established in the wheat, a number of non-gravid female mites were added. The apparatus was kept in an incubator at 26° C., and at a humidity of about 90 per cent., this being maintained by a large tray of water placed on the floor of the incubator. After about a week numbers of young female mites were produced, which swarmed on the sides and glass top of the vessel. This method was useful when large numbers of the moth larvae were needed, to provide a stock culture of the mites.

For observations on details of the biology of the mites, single grain moth larvae were dissected out from wheat grains. They were confined in small (½ in. diameter) solid watchglasses, of a kind which may be stacked into nests. In these the mites readily attacked the larvae, and a number of generations occurred, provided larvae were added from time to time to maintain the food supply. The cultures in these vessels could be examined readily under the binocular microscope.

VII. MOUTHPARTS OF THE FEMALE MITE.

The mouthparts are exceedingly small. When a female mite is feeding on the surface of a moth larva, the capitulum (group of mouthparts) is pressed against the surface of the host. No external sign of stylets can be detected during the process even when watched under high powers of the binocular microscope. When mounted on a slide, some individuals exhibit a slender, needle-like structure which protrudes from the tip of the rostrum. After straining with pieric acid and mounting in glycerine jelly, several mites were squashed by pressure on the coverslip. In some cases it could be seen that this structure consisted of a pair

of stylets which are the distal ends of the chelicerae or mandibles. These structures widen out within the body to form greatly swollen bases (Fig. 2) to which protractor and retractor muscles are attached. The palps are vestigial; their functions are served by the forelegs, which are used to palpate surfaces on which the mite is walking, before feeding is attempted. It may be noted that a short clubbed seta (? sensory) is present on the two distal segments of the fore-legs. No trace of a hypostome could be detected, and it is assumed that the chelicerae are the only piercing structures. The mouthparts are too small to lend themselves to any of the usual methods of dissection. It appears that the two chelicerae enclose a suctorial groove, as they are very difficult to separate. This would account for the ability of the mite to pierce the human skin sufficiently

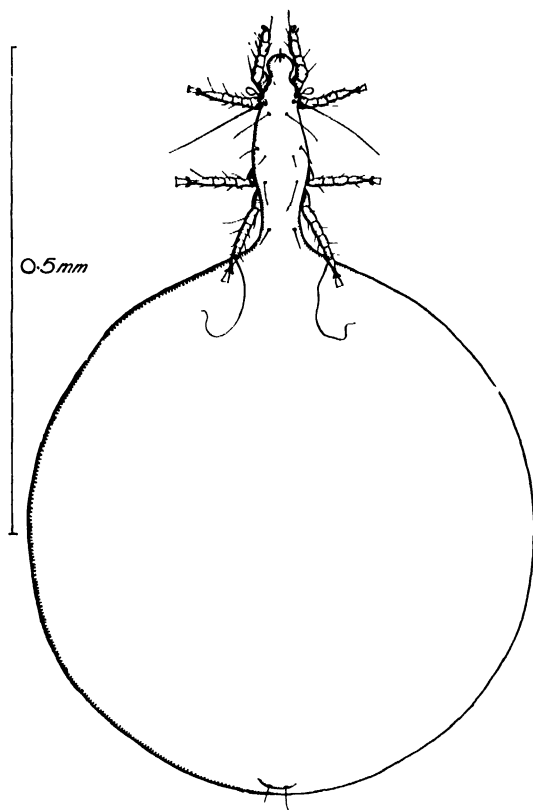


Fig. 5.—Partly engorged female mite. It will be seen that distension is confined to the tip of the abdomen.

deeply to allow of a venom being injected into the hypodermal layers. One function of this secretion, as already indicated, would appear to be to immobilize the host insect larva.

VIII. OBSERVATIONS ON CERTAIN STRUCTURAL FEATURES OF THE MALE AND FEMALE *P. ventricosus*.

It may be noted that the drawing of the non-gravid female given in Fig. 2 differs in various particulars from all the previously published figures that have been seen by the writer (*e.g.*, Webster, Willcocks, Berlese, Ewing); it is widely different from that of Laboulbène and Mégnin (reproduced by Brumpt, 1927). No two figures agree, the chief divergence lying in the number of dorsal setae shown. It is usual to show two pairs of large setae near the base of the second pair of legs.

In my specimens only one pair was constantly present. The male has been also figured in a variety of ways by different authors. The drawings in the present paper were made with the help of the camera lucida from specimens mounted in Berlese's medium, using apochromatic objectives and compensating oculars.

Just posterior to the fore-legs, the cephalothorax bears a pair of club-like, pseudostigmatic organs, presumably sensory in function. They are bladder-like, with one side pushed in, forming a concavity which disappears on mounting in Berlese's medium. The spiracles are paired, opening ventrally between the bases of the fore-legs and the mouthparts. The tracheal system runs backward as a pair of tubes. These branch profusely in the abdomen of the gravid female, where they may be seen as conspicuous structures running meridionally.

IX. RELATION OF *P. ventricosus* TO MAN.

Reference has been made in an earlier section of this paper to records of the association of the mite with certain skin affections in man. *Pediculoides ventricosus* may, in Australian climatic conditions, attain large numbers in local favourable situations. This may occur in haystacks, produce stores, &c. In the work of handling hay infested with these mites, some may reach the human body and pierce the skin. This action will be most marked in hot weather, when their need for moisture is most urgent. The writer made three visits to an infested stack to obtain mites. This was done by pulling out well-buried sheaves and beating them out. After the first visit evidence developed on the skin of 14 bites having been received (max. temp. 80° F.); after the second, 2 bites (max. temp 60° F.); and after the third, about 30 bites (max. temp. 110° F.). The amount of exposure in each case was roughly the same, and the visits were all within the midsummer period.

All parts of the body are liable to be affected. Individual susceptibility to attack varies greatly (Larson, 1925). Some of the more severe cases reported (Webster, 1910) relate to persons who had slept on infested straw mattresses, the back and sides of the body being particularly affected. The body, arms, and neck are the usual regions where the mites bite. The face may be attacked, particularly the eyelid, upper or lower, and puffiness of both lids may result. The author was troubled with occasional bites in this region in the laboratory. It transpired that mites were escaping from cultures, climbing a binocular microscope that stood upon the bench, and running round on the eyepieces, from which individual mites readily transferred to the eyelids, when the microscope was being used.

Man is not a normal host of the mite. It does not persist long on the human body (Askins 1924) nor burrow under the skin (Askins, *loc.*). I have not seen any desire to burrow on the part of mites placed on the skin of the arm and observed under the binocular microscope. The anatomy and biology of the mite indicates that it does not burrow.

Asthma and dermatitis of workers in an Italian grain mill were traced to the mite (Ancona, 1923). The mill was infested by the moth *Tinea granella* L. Dermatitis was produced also amongst the inhabitants of nearby houses by dust from a mechanical elevator, at an English dock where barley from Morocco was being unloaded (Thompson, 1925).

Clinically, parts of the body affected by the mites exhibit a skin eruption. The following details are derived in part from the literature and in part from observations made by myself. The wheals vary in size and form with different subjects. They present, especially after rubbing, a raised whitish area with a small central vesicle, which marks the seat of the puncture. The blanched area is surrounded by a rosy red areola. The lesions may itch severely, especially when warm in bed, or

when the body is heated by exertion. Rubbing and scratching usually breaks the central vesicle and the possibility of secondary infection then arises. Itching usually subsides in 2-3 days, but the marks may last longer.

The following tests with mites seem worthy of record. About 50 newly emerged non-gravid females were placed in a small deep watchglass ($\frac{1}{2}$ in. diameter) which was inverted on the skin of the inner face of the forearm of the writer. The atmospheric temperature was 20° C. (68° F.), and the temperature under the clothing at the point of application was 32° C. (89.6° F.). The watchglass was held in position by a rubber band, and removed at the end of one hour. No lesions developed.

On another occasion 10 mites were applied in a similar fashion, just before going to bed. Three and a half hours later they were removed. Five hours later signs of lesions could be detected. In another four hours these were distinct, rosy red in colour, and with a small pustule at the centre. About 20 hours after exposure they were considerably swollen, each lesion having a central pustule as big as a pin's head. Some oedema of the surrounding area was present. They did not begin to

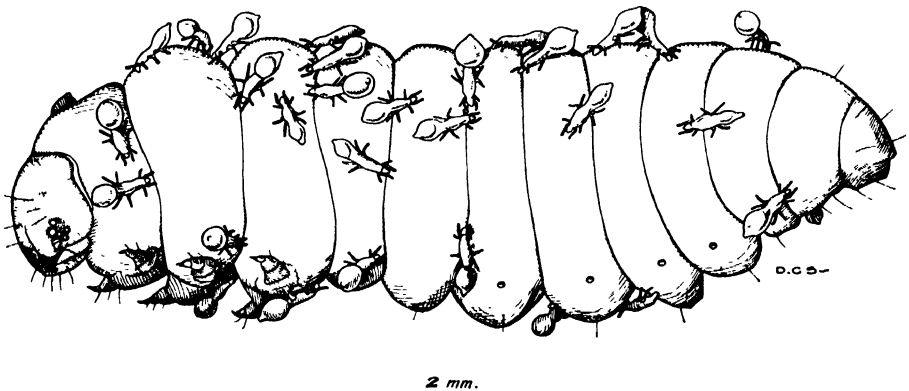


Fig. 6.—Camera-lucida drawing of a larva of the Grain Moth, *Sitotroga cerealella*, on which a number of female mites are feeding. They have fed for $1\frac{1}{2}$ days at 26° C., and show early stages of engorgement. The larva is entirely immobilised.

itch until 24 hours had elapsed. After a further 12 hours the oedema was much reduced and itching had ceased. It could still be renewed by rubbing 72 hours after the original exposure.

Webster (1910) gives figures of typical cases. The characteristic symptoms are well described by Goldberger and Schamberg (1909). They point out that the condition is at times mistaken for "hives," chickenpox, and scabies. In normal infestations malaise or systemic symptoms do not present themselves. In Australia it would appear that the agricultural worker endures the trouble where it occurs, as a normal hazard of his calling, and may not associate it with any living cause existing in the material he is handling. In view of its transient nature, a medical adviser is not consulted. This probably accounts for the fact that the condition has not hitherto been reported in Australia, so far as can be ascertained.

The literature contains a number of references to treatment. These consist, in general terms, of methods of allaying the irritation, and precautions to prevent secondary infection of lesions broken by scratching. Where infested material must be handled, a hot bath as soon as possible afterwards is recommended. The sprinkling of flowers of sulphur in working clothes has been used to repel the mites (*e.g.*, Thompson, 1925).

X. FARMING PRACTICE IN RELATION TO HAY, AND ITS INFLUENCE ON THE
PRESENCE OF *Pediculoides*.

In Australia wheat and oats are the most-used hay crops in the cereal belt. It is the standard practice to cut the crop some time after flowering. Immediately after flowering, the grain in the ears begins to fill out, the process occurring rapidly under Australian conditions. The sheaves are stooked and allowed to dry for some three weeks after cutting, and are then stacked. The resulting hay contains well-developed grain in the ears. There is a prejudice on the part of buyers of chaff in favour of a product in which developed grain is present. From the grower's point of view, an appreciably greater yield of hay is obtained by cutting towards maturity than at an earlier growth stage, *e.g.*, flowering.

It is, however, well known that cereals possess a higher nutritive value at flowering than at the dough stage, or at full maturity of the grain. Until that time the food materials in the plant are located principally in the leaves and developing ears. As the ear matures these materials become gradually concentrated

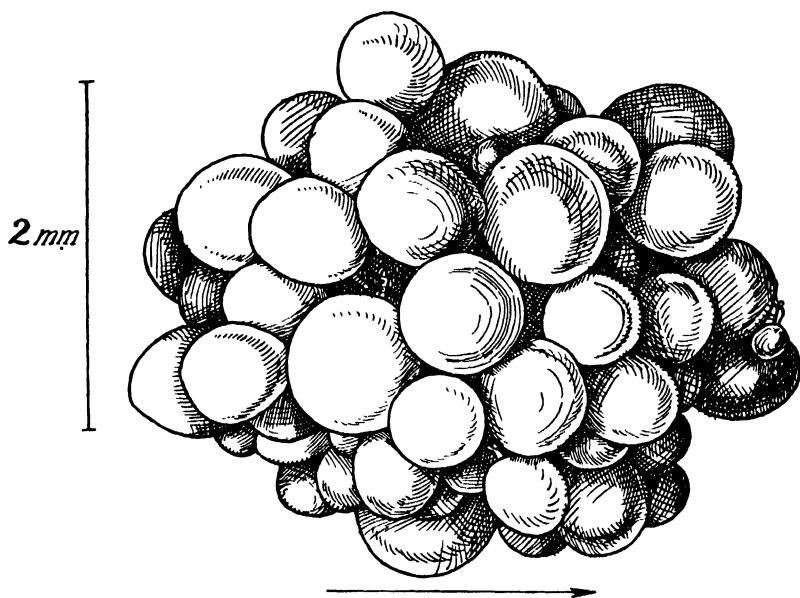


Fig. 7.—Appearance of a group of mites on the shrivelled remains of a grain moth larva. The arrow indicates the original long axis of the larva. (Camera-lucida drawing.)

in the grain, until ultimately the latter represents the chief feeding value of the plant, the straw consisting mainly of indigestible fibre. There are, however, several ways by which the original grain content of such material is reduced before it comes to be fed. In the stack the grain provides suitable food for the Grain Moth, *Sitotroga cerealella*, which reaches large numbers rapidly. It is very constantly present in such stacks, and may destroy a large part of the grain present in the ears. With late-cut hay it may greatly reduce the feeding value of the hay. A certain part of the grain is lost through falling out, while mice undoubtedly account for significant amounts.

As far as *Pediculoides ventricosus* is concerned, it has already been pointed out that, in hay stacks, it feeds chiefly upon the larvae of *Sitotroga*.

The advantages of early cutting (*i.e.*, at flowering time) may therefore be tabulated as follows:—

1. A material increase in the feeding value of the hay is obtained, although the actual yield is decreased. This decrease is largely compensated by the increase in nutritive value and digestibility obtained.

2. The Grain Moth is controlled.
3. The mite, *Pediculoides*, which feeds on this, is checked.
4. The possibility of "hay itch" is greatly reduced.

It may be added that such hay will offer less support for mice, often a source of serious damage where grain is present.

It is realised that it is often less convenient to cut hay crops at this time, and the weather is frequently less suitable for curing. Mr. H. C. Trumble, Agronomist at the Waite Institute, has suggested that an alternative method of conserving the earlier cut forage would be as stack-silage. Owing to the rapid development of grain after flowering (a week may be sufficient to allow appreciable development) it is difficult to avoid a certain amount of it in the stack. It is considered that in regions where "hay itch" is a problem, this harvesting practice should be aimed at. It is supported by a consideration of the relationships of the moth to the hay-crop, and the mite to the moth. Further, the curing process will not be much longer than for the later cut crop.

In conclusion, it is suggested that if a stack from a late-cut crop is to be made, at a farm with a previous history of "hay itch," it should be built on a new clean site each year, some distance from old sites, and that old or residual hay should not be used for flooring or thatching, owing to the risk of infecting the stack with mites that were over-wintering in this material.

XI. ACKNOWLEDGMENTS.

The writer has pleasure in acknowledging valuable help and assistance from a number of persons. Dr. J. Davidson has at all times given encouragement and information of the greatest value, and has read through the manuscript and made many valuable criticisms. Mr. H. C. Trumble, Agronomist, and Dr. J. G. Davies, Agrostologist, at the Waite Institute, gave much helpful advice and information on various aspects of Section X. Mr. H. Womersley, Entomologist at the S.A. Museum, has aided from his wide knowledge of the mites, and in regard to literature. Finally, thanks are tendered to Professor J. B. Cleland, Professor of Pathology in this University, for his interest and advice on the medical side of the problem.

XII. SUMMARY.

1. *Pediculoides ventricosus* Newport is recorded from South Australia.
2. Details of its biology and life-history are given.
3. Its rôle in "hay itch" is discussed.
4. Suggestions for its prevention in stacks are made.

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APRICOT PRUNING AND MANURING AND FROST PREVENTION—CROP RECORDS.

[By J. B. HARRIS, Dip. Hort., Horticultural Instructor.]

APRICOT PRUNING.

An experiment to determine, if possible, the influence of "long" and "short" pruning of apricot trees on the prevalence of gummosis has now been in progress at Light's Pass for some years, the trees having been planted in July, 1928. For an account of the experiment up to July, 1933, see *Journal of Agriculture*, vol. 37, pp. 394-398. No significant occurrence of gummosis has so far been noted, but the comparative cropping of the trees under the two systems of pruning is worthy of note.

As stated in the above journal, the crop during the 1931-32 growing season was disastrously affected by frost, and in January, 1932, only a few fruits, the weight of which was not recorded, were picked, chiefly from the ends of leaders on the "long" pruned trees. In January, 1933, the crop from the long pruned trees was 311lbs. net, and the crop from the short pruned trees 105lbs. net. During the past season, i.e., January, 1934, the long pruned trees produced 31 cases of fruit, equal to 1,674lbs. net, or 14cwts. 3qrs. 22lbs. from the 10th to the 28th January. The short pruned trees produced 28 cases, equal to 1,512lbs., or 13cwt. 2 qrs. of fruit from the 16th to the 29th January. Although the crops from the differently pruned trees were not separately graded, it was apparent to the pickers and other observers that the average fruits from the short pruned trees were appreciably larger than those from the long pruned trees.

APRICOT MANURING.

Although the application of fertilisers to the apricot trees in the manuring test at Light's Pass (see *Journal of Agriculture*, vol. 37, p. 185) was carried out according to schedule, the crop was subsequently destroyed to such an extent by frost on the nights of October 25th and 26th that when the remaining fruit was picked it was found that the crop was so small, and the comparative cropping of the plots so erratic, that the owners of the orchard did not consider the crop worth recording. It is proposed, however, to carry on this test for further years, with some provision for frost prevention, this plot having been twice damaged by frost during the progress of this experiment.

FROST PREVENTION BY ORCHARD HEATING AT LIGHT'S PASS.

The comparison of crops harvested from the heated and unheated or "check" plots in this test bears out the efficacy of orchard heating, as illustrated in the *Journal of Agriculture*, vol. 37, pp. 649-663. The crop harvested from the heated area—1 acre, planted with 70 trees—between January 3rd and January 23rd, 1934, was 88½ cases, approximately two-thirds of the fruit ripening from the 9th to 17th January. The crop from the unheated or "check" plot, consisting of 60 trees, harvested between January 3rd and January 17th, was 28½ cases, the bulk of which ripened between the 9th and 17th January. A most important point for consideration in connection with this test is the fact that 75 per cent. of the fruit from the unheated plot, i.e., 21.3 cases, was harvested from the 14 trees in the two rows adjoining the heated plot. These latter trees showed signs, immediately after the frost, of having benefited to some extent from heat radiated from the heated plot. It should also be borne in mind that, as explained in the above journal, both plots suffered alike from frost on the night of October 24th or early morning of October 25th, when, owing to an accident, no heating was carried out. Further reference to these figures in their relation to costs of orchard heating will be published in a subsequent issue.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

DAIRY PRODUCERS' CONFERENCE.

The Third Annual Conference of Branches associated with the dairying industry was held at Milang on Wednesday, May 9th. Representatives were present from the Adelaide, Hartley, Langhorne's Creek, Finniss, Lyndoch, Strathalbyn, Jervois, McLaren Flat, Scott's Bottom, Belvidere, Cherry Gardens, Murray Bridge, Kangarilla, and Milang Branches.

Mr. P. J. Bailly (Member Advisory Board of Agriculture), Prof. A. J. Perkins (Director of Agriculture), Messrs. W. J. Spafford (Deputy Director), H. B. Barlow (Chief Dairy Instructor), and H. J. Apps (Senior Dairy Instructor), H. C. Pritchard (General Secretary) and F. C. Richards (Assistant Secretary, Agricultural Bureau) were present on behalf of the Department.

The opening address was delivered by Mr. Bailly.

PAPERS AND RESOLUTIONS.

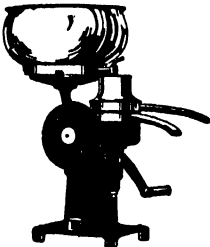
The following papers provided excellent discussions:—"Dehorning," J. Y. Hudd (Adelaide); "Management of the Dairy Herd," A. Kelly (Milang); "Pasture Development," E. L. Goode (Narrung); "Care of Cream and Butter," J. M. Yelland (Milang).

Mr. Bailly presented Life Membership Certificates of the Agricultural Bureau to Messrs. F. Hassam and L. Mann, of the Milang Branch.

Conference carried the following resolutions:—"That this Conference request the Government to pass legislation to compel the dehorning of all bulls 2 years of age and

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over used for dairying purposes." "That the 1935 Conference be held at Mount Barker," "That in view of the fact that 79 per cent. of the milk produced last season in South Australia was manufactured into butter, and during that period (1932-33) 150,000cwts. of butter were made in the factories and 45,000cwts. on the farms, and bearing in mind the importance of the butter industry to the State, this Conference is of the opinion that the utmost endeavour should be made to place the industry on a sound footing." "That this Conference does not agree with the Royal Commission's recommendation that the practice of payment for cream on a butterfat basis should continue, and is of opinion that payment should be made on the basis of commercial butter." "That this Conference is well aware of the widespread opinion among farmers that what has come to be known as 'manufacturing costs' in the butter industry are considerably higher than they should be." "That in order that the cream suppliers' interests may be the better served this Conference asks that immediate legislation be passed to give effect to recommendations 22, 23, 24, 25, 26, 27, and 29 of the report of the Royal Commission on Dairy Industry Prices, and that in the case of recommendation 26, representatives of the producers be associated with those of the Government and manufacturers." "This Conference recommends that the present expensive method of collecting cream for transport to the factories be abolished and that there should be substituted for it, possibly by legislation, a more economical method."

The evening session was occupied with an address by Mr. Barlow, "Pigs for the Overseas Market."

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on April 24th, there being present Messrs. A. J. Cooke (Chairman), R. H. Martin (Vice-Chairman), A. M. Dawkins, F. Coleman, P. J. Bailly, A. L. McEwin, A. J. A. Koch, Professor A. J. Perkins, Dr. A. E. V. Richardson, and H. C. Pritchard (Secretary). Apologies were received from Messrs. J. B. Murdoch and J. W. Sandford.

New Member.—The Chairman welcomed Mr. A. J. A. Koch as a new member of the Board.

Ridley Memorial Trust.—Mr. A. M. Dawkins was re-elected as the representative of the Board on the Ridley Memorial Trust.

Murray Lands East Conference.—The Board granted approval to the application of the Caliph Branch to hold the 1934 Conference of Murray Lands East Branches of the Bureau at Caliph.

New Branch.—Approval was given to the formation of a Women's Branch at Snowtown, with the following ladies as foundation members:—Mesdames W. Pellew, A. E. Michael, W. Stanton, A. and K. Andrews, A. Davidson, W. McDonald, J. Hancock, P. Wheaton, G. Freebairn, C. Lovelock, and Miss E. Kreig.

New Members.—The following names were added to the rolls of existing Branches:—Mangalo Women's—Mrs. O. Guy, Mrs. J. Hissey; Upper Wakefield—Cyril Webb, Arnold Smith, P. Ryan, John Ryan, M. Cleary; Booborowie—W. J. Shattock, F. Shattock, S. Shattock, Harry Baynes; Sutherlands—O. Jencke; Mundalla Women's—Miss M. Fisher, Miss Una Fisher; Gladstone—C. H. Lines, Roy Lines; Scott's Bottom—G. R. Langford; Beetaloo Valley—C. Curtin; Nantawarra—A. Bryant, F. Bryant, P. G. Palfrey.

The Board dealt with a number of items in Committee.

STATEMENT OF IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC., EXAMINED DURING THE MONTHS OF FEBRUARY AND MARCH, 1934.

IMPORTS.

Interstate.

	February.	March.		February.	March.
Apples (bushels)	300	462	Onions (bags)	2,519	1,572
Bananas (bushels)	9,425	11,071½	Potatoes (bags)	1,154	12,809
Citrus—			Swedes (bags)	63	32
Grape Fruit (bushels) ..	3	1	Bulbs (packages)	30	25
Lemons (bushels)	25	17	Plants (packages)	19	15
Oranges (bushels)	44	17	Roots, Grass (packagr) ...	—	1
Nectarines (bushel)	½	—	Seeds (packages)	16	48
Passion Fruit (bushels) ...	67	68½	Wine Casks (No.)	2,030	2,000
Peaches (bushel)	1	—			
Pears (bushels)	1	75	<i>Fumigated—</i>		
Pineapples (bushels)	1,020	862½	Wine casks (No.)	1	—
Plums (bushels)	2	—			
Tomatoes (bushels)	209½	378½	<i>Rejected—</i>		
Gooseberries, Cape (bush.)	4	—	Bananas (bushels)	97	45½
Peanuts (bags)	40	—	Citrus—Lemons (bushels) ..	2	—
Peanuts Kernels (bags) ..	—	5	Pineapples (bushels)	3	—
Walnuts (bag)	—	1	Plums (bushel)	1	—
Beans (bushel)	—	1	Potatoes (bags)	78	183
Carrots (bags)	52	62	Plants (packages)	3	—
Cucumbers (bushels)	11	4½	Secondhand bags (No.) ...	145	—
Egg Fruit (bushel)	—	1	Secondhand cases (No.) ..	12	—

OVERSEAS.

(State Law.)

Wine casks (No.)	1,725	1,713
<i>Fumigated—</i>		
Wine casks (No.)	44	50

Federal Quarantine Act.

	Packages.	Lbs.	Packages.	Lbs.
Seeds, &c.	2,738	453,089	5,504	1,014,623
Plants	—	—	1	50 (No.)
Canes	107	—	58	—
Cocoanut chests	85	—	125	—
Tea chests	3,064	—	1,070	—
Timber	177,076	5,536,327	155,128	4,696,936
		Sup. ft.		Sup. ft.

EXPORTS.

Federal Commerce Act.

	February.	March.		February.	March.
	Packages.	Packages.		Packages.	Packages.
Egypt Apples	—	487	New Zealand	109	32
England .. Apples	38,386	110,508	Scotland .. Apples	—	8,228
Grapes	—	150	Singapore .. Apples	75	65
Pears	6,383	7,048	Lemons	2	—
Germany .. Apples	—	81,546	Peaches	5	55
India Apples	969	3,077	Pears	50	106
Grapes	5	154	Plums	130	6
Nectarines	4	—	Vegetables	46	55
Peaches	54	—	Straits		
Pears	205	125	Apples	—	10
Plums	43	—	Settle-		
Vegetables	34	—	ments		
Nether- Apples	75	2,174	Peaches	8	—
lands, Peaches	7	6	Pears	3	5
East Pears	197	130	Plums	20	—
Indies			Potatoes	15	15
			Other vegetables	3	7
			Sweden .. Apples	—	32,004

DAIRY AND FARM PRODUCE MARKETS.

MESSRS. A. W. SANDFORD & CO., LIM.

BUTTER.—The cold dry weather which was experienced last month caused a further shrinkage in supplies of dairy produce, and the minimum of production has now been reached. In one or two of the more favored parts of the State a slight increase in cream supplies was noticeable, but, in the aggregate, production is still almost stationary. During the month various conferences were held in this and other States to endeavor to arrive at a plan for stabilising the industry and in the eastern States a scheme has been arranged for this object. In South Australia it is proposed to arrange a State plan which, it is hoped, will function satisfactorily. Rates firmed at the end of the month and present values are:—Choicest creamery fresh butter in bulk, 1s. 3½d. (These prices are subject to stabilisation levies.) Store and collectors lots, 6d. to 7d. per pound.

CHEESE.—The South-Eastern factories marketed quantities of all sizes throughout the month. Local and Westralian trade was again well maintained and ready clearances effected. Production is now down to a low level, but, as rains were received in the Gambier district, it is expected that a gradual improvement will take place from this out. The present rates are as follows:—Large and medium, 7½d. to 8½d. per pound; loaf, 8½d. to 8¾d.; semi-matured and matured, 8½d. to 9½d. per pound.

EGGS.—As usual during the cold weather the supplies of eggs have fallen back and production at the present time is about at minimum. However, there is more than sufficient for local needs, and some shipments have gone forward each week to Sydney. Rates moved forward during the month and at present are as follows:—Ordinary country eggs, hen or duck, 9d. per dozen; selected fresh eggs, 1½ozs. and over, 1s. to 1s. ½d. per dozen.

BACON.—Although the turnover in bacon has shown steady improvement, which is usual at this time of the year, the demand for hams has slackened. However, there was little demand during the month for farm cured bacon as storekeepers generally preferred to handle the factory cured bacon of the established brands. Rates have continued on an even keel throughout and are as follows:—Best quality sides, 9½d. to 9¾d.; middles, 10½d. to 11d.; rolls, 8d. to 8½d.; hams, 11½d. to 1s.; cooked, 1s. 2d. to 1s. 2½d.; lard prints, 5½d. per pound.

ALMONDS.—It is generally expected that the quantity of almonds gathered this year will be considerably less than last season. The consignments received in the open markets during the month were only limited and there was no difficulty in quitting them from day to day. Present values are:—Softshells and Brandis, 7½d. to 8d.; hardshells, 4½d. to 5d.; kernels, 1s. 9d. to 1s. 10d.

HONEY.—This commodity also is shorter in supply this season than last, and it is expected that the quantity gathered will not be more than 30 per cent. or 40 per cent. of last season's take. However, there was a large carry-over from the previous season, so that no difficulty is being experienced in meeting the demand from week to week. Rates are as under:—Prime quality clear extracted in liquid condition, 3½d. to 4d. per pound. Special quality odd tins, 4½d. per pound; lower grades, 1½d. to 2½d. per pound.

BEEFWAX.—Stocks are light and prices moved forward to 1s. 4d. to 1s. 4½d. per pound.

POTATOES.—New season's, 9s. per cwt.

ONIONS.—Brown Spanish, 6s. per cwt.

LIVE POULTRY.—As usual, after the Easter markets supplies of poultry were considerably less, but, during the past few weeks, there has been a much larger quantity of birds sent forward. As most poulterers have now almost exhausted their supplies held in cold store, they are operating freely from sale to sale and rates are, therefore, well maintained. During recent markets there has been a shortage of prime quality heavyweight turkeys, and values for these have been high. We advise consigning. Crates loaned on application. The prices at present ruling are as follows:—Prime roosters, 3s. 2d. to 4s. 3d.; nice conditioned cockerels, 2s. 7d. to 3s. 1d.; fair conditioned cockerels, 1s. 9d. to 2s. 6d.; chickens lower; heavyweight hens, 2s. 3d. to 3s. 3d.; medium hens, 1s. 9d. to 2s. 2d.; light hens, 1s. 4d. to 1s. 7d.; couple of pens of weedy sorts lower; geese, 2s. to 3s.; goslings, lower; prime young Muscovy drakes, 3s. to 4s.; young Muscovy ducks, 2s. to 2s. 9d.; ordinary ducks, 1s. 3d. to 2s.; ducklings, lower; turkeys, good to prime condition, 9d. to 1s. per pound live weight; turkeys, fair condition, 7d. to 8d. per pound live weight; turkeys, poor and crooked breasted, lower; geese, 3½d. to 4½d. each.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of April, 1934, also the average precipitation for April, and the average annual rainfall.

Station.	For April, 1934.	Av'ge. for April.	Av'ge. Annual Rain-fall.	Station.	For April, 1934.	Av'ge. for April.	Av'ge. Annual Rain-fall.
FAR NORTH AND UPPER NORTH.				LOWER NORTH—continued.			
Oodnadatta	0.09	0.23	4.69	Brinkworth	0.49	0.90	15.83
Marree	0.04	0.39	5.93	Blyth	0.96	1.33	16.80
Farina	—	0.45	6.48	Clare	1.62	1.94	24.56
Copley	0.02	0.57	7.93	Mintaro	1.99	1.62	23.47
Beltana	—	0.55	8.53	Watervale	1.86	2.21	26.91
Blinman	0.41	0.81	11.92	Auburn	1.52	1.81	24.00
Hookina	0.13	0.67	11.46	Hoyleton	1.97	1.46	17.35
Hawker	0.21	0.90	12.31	Balaklava	1.28	1.38	15.49
Wilson	0.26	0.85	11.82	Port Wakefield ..	1.19	1.12	12.06
Gordon	0.16	0.51	10.59	Terowie	0.30	0.89	13.40
Quorn	0.14	0.91	13.29	Yarcowie	0.39	0.95	13.63
Port Augusta	0.40	0.76	9.46	Hallett	0.67	1.13	16.48
Bruce	0.20	0.49	9.95	Mount Bryan	0.64	0.94	16.81
Hammond	0.25	0.85	11.27	Koorunga	0.59	1.21	17.92
Wilmington	0.39	1.34	17.43	Farrell's Flat ...	1.17	1.41	18.68
Willowie	0.70	0.72	12.28	WEST OF MURRAY RANGE.			
Melrose	0.99	1.63	22.94	Manoora	1.26	1.31	18.93
Booleroo Centre	0.64	1.15	15.23	Saddleworth	1.93	1.62	19.61
Port Germein ...	0.76	1.10	12.55	Marrabel	1.97	1.59	19.94
Wirrabara	0.69	1.44	19.34	Riverton	2.95	1.70	20.81
Appila	1.10	1.16	14.66	Tarlee	2.32	1.47	18.13
Craddock	0.12	0.74	10.83	Stockport	2.37	1.30	16.97
Carrieton	0.39	0.78	12.29	Hamley Bridge ..	1.66	1.34	16.61
Johnburg	0.25	0.65	10.59	Kapunda	3.32	1.56	19.82
Eurelia	0.45	0.84	12.85	Freeling	2.20	1.38	17.88
Orroroo	0.34	0.92	13.23	Greenock	2.08	1.61	21.57
Nackara	0.59	0.58	11.18	Truro	1.57	1.49	19.95
Black Rock	0.33	0.86	12.43	Stockwell	1.94	1.55	20.17
Oodlawirra	0.54	0.70	11.67	Nurootpa	2.16	1.55	20.72
Peterborough	0.68	0.93	13.27	Angaston	1.59	1.66	22.47
Yongala	0.53	1.04	14.47	Tanunda	2.17	1.70	22.03
NORTH EAST.				Lyndoch	1.38	1.67	23.46
Yunta	0.12	0.57	8.54	Williamstown ...	1.44	2.04	27.77
Waukaringa	0.10	0.52	7.97	ADELAIDE PLAINS.			
Mannahill	0.58	0.54	8.21	Owen	1.24	1.16	14.53
Cockburn	1.46	0.58	7.98	Mallala	1.17	1.34	16.59
Broken Hill,				Roseworthy	2.16	1.38	17.39
N.S.W.	0.43	0.71	9.57	Gawler	1.42	1.56	18.97
LOWER NORTH.				Two Wells	2.06	1.33	15.75
Port Pirie	0.90	1.17	13.26	Virginia	2.41	1.35	17.18
Port Broughton ..	0.45	1.19	13.92	Smithfield	1.31	1.10	17.65
Bute	0.73	1.25	15.49	Salisbury	1.62	1.55	18.59
Laura	3.37	1.43	17.99	Adelaide	1.51	1.73	21.15
Caltowie	1.16	1.26	16.75	Glen Osmond	1.54	2.03	26.03
Jamestown	0.36	1.26	17.75	Magill	1.35	1.95	25.60
Gladstone	1.58	1.33	16.33	MOUNT LOFTY RANGES.			
Crystal Brook ...	0.36	1.24	15.82	Teatree Gully ...	1.53	1.90	27.33
Georgetown	0.69	1.50	18.41	Stirling West ...	3.36	3.57	47.05
Narridy	0.18	1.26	15.88	Uraidla	3.72	3.21	44.19
Redhill	0.57	1.34	16.61	Clarendon	2.70	2.72	32.89
Spalding	0.60	0.99	18.99	Morphett Vale ..	1.75	1.81	22.68
Gulnare	2.07	1.05	18.71	Noarlunga	1.90	1.63	20.41
Yacka	1.22	1.17	15.40	Willunga	2.62	1.92	26.03
Koolunga	0.56	1.16	15.43	Aldinga	2.80	1.46	20.28
Snowtown	0.83	1.26	15.71				

RAINFALL—continued.

Station.	For April, 1934.	Av'ge. for April.	Av'ge. Annual Rain-fall.
MOUNT LOFTY RANGES—continued.			
Myponga	3.90	1.66	29.68
Normanville	2.19	1.62	20.73
Yankalilla	2.75	1.60	22.90
Mount Pleasant ..	2.62	1.98	27.24
Birdwood	1.68	2.04	29.24
Gumeracha	2.09	2.44	33.44
Millbrook Res.	2.59	1.72	34.82
Tweedvale	2.87	2.53	35.97
Woodside	2.52	2.17	32.30
Ambleside	3.51	2.43	34.90
Nairne	2.49	2.05	28.17
Mount Barker ..	3.01	2.22	31.97
Echunga	3.83	2.50	33.26
Macclesfield	3.26	2.25	30.44
Meadows	4.33	2.78	36.21
Strathalbyn	2.77	1.37	19.32

MURRAY FLATS AND VALLEY			
Meningie	1.56	1.44	18.42
Milang	1.40	1.21	14.97
Langhorne's Ck. ..	1.63	1.11	14.90
Wellington	1.38	1.17	14.70
Tailem Bend	1.42	0.75	15.08
Murray Bridge ..	1.00	1.09	13.64
Callington	1.35	1.09	15.22
Mannum	1.30	0.99	11.53
Palmer	1.63	0.87	15.55
Sedan	1.00	0.86	12.11
Swan Reach	1.48	0.52	10.62
Blanchetown	1.92	1.00	11.03
Eudunda	1.56	1.32	17.18
Sutherlands	1.44	0.60	10.88
Morgan	1.43	0.61	9.21
Waikerie	0.63	0.53	9.70
Overland Corner ..	0.57	0.75	10.37
Loxton	1.00	0.48	11.65
Renmark	0.44	0.64	10.49

WEST OF SPENCER'S GULF			
Eucla	3.02	1.04	9.98
Nullarbor	0.65	0.63	8.84
Fowler's Bay	0.69	0.85	11.93
Penong	1.26	0.82	12.23
Koonibba	1.52	0.66	12.11
Denial Bay	1.37	0.87	11.52
Ceduna	1.65	0.57	10.16
Smoky Bay	0.94	0.58	10.51
Wirrulla	1.14	0.54	10.50
Streaky Bay	1.42	0.96	14.88
Chandada	0.69	—	—
Minnipa	0.50	0.68	13.87
Kyancutta	0.41	—	—
Talia	1.42	0.63	14.63
Port Elliston	2.72	1.04	16.50
Yeelanna	3.10	0.75	16.02
Cummins	2.78	0.75	17.61
Port Lincoln	2.92	1.41	19.43
Tumby	3.37	0.85	14.14
Ungarra	3.58	0.77	16.87
Port Neill	3.04	0.70	13.16
Arno Bay	1.22	0.93	12.63

Station.	For April, 1934.	Av'ge. for April.	Av'ge. Annual Rain-fall.
WEST OF SPENCER'S GULF—continued.			
Rudall	0.96	0.86	13.12
Cleve	1.18	1.13	14.79
Cowell	0.58	1.11	11.12
Miltalie	0.91	1.15	13.64
Darke's Peak	0.42	0.77	15.23
Kimba	0.07	0.79	11.84

YORKE PENINSULA.			
Wallaroo	0.56	1.26	13.99
Kadina	0.31	1.44	15.69
Moonta	0.98	1.44	15.10
Paskeville	0.65	1.24	15.52
Maitland	0.86	1.69	19.97
Ardrossan	1.46	1.16	13.98
Port Victoria	0.99	1.30	15.49
Curramulka	0.92	1.27	17.95
Minlaton	1.13	1.38	17.85
Port Vincent	1.24	0.87	14.50
Brentwood	1.59	1.07	15.58
Stansbury	2.48	1.25	16.84
Warooka	2.20	1.31	17.53
Yorketown	1.51	1.28	16.94
Edithburgh	1.54	1.34	16.40

SOUTH AND SOUTH-EAST.			
Cape Borda	2.14	1.85	24.86
Kingscote	3.83	1.21	19.16
Penneshaw	3.33	1.21	19.02
Victor Harbor	3.80	1.59	21.42
Port Elliot	3.18	1.53	19.95
Goolwa	2.17	1.34	17.87
Copeville	1.41	0.47	11.57
Meribah	1.56	0.93	11.46
Alawoona	2.26	0.63	10.29
Mindarie	1.21	0.54	12.22
Sandalwood	0.92	0.50	13.73
Karoonda	0.77	0.65	14.48
Pinnaroo	1.42	0.78	14.57
Parilla	1.37	0.78	14.01
Lameroo	1.46	1.02	16.10
Parrakie	1.24	0.70	14.64
Geranium	1.28	0.94	16.53
Peake	1.56	0.81	16.13
Cooke's Plains	1.47	1.10	15.43
Coomandook	1.31	1.00	17.20
Coonalpyn	1.86	1.35	17.53
Tintinara	1.66	1.31	18.73
Keith	2.09	1.11	17.96
Bordertown	1.61	1.55	19.26
Wolseley	1.70	1.52	18.52
Frances	2.84	1.42	20.01
Naracoorte	3.00	1.73	22.63
Penola	3.11	1.85	26.05
Lucindale	5.94	1.77	23.29
Kingston	3.69	1.80	24.37
Robe	4.27	1.74	24.68
Beachport	3.77	1.89	27.07
Millicent	5.57	2.31	29.81
Kalangadoo	4.02	2.04	32.38
Mount Gambier	3.72	2.32	30.55

AGRICULTURAL BUREAU REPORTS.

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Borrika	*	—	—	Keith	*	24	21
Bowhill	*	28	25	Kelly	†	5	2
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Brinkley	*	23	27	Kilkerran	†	24	21
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* No reports received during the month of April. † Held over. R In recess. ‡ Formal.

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

[Branch Secretaries are reminded that the following are exempt from payment of the Annual Bureau subscription:—Life members, Branch Secretaries, members appointed before August 1st, 1930, and new members who reside in the same house as (a) a life member, (b) Secretary, or (c) another member who already subscribes.

The subscription for all other members is 2s. 6d., commencing from August 1st in each year, provided that—subject to the above exemptions—nominations forwarded during the months of January to June must be accompanied by a payment of 1s. 6d. each nomination for that period.]

MEN'S BRANCHES. SOUTH-EASTERN DISTRICT. POISONING TREES.

[Paper read by Mr. F. J. R. Dinning at the April meeting of the Mundulla Branch.]

The formula recommended is as follows:—1lb. of arsenic, 1lb. of washing soda, 1gall. of water; boil on a slow fire until the liquid is quite clear and free from white particles; give an occasional stir, care being taken not to inhale the fumes. The mixture can be boiled in kerosene buckets by putting in 4lbs. each of arsenic and washing soda and adding 3galls. of water; then make up to 4galls. by adding enough hot water to fill the bucket just before taking it off the fire.

It is very difficult to prevent the mixture from boiling over in the early stages. To guard against this, a slow fire is necessary. If the soda is crushed very finely, dissolved in boiling water and then poured slowly on the arsenic and stirred a little before hanging over the fire, there will be less danger of boiling over. A slow fire, out in the open air, should always be used to lessen the danger of inhaling the fumes, which are very poisonous. Because of the poisonous nature of the fumes, the liquid should not be used until quite cold.

METHOD OF APPLYING.

Trees which are large enough to frill ring; a frill should be cut through the bark just into the sap-wood. About one chop deep around the tree is all that is required. Each chop with the axe must link up to complete the ring, but the chip should not be taken out, thus leaving an open frill at the top, so the liquid can be poured in easily.

The ring should be near the ground—the nearer the ground the less likely the shoots are to grow. Ring about 6in. from the ground on all small trees, and a little higher on old timber. Trees that are too small to ring can be cut down level with the ground and sufficient liquid poured on the stump to wet the top of the stump. This method will kill mallee also.

To apply the liquid, a can that will hold 3 pints is necessary. It should be shaped like a watering can without the sprinkler, and have a nozzle opening that will admit a piece of No. 10 wire. The can should be fitted with a strainer made of fine wire screen, otherwise pieces of bark, sticks, &c., block the nozzle of the can and prevent free running.

The quantity of liquid required is just sufficient to wet the inside of the ring of the tree, that is, the stream from the No. 10 nozzle, as you walk around the tree, will do the job, but it must connect, with no patches missed.

THE BEST TIME TO POISON.

The best time of the year to poison is when the sap is down; during May, June, July, and August, June and July for preference. Poisoning during summer does not kill the stump. The trees usually show signs of withering from 5 days onwards, and usually die within a month.

The trees should be poisoned as soon as rung so that the liquid mixes with the sap. Trees rung an hour before poisoning do not take the poison readily. A good method where men are available is for two to ring and one poison.

When only a small quantity of liquid is required, caustic soda can be used in place of washing soda. This does away with the necessity for the cumbersome job of boiling. 3lbs. of caustic will dissolve 4lbs. of arsenic without boiling. However, caustic soda is too costly when large quantities are needed.

CARE NECESSARY WHEN HANDLING.

Care should always be taken not to get the liquid in cuts or sores, and if clothes are saturated with the mixture it will take the skin off the body. Do not get it in foot-wear or it will cause serious burns.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Penola	13/4/34	—	Formal	F. Hinze
Mount Gambier	13/4/34	10	Address—A. L. Warren	G. Gurry
Allandale East .	23/3/34	12	Discussion	J. Laslett.

UPPER NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

WILMINGTON (Average annual rainfall, 17.43in.).

April 10th.—Attendance, 15.

DEBATE.—“Merits of Jersey v. Shorthorn Cattle as Sidelines on the Farm.” For Jerseys—Messrs. M. H. Modystach, S. C. Genders, and O. A. Haase. For Shorthorn—Messrs. H. Duhring, G. Fraser, and J. L. Moroney. Mr. E. L. Orchard acted as adjudicator. Jersey, 286 points; Shorthorn, 255 points.

QUESTION BOX.—*Storing Cocky Chaff.*—If it is proposed to store the chaff for any length of time, the best method is to provide a proper shed for the purpose. Failing that, the best way is to erect uprights about 5ft. apart, the length and height depending on the quantity of chaff. Wire netting is then fastened to the uprights. It is a good plan to lay flag stones at the bottom to prevent moisture soaking into the chaff and making it mouldy. A square enclosure is the best, because the wagon can be backed into it and each load built up, trampling it down well occasionally. Build chaff 2ft. above the netting before starting the gable roof, otherwise the setting down spoils the netting and the straw covering will dip to the inside, leading the water into the stack.

Cure for Sore Shoulders.—Cut a hole in the collar or remove the stuffing in the collar at the point, sewing a ring around to keep the place empty. After the sore has healed the stuffing may be replaced. It is advisable to bathe the affected part with white lotion every four or five hours. After the wound is clean one of the gall ointments advertised by veterinary firms may be applied. (Secretary, C. Cole.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Warcowie	27/3/34	25	Address—E. L. Orchard .	A. Crossman
Morchard	6/4/34	8	Question Box	E. Tilbrook

MIDDLE-NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

BQOBOROWIE.

April 5th.—Attendance, 15.

HARVEST REPORT.—Mr. E. A. Bristowe presented the following:—“Dan and Free Gallipoli thin and very short, but yielding a return beyond expectation—22bush. Federation and Bena, 8 bags. Merriden sown in the hills, which members of the

Branch inspected early in November, then looked very disappointing. A nice rain near the end of the month worked wonders on this crop, and it returned a yield of 10 bags. Mr. Bristowe then gave a short discourse on the comparison of the rainfall and the wheat prices over a lengthy period of years, finishing with a review of the growth of the world's population, which increased a little faster right through history than did the produce of the agriculturist until about 1928, when the increase in the growth of population suddenly ceased and the produce of the agriculturist increased and brought about a surplus that is glutting the world's markets to-day. (Secretary, A. Mayfield.)

BLYTH (Average annual rainfall, 16.80in.).

March 2nd.—Attendance, 16.

SEED WHEAT COMPETITION.—Mr. W. Eime read the following paper:—"The Seed Wheat Competition which has been so successfully conducted during past years has resulted in raising the standard and quality of crops in this district, and it would be a retrograde step if it were abandoned. I suggest that we have a Competition of seed wheat as used by members. Samples to be taken from two varieties of 90bush. each, and the wheat to be ready graded and pickled. For the scale of points I suggest the following:—

	Points.
Weight per bushel	15
Plumpness and evenness	15
Freedom from weeds, seed, smut, barley, &c.	25
Trueness to type and freedom from visible admixture	18
Freedom from injury in harvesting	17
Freedom from dirt, chaff, straw, &c.	10

100

Freedom from barley, weeds, and seeds is more important than weight per bushel. The entrant to sign an assurance that nothing more than the usual cleaning for the drill had been done with the wheat. At the Royal Show 15 points is allowed in the milling class for weight per bushel. For seed wheat, weight per bushel does not count. Another class.—One variety of 15bush., also pickled, is recommended:—

	Points.
Weight per bushel	20
Plumpness and evenness	15
Freedom from weeds, seeds, smut, barley, &c.	25
Trueness to type and freedom from visible admixture	15
Freedom from injury in harvesting	15
Freedom from dirt, chaff, straw, &c.	10

100

In this class the method of cleaning could be left in the hands of the entrant. The prizes need not involve a large sum of money. The quantity suggested should suit most farmers, for they mostly sow 90 or 100 acres of two favorite wheats, then the man that cannot compete in the big lots has the small amount to put up. He can afford to clean his better. There would be nothing to prevent a farmer putting the same wheat in both Competitions." It was resolved to take samples of pickled or unpickled grain from a stack of not less than 60bush., and that the following scale of points be used for judging: Plumpness and evenness of grains, 25; freedom from weed seeds, 25; freedom from visible admixture, 15; freedom from injury in harvesting, 25; freedom from dirt, chaff, &c., 10; total, 100 points. (Secretary, R. Eime.)

March 23rd.—Attendance, 14.

DRY PICKLING WHEAT.—In the course of a paper under the heading, "What quantity of dry pickle is necessary as a certain preventive against bunt?" Mr. P. Fiegert said:—"There is no exact quantity of dry pickle that can be claimed as a sure preventive against bunt, because districts are so different and the methods carried out in some parts of this State would be quite unsuitable in others." Members in discussing the paper were of the opinion that dry pickle was far superior to wet pickle with wheat, but not with barley. For wheat 1oz. to 1½ozs. per bushel of copper carbonate was considered sufficient.

DESTRUCTION OF FOXES.—Paper read by Mr. J. Pratt:—"When the skins are of little or no value I suggest poisoning with strychnine, using for baits fresh beef or mutton; a ball of caul fat is also very good. Perhaps the best baits are pigeons or sparrows—foxes take them readily, and a dog is not likely to pick them up. Use a drag and drop the baits right on the trail—around dams or water troughs is an ideal place in summer. When ewes are lambing and a lamb partly eaten by foxes is

found, poison it, being careful not to touch it with your hands. When ewes are lambing shift them to another paddock, and drop a few baits at the gate through which the flock passes. A stale sheep's head also makes an effective drag." In the discussion that followed members referred to the various methods of killing foxes. It was reported that one outstanding and simple method of fumigation was to place a burning bag or bundle of straw down the burrow. The fox would attempt to get out of the burrow at the first smell of smoke, and would be killed endeavoring to fight the fumes at the opening of the burrow. Each time that had been tried the fox had been found dead about 3ft. from the mouth of the burrow. (Secretary, R. Eime.)

BLYTH SEED WHEAT COMPETITION.

[Judged by Messrs. F. Coleman and W. C. Johnston, R.D.A.]

Class v. Best Collection of Two Varieties.—Messrs. T. Williams and H. E. Zweck tied for first place, each gaining 186.5 points. Both names of the successful exhibitors will be inscribed on the trophy presented by Messrs. H. J. Penno & Co., Ltd. Third prize was won by Mr. H. W. Eime, gaining 185.75 points.

Results.—T. Williams—Rance, 95.75; Ford, 90.75; total, 186.5. H. E. Zweck—Rance, 93.5; Sword, 93.0; total, 186.5. H. W. Eime—Rance, 96.25; Ford, 89.5; total, 185.75. A. L. McEwen—Rance, 94.5; King's Early, 90.25; total, 184.75. F. W. Zweck—Rance, 90.75; Nabawa, 92.5; total, 183.25. H. A. Zweck—Ford, 88.0; Sword, 93.75; total, 181.75. L. C. and R. H. Mugge—Currawa, 92.0; Ford, 82.75; total, 174.75. L. C. and R. H. Mugge—Sword, 87.5; Currawa, 92.0; total, 179.5. W. O. Eime—Rance, 83.75; Sword, 83.5; total, 167.25. Mr. H. W. Eime's Rance, with 96.5 points, gained the champion trophy presented by E. H. Lanyon, Esq. (Secretary, R. Eime.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Wandearah.....	10/4/34	22	Address—J. O. Hatter ..	J. O'Shaughnessy
Murraytown ...	24/3/34	11	Discussion	E. Pitman
Appila	28/3/34	14	Address—W. J. Spafford	E. Wurst
Beetaloo Valley	26/3/34	21	Address—W. J. Spafford	B. Giddings
Redhill	27/3/34	13	"Sheep Diseases," T. Torr	S. Pengilly
Gladstone	29/3/34	17	Question Box	L. J. Sargent

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

BLACK SPRINGS.

February 27th.—Attendance, 14.

SHEEP ON SMALL HOLDINGS.—Mr. J. Heinrich read the following paper:—"With the continued low prices for wheat and dairy produce, the small landholder will more or less change over from wheat farming to wool growing and fat lamb raising, this is not an easy matter in a time of depression. In the first place, the farm must be sheep-proof fenced and each paddock must have an ample supply of water. The farmer will ask himself the question, What shall I do with my stock and plant? There is no need to sell out, but instead of cultivating and growing only wheat he should revert, to some extent, to barley and oats. These cereals can be fed to ewes, who in return would profitably return a high class lamb and a good fleece. At present prices a good ewe rearing a lamb would net about 30s. a year. In some instances the farmer would find it difficult to finance the purchase of a flock of good ewes, but he may obtain assistance to do this, for otherwise I am convinced it is a good proposition. Sheep are very interesting, and the farmer will soon gain a fair knowledge, especially if he goes to a successful breeder in his district who would be only too pleased to give him timely advice. Better still, he should join an Agricultural Bureau in his district. Another factor that must not be lost sight of is that a high class ewe be kept. For preference, a Merino ewe producing a heavy fleece of good quality could be mated to Dorsets or other English breeds for export lamb raising. At present the Merino would be quite sound if good flock rams are used from a reputable breeder. By growing cereals and feeding to sheep the revenue from the farm could be considerably increased." (Secretary, K. Dunn.)

FRAYVILLE.

April 5th.—Attendance, 14.

POULTRY AS A SIDELINE.—Paper read by Mr. L. Eichler:—"Some hold the mistaken idea that poultry can exist and pay under the most adverse conditions, and if they do not, then it is the fault of the fowls. Every competent authority agrees that failure with poultry is the fault of the operator. The good laying strains are White Leghorn and Black Minorcas, and for table birds and fair layers the Black Orpington, Rhode Island Red, Wyandotte, and Plymouth Rock. A flock of 100 good layers will return 20 to 30 per cent. more eggs in a year than will an equal number of ordinary stock. They cost no more to feed. The fowls need a shed for roosting, not draughty but well ventilated, to keep the birds as healthy as possible. Disease once started will very quickly spread through the flock. Keep the shed as clean as possible, and spray with a solution of kerosene or a mixture of old motor crankcase oil and kerosene. This will kill poultry tick and red mite. If this is done fortnightly to the perches there will be no sign of scaly legs. Points to notice in examining a hen which has laid well:—Vent bluish-coloured, eyelids thin and edges white, eyes keen and sparkling, plumage worn, soiled, and close feathered. A poor layer:—Vent flesh-coloured, eyelids thick, yellow tinted, if moulting has not occurred; coarse-headed hens are invariably poor layers, the head should be acute, the face almond-shaped, and back of head long. Poor layers have a thick dry skin underlaid with fat; the good layer, the skin should be soft, thin, loose, and silky. To clean up the fowls, handle each bird, examine the mouth, see that it is clean from dangerous growths, &c. If affected, dust the part with powdered bluestone. Look for body parasites and dust well with insect powder. Have a mixture of salad oil 4 parts and kerosene 1 part; clean the shanks with this, and apply a very little to the face, comb, and wattles, especially behind ear or ear lobes. This helps to keep off chickenpox. **Broodiness.**—Where egg production is the main objective, broodiness among the layers is a nuisance and entails much work. Put a leg band on such hens and place in a coop until the fever is over. If she is a good layer return her to the flock; if not, send her to market. The less broody hens the better. The quicker they are cured the better. The broody instinct may last for five or six weeks, and sometimes longer. Some heavy breeds are more inclined to brood than light breeds. The purer the flock the less broodiness." (Secretary, H. Ramm.)

LIGHT'S PASS.

February 16th.—Attendance, 23.

Members exhibited home-made gadgets and labor-saving devices for use on the farm. Several interesting and useful models of the different home-made tools and implements were shown, and their uses explained. Mr. Stewart, of the A.D.F.A. addressed the meeting, giving several useful and novel ideas of trapping sparrows and starlings, which at present are doing a great deal of harm.

On February 28th members made a trip of inspection to the Hackney Experimental Vineyard, where they were met and conveyed through the garden by Mr. G. Quinn. They afterwards proceeded to Mr. N. Wick's nursery, where a pleasant and instructive evening was spent. (Secretary, C. Verrall.)

NANTAWARRA (Average annual rainfall, 15in.).

March 10th.—Attendance, 10.

FAT LAMBS.—Mr. E. G. Herbert read an article from the *Journal of Agriculture*, "The Production of Fat Lambs for Local and Export Trade." Discussion: Mr. E. V. Hamdorf favored the Dorset Horn crossed with a Merino ewe for lambs. He also thought the Border Leicester-Merino a good cross. Yarding the flock every second night was advisable. Mr. K. Young thought the Dorset Horn-Merino the best cross for the farmer to breed lambs. Mr. A. Herbert said it had been proved that the crossbred produced the best lamb, but the pure-bred Merino was the most satisfactory on a mixed farm, as the ewes could be kept for breeding when necessary, as well as being less troublesome. The small difference in the price of lambs would be practically made up by the heavier and better wool clip. (Secretary, S. Herbert.)

OWEN.—February 12th.

HARVEST REPORT.—Mr. J. Harkness, in giving a report of the 1933-4 harvest, first reviewed the rainfall and climatic conditions of the past year, and continued by saying that by the beginning of October everything pointed to a good return, with plenty of hay. We thought that the dry winter had made the roots of the plants go deep in search of moisture, and with a few frosts the wheat plant should be tough enough to withstand the usual hot winds. The conditions from mid-September to mid-October were very dry and followed by hot winds, one or two days being very severe. It appeared, before the hot winds, that the harvest would be later than usual, but

the crops seemed to mature as much in the fortnight as they should have taken a month to do. Some patches a little on the rank side turned from green to white, and later broke down, and consequently yielded nothing. After this disastrous period of heat and wind, the weather settled down to ideal ripening conditions, but the effects of hot winds were apparent in all varieties. Weeds were rather prominent in most crops, particularly wild mustard, which seems to thrive when crops receive a check. A comparatively new weed, the rat-tailed poppy, was rather prominent in one paddock, and, if not watched carefully, will spread rapidly. Our most dreaded disease, red rust, was conspicuous by its absence, after having been with us for the two previous years. Take-all was a little more prevalent than usual, probably the cause of this being the lack of winter rains to solidify the soil, which was left too open. There was a sprinkling of hull smut throughout some varieties, no doubt for the want of more care at pickling time. Flag-smut was present, but in a lesser degree than usual, owing, no doubt, to so much Nabawa being grown. One of the most disappointing features of the harvest was the pinched sample of light-weighting wheat. In some cases we have never reaped poorer wheat, and never such poor grain in the absence of red rust. The chief offender in this regard was the variety Nabawa, more or less our standard wheat, which has been a consistently good yielder for many years. Throughout this district it was almost a consistent failure, but I think it will do well in future, all the same. It yielded with us from 12bush. to 20bush. per acre. Sword was the outstanding variety, yielding 34bush., the sample being fair and weighing light. The best grain came from Waratah, which yielded about 24bush. Ford grew a lot of straw as usual, and returned 24bush.; also Nawab, while not growing as much straw as Ford, yielded about the same. The farm average was 22bush. Two patches of English barley each returned 8 bags to the acre, one lot being fair grain and the other poor. With regard to oats, three varieties—Guyra, Mortgage Lifter, and Mulga—were grown. Guyra performed best, yielding approximately 30bush. of plump oats, standing up to winds fairly well, and not shedding the grain as much as the other two varieties. Mortgage Lifter returned about 27bush., but the grain was very thin, and the crop went squashy in places. Mulga oats are somewhat new to this district; they are an early market variety, fairly good hay, and the grain is almost white. The variety yielded about 20bush., and although caught by hot winds, filled a fairly plump grain.” Other members contributed information regarding their crops. (Secretary, M. Freebairn.)

ROSEWORTHY (Average annual rainfall, 17.46in.).

March 3rd.—Attendance, 26.

SHEEP VERSUS WHEAT.—Paper presented by Mr. R. Tremlett:—“This subject is one of especial interest to local farmers situated in this favorable district. For purposes of comparison it is proposed to deal with:—(1) Wheat as the chief cereal crop and entirely as the first consideration, but the growing of malting barley to be allied with it—this being the most favored rotation in this district. (2) Sheep, firstly for the production of fat lambs, and secondly for wool. As a practical demonstration of the relative values of wheat and sheep, I intend to take an average farm of 600 acres. The chief interest in this subject must lie in the possibilities of both wheat and sheep at the present moment, under the existing conditions, and not purely and simply as an alternative undertaking by a farmer just commencing one or the other. In taking an average farm for this comparison I have assumed it to be fenced with a six-wire fence, together with the usual improvements.

Wheat (600-acre farm).—200 acres of wheat each year; 200 acres of barley grown on the wheat stubbles; 200 acres of bare fallow. A study of the wheat yields of this district shows that over a period of years a 9-bag average will be maintained, and a 7-bag crop of barley on the wheat stubbles. Thirty acres of the wheat crop must be cut for hay for the feeding of the farm team of 12 horses—an adequate number for the efficient working of the above farm—leaving 170 acres under wheat. Gross income at last harvest prices for grain:—

	<i>Income.</i>	£	s.	d.
170 acres of wheat at 9 bags per acre = 1,530 bags at 2s. 3d. per bushel .		516	7	6
200 acre of barley at 7 bags per acre = 1,400 bags at 2s. per bushel . . .		420	0	0
		<hr/> £936 7 6		

equals gross income except for the deduction of horse feed.

The expenditure side of the ledger must now be examined. The land itself, together with usual improvements, must be valued at ruling rates—approximately £12 per acre. This item is really almost immaterial, as it will be an equal deduction on both wheat and sheep.

<i>Expenditure.</i>		£	s.	d.
Purchase price of land (£7,200) at ruling rates of interest (5 per cent.)		360	0	0
Superphosphate		76	0	0
Seed wheat		40	0	0
Seed barley		30	0	0
Cornsacks		87	0	0
Bindor twine		4	0	0
Sewing twine		2	0	0
Pickles		2	0	0
Shares, &c.		3	0	0
Shoeing, &c.		3	0	0
Depreciation of farm plant valued at £700 at rate of 10 per cent. per annum		70	0	0
Depreciation of farm team valued at £360 (being £30 per head) at rate of 10 per cent. per annum		36	0	0
Interest at rate of 5 per cent. per annum on capital outlay of machinery and horses (£1,1060)		51	0	0
Wages (1 man for 12 weeks' harvest); wages also for the rest of year (40 weeks)		116	0	0
Total expenditure		£880	0	0
		£	s.	d.
Total gross profit		936	7	6
Less total expenditure		880	0	0

Leaving a net profit of £56 7 6

This amount is not actually the net profit for no provision has been made for maintenance of farm improvements and buildings, but for purposes of this discussion the above figures are accurate enough.

Rates and taxes have been entirely omitted as they are an equal deduction on either side.

SHEEP GROWING.

There is a general tendency to regard sheep farming as being of a much easier nature than wheatgrowing. On many different grounds this idea may be combated. In wheatgrowing there is a regular routine to follow which has differed only slightly over the last 20 years. Grass farming is a highly scientific study in so far as the cumulative effect of top-dressing, and the pasture must be given every consideration together with the improved fertility of the soil so that it can be readily seen that for comparison purposes with wheat it is not the profits which are made the first year but over a period of years which must be considered. Local farmers are very apt to regard sheep as a sideline and pastures as a secondary consideration. This view is quite natural, situated as we are in country which up to the present time has been almost entirely devoted to wheat. The actual figures relating to Australia's primary production are very interesting as follows:—65 per cent. of Australia's products grown on grass; 35 per cent. wheat and cereal growing. The vital point in this discussion lies in the one question, 'How many sheep per acre can be carried'? This question is one which can be studied from several different angles:—(1) To rely on natural pasture. (2) Top dress the virgin pasture with superphosphate. (3) Put down a sown pasture. I propose to adopt the top dressing of natural pastures. Experiments conducted at Kybybolite Experimental Farm give some astonishing figures in this respect:—Virgin pasture, 0.92 sheep per acre; 50lbs. superphosphate, 2.88 sheep per acre; 90lbs. superphosphate, 3.25 sheep per acre; 180lbs. superphosphate, 3.45 sheep per acre. Studying these figures it will be seen that the most economical dressing of superphosphate would appear to be at the rate of 90lbs. per acre, and I shall adopt this amount as being the most suitable for this district. Kybybolite figures show that this dressing can be applied at a cost of 5s. 6d. per acre. For a similar application in this district we shall be forced to rate it a little higher as the work would have to be let by tender as no power would be available. The actual costs of the super is approximately 3s. 9d. per acre, which, together with the cost of application, equals 5s. 9d. per acre.

Most of the fields in this district show definite traces of clover in the pasture, and only require dressings of super to encourage their growth. At Roseworthy College it was readily seen on inspection days that nowhere else in the district was there such a magnificent crop of clovers. This is undoubtedly due to the heavy dressings of superphosphate which have been applied to previous wheat crops leaving a fairly large residue of super available for the pasture.

On our own farm a paddock of 50 acres was sown to wheat, 25 acres of it was cropped to barley the following year, while the other 25 acres was fallowed. On the land which was fallowed there was no trace of clover, while that which had barley on it had a prolific crop of clover in the straw. The whole paddock was again sown

to barley, and prior to fallowing it the following year the land which had had three successive dressings of superphosphate had an enormous lift of clover intermingled with King Island melilot, while that which had only one dressing of super was quite bare. This clearly demonstrates that the seed is always present in the soils, and only awaits the dressings of super to promote their growth.

Taking an identical farm with the one used for wheatgrowing, fenced in the ordinary manner—namely, 80-acre paddocks—I intend to further subdivide it by two easily removable fences. By so doing the stock-carrying capacity can be materially increased. These fences can be easily constructed of cyclone and corkscrew droppers, and can be used to subdivide each 80-acre paddock in turn. I suggest dividing the whole flock into two smaller flocks, and grazing each 40-acre paddock once in eight weeks so that in this way the feed which has been eaten back short has time to recover and make fresh headway.

How many sheep can be carried? By top dressing it with 93lbs. of super I consider it will carry two sheep per acre, provided some provision is made during summer for hand-feeding. As it is intended to carry breeding ewes together with lambs up to the marketing stage it can be readily seen that it would be an impossibility to carry as many ewes as wethers, so that approximately 1,000 ewes would equal 1,200 wethers. Therefore there would be a basic flock of 1,000 ewes together with lambs to be carried.

There are many alternative methods of hand-feeding the sheep during summer such as ensilage, nuts, oats, barley, hay-chaff, &c. These methods are entirely optional. There should be an adequate supply of dry feed and roughage available throughout the summer, and this can be considerably augmented by a judicious withdrawal of the flocks from certain paddocks toward the end of the growing period. Nuts can be fed to advantage over a period of five months—from the beginning of the year until the end of May—thus giving the pastures time during May to make some little headway. The nuts can be fed judiciously at a cost of 2d. per sheep per week, so that 1,000 sheep will cost £8 6s. 8d. per week, making the total for handfeeding over a five-months period £175. These can be fed more equitably on a prepared piece of ground than in the feeders, for in this way each sheep will get its share.

With due care it should be possible to obtain a 90 per cent. lambing actually marketed. In taking the wool prices of 16d. this figure must remain more or less conjecture, for no doubt the quality of the wool would be materially increased compared to the quality now existing; 1,000 2-year-old ewes bought at existing prices (approximately £1 per head) equals £1,000. Using one British bred ram to each 50 ewes it would be necessary to purchase 20 rams at £3 3s. per ram, which equals £63. These figures may be considered a little high, but the maxim must be:—'Quality first,' thus resulting in higher figures for the products. I am using Merino ewes for the basic flock mated to a British breed of ram combining high values for wool and suitable lambs.

SHEEP.

<i>Revenue.</i>	£	s.	d.
900 lambs (33lbs. per lamb at 5d. per lb.; skin, 2s. 6d.) at 16s. 6d. per lamb	742	0	0
1,000 sheep cutting a fleece of 11lbs. per sheep = 11,000lbs. of wool at 16d. per lb.	733	0	0

Gross profits realised	£1,475	0	0
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Expenditure.

	£	s.	d.
Interest on capital outlay for purchase of farm	360	0	0
Interest on capital outlay on purchase of ewes and rams	53	0	0
Cost of application of 93lbs. of super at 5s. 9d.	172	0	0
Costs of hand-feeding	175	0	0
Depreciation of standing flock of ewes over 3-year period at 12 per cent. per annum	127	0	0
Depreciation and interest on capital; outlay on fencing and water troughing, &c.	20	0	0
Carriage of wool	10	0	0
Woolpacks, &c.	7	0	0
Branding oils, &c.	5	0	0
Carriage of lambs	30	0	0
Costs of shearing	15	0	0
Wages (1 man for approximately 6 months)	65	0	0
2 per cent. mortality in breeding ewes	20	0	0
— water	5	0	0

Total expenditure	£1,064	0	0
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Leaving a net profit of £411.

Sheep growing, therefore, shows a profit of £411 as against profit of £56 made from wheatgrowing." (Secretary, S. Bowden.)

Attendance, 19.

Messrs. R. Currie and E. Day reported on the Riverton Conference.

KING ISLAND MELILOT.—Mr. Day said a field of this fodder plant had provided his cows and sheep with excellent pasture, and although it had a strong—not offensive—odor it had not tainted the milk. The difficulty of it, he said, was to reap a crop of barley without getting the seed. Barley merchants objected to it for malting purposes. Mr. L. George said that chaff merchants objected to hay containing it, although he thought it uninjurious to animals; he thought the smell was the chief objection. **Strangles.**—A member asked:—(1) “What is the best treatment for a horse suffering from strangles which had no swelling under the jaw and had difficulty to breathe?” Reply—Obtain a nosebag and pour hot water and turpentine on bran and place on animal for a short time. Rub a mixture of 1 turps to 2 heavy oil under jaw, which helped to bring up swelling. Other questions discussed were:—(2) What is the best method to eradicate warts from heifer’s eyelid? Reply—Apply castor oil or milk from the Sow thistle. (3) Is it advisable to cultivate stubble land dry to be cropped or leave until wet conditions? Reply—The general opinion was that early working was no benefit, but burning off and working immediately under damp conditions gave the best results if the land was not of too hard a nature. (Secretary, C. Currie.)

WHEATS FOR THE ROSEWORTHY DISTRICT.

[Paper read by Mr. J. Eden at the March meeting of the Roseworthy Branch.]

In latter years, the varieties grown in this district have changed considerably, taking the place of those that were grown a few years ago. This is accounted for by the fact that this district was chiefly a hay growing centre and at the time it was the opinion of many that harvesting grain on a larger scale would be an unpayable and unsatisfactory proposition.

Then there came the time when hay markets slumped and growing for grain was considered much more payable. Subsequently farmers turned more attention to reaping wheat and it was soon proved that Roseworthy could grow wheat crops equal in yield to any district in the State. In the hay growing period such wheats as Huguenot, Tuscan, and Indian Runner were favored, having an advantage over other varieties in weight and height, which are the main assets in growing hay for market. Almost all prolific hay wheats are poor yielders, so wheats were sown that yielded better and at the same time were suitable for cutting for hay. This district has advantages over most others in being able to grow wheat for grain as well as hay, so that what is needed is a dual purpose variety, then the farmer may use his discretion, whether he cuts his crop for hay or reaps it for grain. In discussing suitable wheats for this district, new varieties have come into prominence in the past few years and now the most suitable varieties appear to be Sword, Ford, Nabawa, Felix, Waratah, Sultan, and numerous others. Most of them have the virtues of making good hay as well as being prolific yielders.

The varieties now sown come under two groups—Macaroni wheat, of which Huguenot and Indian Runner are species, and the “Vulgate” group under the name of common wheat, which includes practically all the varieties grown in this district. To return to the most suitable wheats in this district, some varieties have not received the popularity that they had a year or so ago; the only clue to this answer is the inclusion of a new variety—Sword—which has forced out inferior competitors. Sword is worthy of first place in this district, and it can hardly be bettered as a dual purpose wheat.

It is advisable to sow several varieties; depending on the area of land available. While harvesting one plot, the other is ripening. Sow early, mid-season, and late varieties, to have a chance of reaping at the right time. A season may not suit some varieties; also, choose wheats for the condition of the land.

On the chart published below is described some of the characteristics of the varieties most suitable for the district.

DETAILED DESCRIPTION OF

Variety.	Pedigree or Source.	Germination.	Stooling Property (Good hay Wheats are not Good Stoolers).	Growth.	Season.	Freedom from Disease.
SWORD	Sultan x Ford	Medium	Fair	Strong	Medium Early	Resistant
FORD	Fancy x Crossbred 53	Medium	Fair	Strong	Medium Early	Very Resistant
NABAWA	Gluyas Early x Bunyip	Quick	Only fair	Strong and hardy	Early	Very good and flag smut re- sistant
FELIX	(King's W. x Jonathon) x (Anvil x King's W.)	Quick	Poor	Medium	Early	Takes rust
WARATAH.....	Hudson's Early Purple Straw x Gluyas	Quick	Poor	Strong and hardy	Early	Hardy
SULTAN.....	King's White x Caliph	Quick	Poor	Very strong and hardy	Early	Takes rust and flag smut
FLORENCE	(White Naples x Im- proved Fife x W. Naples) x Im. Fife x Eden	Medium	Poor to moderate	Erect but only fair	Very early	Very good smut proof
EARLY GLUYAS ...	Early selection from Ward's wheat, origin Egypt	Quick	Fairly sparse	Rapid and early	Very early	Good
Indian H. (eat only)	Improved variety known as Indian F x Federation	Medium	Good	Short and upright	Medium	Good
.....	Indian H x Federation x Currawa	Medium	Good	Very upright but short	Medium	Fair, takes flag smut

WHEAT VARIETIES.

Lodging.	Shattering of Grain.	Head Straw.	Hay.	Grain.	Quality Grain Milling.	Remarks.
Very good	Fair to good	Light color, fairly high, long head, 2 or 3 grains	Excellent heavy	Light and long in color. Pro-lific yielder	Fair to good	Not properly fixed
Good	Fair to good	Do.	Very good	Very good yield	Good	A good reaping wheat
Inclined to lodge	Good	Do. Not as long as above 2	Good	Yellowish and long, good yielder	Only fair	Grain cracks easily, poor bread wheat
Inclined to lodge	Good	Do. Little shorter (x) than one above	Good	Yields well	Fair to good	Has done well in this district. Good wheat for dirty ground
Good	Shakes a little	Dark color, short nugget head	Poor fodder	Plump heavy and dark grain, oval shape, good yielder	Fair	Several sterile spikelets in this district. Threshes well. Copes well with weeds
Inclined to lodge	Good	Thick straw	Good heavy hay—not in mallee districts	Good yielder	Fair	Strong grower for weedy paddocks
Good	Inclined to shake	Hollow pithy straw, yellow tapered head of medium length	Good	Light color, plump, and oval, yields well	Excellent	Spikelets shatter readily
Lodges easily	Good	Darkish color, short beard, 3 or 4 grains	Good	Second class, yellowish, points at ends but well rounded	Fair	Worst point is lodging; has solid pithy straw
Good	Good	Short strawed, dark, small compact head, 2 or 3 grains	Not any use for hay growing	A good yielder	Fair	A wheat that reaps better than looks.
Stands up well	Good	Short, small, and compact head; short straw	Do.	Excellent yielder	Fair	Coming wheat, suit red ground best. Many shoots come from one root

TRURO (Average annual rainfall, 19.95in.).

April 16th.—Attendance, 17.

FARM ROUTINE.—Mr. M. Rice read the following paper:—"Commencing from mid-April.—This year, owing to the early rains, farmers should be preparing for sowing oats and Cape barley for early feed. Wheat should not be sown too early, mid-May to June being quite early enough in this district. Seed should be graded or put through the winnower again. Do not sow too many varieties of wheat—three to four kinds on the average farm is quite sufficient. The end of June should see the finish of seeding, except sowing barley for seed. Seeding completed, most farmers allow their horses a fortnight's spell before commencing fallowing. Have early fallow, but do not plough the ground while it is too wet, because it then sets hard and does not become properly aerated. Deep ploughing is not necessary, 3in. is adequate; if fallowed to 6in. clay is turned up, which does not assist in yielding good crops. Harrow the fallow immediately after ploughing and allow the ground to remain until weeds begin to sprout, then cultivate with a stump jump cultivator in preference to a spring tooth or combine. The first cultivation should be the deepest, then a little shallower at each subsequent working. Most farmers keep sheep, and after the fallowing is completed it is necessary to prepare for shearing. Hay cutting starts about the first to second week in November, and much depends on the variety of wheat sown. Bluey has been a good hay wheat. Out the wheat as the crop turns yellow, allowing a little grain to form to improve the feeding quality of the hay. Hay should be carted 10 days to a fortnight after cutting, when the hay should be thoroughly dry. In building the stack, always keep the middle filled to throw out the rain. When the hay is carted, oats are ready to strip, and should be reaped immediately they are ripe or they will shake out and be lost. After cleaning the oats, shoot them out in the barn, then the mice will not ruin the bags or damage the oats to any extent. By the time the oats are reaped barley is ready, and finally the wheat is ready for the stripper. The standing crop is the best place from which to pick seed for next season. After harvesting is completed straw has to be carted to cover the haystacks, and there are always a few sheds, &c., that need covering. It is advisable to build a few straw stacks for shelter and fodder for stock during winter. Then comes the farmer's slack time, which is filled up by fencing, dam cleaning, and the numerous odd jobs that need attention. During March seed wheat should be prepared. Dry pickling can be done at any time, but when bluestone is used, the seed must not be pickled until almost required for sowing. Dry pickling is better than the old method, because the wheat germinates more quickly, it is a better fungicide and can be done at any time. The old wet pickling method often meant doing it after tea, when a farmer's day's work ought to be finished." (Secretary, L. Davis.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Tarlee	10/4/34	9	Conference Reports.....	N. Clarke
Lyndoch	21/3/34	12	Address—A. H. Codrington	J. S. Hammatt
Lyndoch	24/3/34	12	Discussion	J. S. Hammatt
Rosedale	26/2/34	23	"Useful Contrivances" .	S. Sincock
Rosedale	26/3/34	17	Address—F. E. Waddy ..	S. Sincock
Snowtown	13/4/34	14	Address—W. C. Johnston	A. Hocking
Roseworthy	17/10/34	27	Visit to R.A.C.	S. Bowden
Roseworthy	2/10/34	20	Address—G. H. Clarke, B.Sc.	S. Bowden
Roseworthy	14/11/34	24	Crop Competition Report	S. Bowden
Roseworthy	5/2/34	29	Harvest Reports	S. Bowden
Stockport	29/3/34	9	Address—W. C. Johnston	T. Klafter
Truro.....	29/3/34	21	Cinema Lecture—Vacuum Oil Co.	L. Davis
Owen	19/3/34	16	Lecture, "Concrete on the Farm"	M. Freebairn
Nantawarra	29/3/34	12	Paper from <i>Journal</i>	S. Herbert
Black Springs ..	27/3/34	16	"Wool Industry"— W. Hawkes	L. Dunn
Buchanan	3/4/34	17	Address—W.C. Johnston	L. Bell
Woods Wakefield	29/3/34	15	"Colt Breaking"—B. Cleary	C. Neumann

YORKE PENINSULA DISTRICT.**SOUTH KILKERRAN.**

March 27th.—Attendance, 7.

DESTRUCTION OF PESTS.—Paper read by Mr. W. A. Heinrich:—"The pests that mostly concern farmers are rabbits, foxes, rats and mice, weevil, blowflies, common houseflies, sheep lice, fowl lice, and tick. Little need be said about the damage caused by these pests, and it would be difficult to estimate what they cost the Australian producer annually. The means of destroying them vary according to the conditions in which they exist. In this district the best method for killing rabbits is to fumigate the burrows after the rabbits have been chased in by dogs. There is no need to buy expensive fumigators, for most farmers have either a car or a tractor. With a length of flexible tubing slipped over the exhaust pipe and the other end inserted in the main burrow and covered in with loose dirt, the engine is started and run at a speed a little faster than idling. As the gas rises from the other openings, they, too, are closed up. By doing this, all the air is forced out and the burrow filled with carbon-monoxide gas; death is certain to anything that happens to be in there. The next procedure is to destroy the burrow. I recommend where possible to plough to a depth of 12ins. to 15ins. with an old three-furrow plough on a tractor or a single furrow with horses. Even though this method does not disturb the deeper holes, it leaves so much loose dirt on top that outside rabbits seldom find them again. The fox is more elusive, and unless seen going down the burrow, digging, fumigating, or swamping may be a waste of time and water. Although there are quite a number seen at day, anyone who has not been out at night with a spotlight has no idea how many are actually roaming around. They do a certain amount of good when mice are bad, but unfortunately they are not satisfied with that diet, and lambs and poultry usually make up the desired meal. Where the country is reasonably clear enough to drive a car, spotlight shooting is easily the best way to thin them out. Poisoning is quite effective, but must be understood and carried out with care; baits left lying around are dangerous to livestock. A good idea is to drag a trail across a paddock with a frosh sheep's liver and at intervals bury an egg dosed with strychnine. Rats and mice can be poisoned with less dangerous stuff, but this method is not very desirable in a house or in sheds where feed is kept for stock. When hay is kept for any length of time a mouseproof enclosure will save a lot of waste, and where a mouseproof barn is not available and space not too limited, bags of grain should be stood in rows, two high, with sufficient room for cats to get between the rows. This prevents rats or mice from nesting there. I have tried stacking both ways, and the loss of grain and torn bags is far worse in the close stacking. Have a small opening in the door or wall for cats to go in or out when they like and a good supply of fresh milk available and not too much scraps from the house when mice and rats are plentiful. Weevil do not affect the farmer seriously unless he holds grain for long periods. The most effective way to protect seed wheat is to dry pickle it. Fumigating stacks to rid them of weevil has been carried out with a fair amount of success. The blowfly trouble is a very serious one and not so bad as it was some time back; every care must be taken to destroy by burning or burying any dead animals. This also upholds the theory of fumigating rabbits in preference to poisoning. Crutching sheep with shearing machines, say twice a year, minimises the trouble to a great extent. The common house fly is one that requires a lot of keeping down. Fowls are very useful in this respect, and although they are undesirable in the stable so far as the chaff is concerned, the good they do there more than makes up for it, as they are continually scratching the manure about and thereby disturbing the breeding-places of flies. As a precaution against lice in sheep it is necessary to dip. The same solution is also very useful for destroying flies and fleas in sheds, &c., also fowl lice. As fowl tick live in the cracks of wood in the roosts, &c., and only attack the birds at night, all woodwork must be soaked with waste oil and kerosene." (R. Hasting, Secretary.)

FORTY-THREE YEARS AGO.**STRIPPER OR REAPING MACHINE VERSUS TWINE BINDER AND BAGSHAW'S HEADER.**

The following interesting paper, extracted from the first minute book of the Arthurton Branch, and presented by Mr. J. Koch on June 20th, 1891, was read by Mr. T. Howlett at the February meeting of the same Branch:—"All farmers in this district have cause more or less to sorrowfully remember the harvest of 1890 because of red rust, and as this disease was again making itself very conspicuous just before last harvest I determined upon becoming the owner of a 'Hornsey Twine Binder' to

take off as much of my crop as possible for hay. I purchased the binder at a cost of £65, cut all my hay with it, the result of which my hay chaff commands a sale of about 7s. 6d. per ton more than if cut with the ordinary mower. I confess that I consider the mower a thing of the past after having used the binder, which is really a labor-saving as well as a thoroughly economical machine, does away with the rake, no cocking required, while I believe the greater advantage is apparent in the carting. This can be gone on with in any weather; in fact, a wind is preferable for throwing sheaves, whilst for loose hay the wind is a great inconvenience, and lastly, a stack is much more easily reared, providing the right way for building is adopted; also when properly finished is much more proof against winter rains than a stack of loose hay, and to those who have an eye to the beautiful or neat appearance of their stack yard the sheaf stack is much more symmetrical than the other.

After having finished cutting the hay, I put the binder into a very nice even crop of Steinwedel wheat, just as it was on the turn for ripening, just 12 days before the balance was fit to reap; some of the heads which were not quite so ripe, and others were yet doughy. I cut 10 acres with the binder, which, when cleaned up, realised 191bush. of a sample of a splendid plump grain of a nice bright color and much more productive if used for seed, because of no broken grains as we generally find among wheat when reaped by the stripper. I reaped the same number of acres of the same crop with the stripper. I used the binder on the outside, going all round the piece then the middle of that which was left I stripped. The crop was to all appearances precisely the same, if not better than what I cut, but after winnowing and bagging up I discovered I had only 166bush. 47lbs., being a little over 2bush. on an average per acre less than I realised from the binder. There is no necessity to go into details on the working or cleaning up after the stripper, but as some are probably unacquainted as to the mode in which the headers work I will endeavor to explain the method as briefly as possible. I have my horse works made stationary to my chaffcutter, so that I fixed the header on the opposite side to that of the cutter, the horses working or drawing in the opposite direction. I drew the ground plan some time beforehand, so that I arranged my stack of sheaves as conveniently close to the header to allow of operating room, and also a stool for a stack of the sheaves after having passed through the heading machine. Having all in readiness for a start, with five assistants, we commenced operations, one man throwing off stack to the header, another handing on to the feeder who, after having pressed the sheaf home for the header to do its respective work, threw the sheaf to a fourth man, who tossed it on to the stack, where there was one other beside the builder. The wheat is driven with great velocity out into a heap from the header ready for the winnower. Messrs. Bagshaw state that two horses drive this machine, but I found it too much for two to keep going, so I hooked on a third, which made comfortable work of it. I am of the impression that a Bagshaw header is more to our purpose than is a steam thresher for the following reasons:—The cost is in the first place £14, which is within reach of any practical farmer and can be worked by ordinary horse works—the price is a mere bagatelle compared with that of a steam thresher. There is no risk of danger of fire raised by sparks, no water required for feeding, which sometimes is an item to be considered in summer, and lastly, when the header is used, the strings are not cut or broken, leaving the straw so much better to put again in the stack ready to be taken at any time to be cut up into chaff. As the straw is cut when green, this makes really a very good feed for cattle or horses; my own horses eat it well when chaffed. The work of chaffcutting is considerably reduced with sheaved hay, for I find I can feed quite comfortably without the aid of anyone, which I cannot do with loose hay, while the chaff is cut much more evenly, because the straw in a sheaf is laid straight. *Re* cost of twine and oil per acre, Mr. Koch stated, in answer to a question by Mr. Mills, that the total cost for both was about 16d. per ton. He recommended Manilla twine for the binder."

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Kilkerran	9/4/34	7	"Care of Horses," B. Koch	G. Heinrich
Bute	20/4/34	15	Discussion	H. Perry
Paskeville	24/4/34	9	Address—J. Prouse	J. Prouse

WESTERN DISTRICT.

OEDUNA (Average annual rainfall, 10.16in.).

March 6th.—Attendance, 11.

The monthly meeting was held at Mr. C. Kloeden's residence. Congress resolutions were discussed. Mr. W. Pfeiffer read a paper—"Tractors on the Farm." Mr. E. A. Hastings was presented with a Life Membership certificate of the Agricultural Bureau. (Secretary, E. R. Pfeiffer.)

CHILPUDDIE ROCK.

April 4th.—Attendance, 12.

Members discussed the best methods of farming successfully in this district. It was considered that the farms should be between 2,000 and 3,000 acres; at present the average farm was about 1,100 acres, and it would not pay to subdivide a farm of that size into sheep-proof paddocks for the number of sheep the farm would carry. Wheat should be grown on fallow only, and then only once in four years. To fallow successfully sheep were essential, because the soil would drift if cultivated too often. Members were of the opinion that they would be able to work a farm of between 2,000 and 3,000 acres in conjunction with sheep with the same plant as was now necessary on their present holdings. (Secretary, H. Brown.)

LAURA BAY.

March 13th.—Attendance, 14.

HARVEST REPORTS.—The following yields were reported:—A. J. Bowell, Nabawa, 4½bush.; A. R. Lowe, Florence, 5bush.; C. Collins, Quality, 6 bush.; J. W. Blumson, Waratah, 6bush.; W. L. Edson, Canberra, 10bush. Florence, 8½bush. Nabawa, and Rancee 7½bush. The best samples were: N. S. Morrison, Waratah; A. R. Lowe, Nabawa and Florence; W. L. Edson, Rancee; C. Collins, Quality. (Secretary, W. L. Edson.)

WARRAMBOO.

April 13th.—Attendance, 8.

IS THE AGRICULTURAL BUREAU WORTH WHILE?—Paper read by Mr. F. Chilman—"The Agricultural Bureau is a valuable farmers' organization, for the following reasons:—There are 336 Branches, with a membership of 7,999. Such a State-wide organization could do a vast amount of good if all members pulled together. The members of the Advisory Board will always give serious consideration to any matters sent in to them. The annual Congress in Adelaide deals with all subjects brought up by the Branches throughout the State, and local conferences deal with all local matters. These are referred back to the Advisory Board for consideration. Members often fail in not taking enough interest in local conferences, it is up to all Branches and local members to take an interest in these and see that they provide material for discussion and papers to be read. Our Bureau organization is the envy of other States, and yet interest is often lacking in local centres to make it worth while. It is the duty of all members to join in the discussion and see that interest is maintained."

Mr. O. J. Murphy read a paper on "Harrows." He said land prepared with the harrows and drill grew as good a crop as that in which the combine was used. The former were lighter on the horses, but took an extra man to work both together. Where share points were bolted on to the harrows it was excellent for killing weeds when small. Members favoured having the ground damp when harrowing. (Secretary, F. Chilman.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Koppio	28/3/34	12	Formal	M. Gardner
Laura Bay	10/4/34	15	Formal	W. Edson
O'Loughlin	5/4/34	18	Paper from <i>Journal</i>	E. Pfeiffer
Green Patch ...	1/3/34	10	"Bookkeeping," C. J. Whillas	C. J. Whillas
Pinbong	3/3/34	21	Paper from <i>Journal</i>	H. Scholz
Elbow Hill	27/3/34	6	Discussion	J. Wildman
Goode	4/4/34	12	Discussion	B. Linke
Kyancutta	3/4/34	8	Discussion	E. Kelly

EASTERN DISTRICT.

MONARTO SOUTH (Average annual rainfall, 14in. to 15in.).

February 17th.—Attendance, 16.

FIRST AID.—Paper read by Mr. M. Kuchel:—"There should be a first-aid kit or cabinet on every farm, thus acting as an emergency in case of accident, especially where a farm is some distance from a doctor. First aid can then be given. After this is done, and should the accident be of a serious nature, the patient can be taken to the nearest doctor without delay. *Points to Bear in Mind.*—(1) Blood from an artery is bright red and flows in jets. When blood flows from an artery, prompt action is required to save life. (2) Blood from a vein is dark-bluish in colour and flows slowly; the flow in veins is just the reverse from arteries. Stoppage of bleeding is the first point to be attended to if it is serious. Bleeding may be from an artery or a vein, or both. The readiest means of stopping bleeding is pressure, which may be carried out by tight bandaging above and below the wound, and placing a pad and bandaging over it (the pad must be clean lint or folded cloth), or for severe bleeding a tourniquet may be applied to the wound or limb above the wound. This severe pressure should be removed as soon as possible. For ordinary wounds a simple pad and bandage over it is usually sufficient to control the flow. *Broken Bones (Signs of).*—Motion at the part, a crackling sensation on moving broken ends, alteration in shape of limbs, often shortening. *Treatment for Some of the Important Breaks.*—Always apply splints before lifting or carry the injured person. Dangers are of pushing the broken ends through flesh, blood vessels, nerves, or internal organs. (1) For the hand—Apply splints, bandage and support in a sling. (2) Legs—Apply splints inside and outside and bandage. (3) Forearm (wrist)—Apply padded splints to back and front from hand to elbow, holding the arm extended with the thumb pointing upwards, support in a sling. (4) Upper Arm—Bend arm and apply roller bandage to hand and forearm, splints to back and front of arm, sling the forearm. *Dislocations.*—(1) Elbow—Simple extension, the elbow being kept straight, with the patient seated on a low stool or on the ground; place the knee in the bend of the elbow and taking hold of the patient's wrist, pull steadily and firmly, at the same time bending the arm gently, and the bones will in most cases return to their places without difficulty. (2) Fingers.—These are difficult to manage, but the general extension of simple principles is all that is usually applied. (3) Shoulder.—The common form is into the armpit, the shoulder is flattened, the head of the bone may be felt with the fingers, and the arm cannot be easily raised, even with the shoulder. Treatment: Have the patient lie down and sit directly behind him, place one hand upon the shoulder to fix it, then raise the arm from the side and straight up by the patient's head, until the bone is thus elevated into its socket. Another method is by the patient's self, by attempting to lift a gate—one that is fixed—placing the arm over the gate, so that the armpit rests on the gate and then lift slowly. (4) Dislocation of Wrist, Knee, or Ankle.—These are mostly accompanied with a fracture of one or both bones of the involved joint, and the services of a good surgeon are indispensable or a wrist-strap for keeping the wrist in place. *Foreign Bodies in the Eye.*—These should be removed as soon as possible; do not rub, this only increases the inflammation. If the injury is caused by caustic, strong acids, or salt, drop sweet oil into the eye. When lime, ashes, dye stuffs, or tobacco is the offending object, cream or sour milk is the best application. When sharp minerals, paint, sand, dirt, and the like get into the eye, apply white of an egg. If small particles cannot be removed by the above means, the upper lid should be turned inside out by taking the eyelashes between the finger and thumb, then turning the lid upperwards over a probe or match-stick; the foreign substance may then be wiped off with the corner of a clean handkerchief. *Burns (Severe).*—Wash with picric acid, exclude air. Any of these local applications is recommended—(1) Carron oil, a combination in equal parts of linseed oil and limewater. (2) Carbolic acid and olive oil—1 part of the acid to 12 parts of olive oil. (3) Soap—Moisten white or brown soap in water, place thickly on linen, and place on the burn. (4) Flour or Starch—Spread thickly on the burn. The remedies that have been given are for the most frequent accidents where first aid can be given without the aid of a doctor. The application of a dirty dressing by dirty hands to wounds is frequently the means of spreading disease instead of stopping it; use antiseptic washes and the thorough and skilful use of water and soap is of far more use than misapplied remedies." (Secretary, C. Altmann.)

PRUNING COMPETITIONS.

A meeting of the River Murray Pruning Competition Committee was held at Barmera on May 2nd, when representatives of B. rri, Ramco, Waikerie, and Barmera attended to receive the annual report and to discuss the details of the forthcoming competitions.

The Secretary (Mr. J. J. Odgers) stated that in the 1933 competitions there was an increase in the number of competitors at Cadell, and that Block E substituted for Renmark.

There was a greater number of candidates for the championship last year than for many years, there being 17 in the vine and 15 in the tree sections. Trophies were donated by the Royal Agricultural and Horticultural Society, the Dried Fruits Board, Mr. W. Langdon Parsons, The Adelaide Chemical and Fertilizer Coy. Ltd., Nitrogen Fertilisers Pty. Ltd., and the Wallaroo-Mount Lyell Fertilizer Co.

Mr. R. Isaacson, Waikerie, won the trophy for the highest aggregate, and also won both the vine and fruit sections. There was keen competition throughout—Waikerie, Renmark, Cadell, Mypolonga, Berri, and Moorook being represented in the placed positions.

The Langdon Parsons trophy for the highest aggregate in the local competitions was won in the first year by Mr. E. A. Liddicoat, of Moorook. The trophy (silver cup) will ultimately be held by the competitor holding the highest aggregate over a period of three years. Mr. Liddicoat has been presented with an inscribed silver medal indicating that he was the winner of the Langdon Parsons cup for the first year in which the cup was donated for competition.

The financial statement showed a credit of £6 19s. 11d.

In arranging details for this year's competition it was decided to ask again for the services of Mr. E. Leishman (Horticultural Instructor) as judge, and that local committees appoint two consultative judges to assist him. Competitions were then arranged for Cadell (June 26th), Waikerie (June 27th), Moorook (June 28th), Barmera (June 29th), Berri (July 3rd), Renmark (July 4th), and Berri (championship) on July 5th. The date of the competition at Mypolonga to be arranged in consultation with the judge.

The rules governing this year's competition will be practically the same as last year.

CONSTRUCTION OF AN IRRIGATION AREA FOR THE PURPOSE OF FODDER PRODUCTION.

[Paper read by Mr. F. Suter at the March meeting of the Overland Corner Branch.]

The remarks in this paper are confined to inundated lands adjoining permanent water courses. The land usually being of a rich nature, has a decided advantage over the higher land which incurs a much greater expense in primary construction. The river frontage lands in this district are usually termed inundated land, although comparatively speaking, the medium low-lying land is only flooded once in 3 years. The higher land may be flooded with a very high flood which rarely occurs, high floods usually being from 7 to 10 years apart. Should the high flood occur every 7 years and flood the fodder block the owner would benefit because lucerne being the best fodder under irrigation needs replanting after 7 years intense cutting or feeding off. Should the beds become flooded at any time this will cleanse and fertilise the land to such an extent that the improvement in the growth of fodder will be noticeable after replanting.

Referring to the river flats, the growth of any summer fodder which may be grown is prolific just when it is most needed, i.e., when all the high land feed has dried off or blown away. There is also much higher land as a rule quite close to the main permanent watercourse. It would be quite safe to say that this land will not grow weeds or herbage under natural conditions. This land if placed under irrigation grows an abundance of good fodder economically. More so on account of its nearness to watercourse if planted with lucerne owing to the roots penetrating the subsoil to a great depth in search of moisture for its growth.

LAGOONS.

The very low-lying land, commonly known on the Murray as lagoons, dry out in dry seasons. A number of owners of these lagoons try irrigating or flooding a wheat crop on other fodder owing to the shortage of feed through the dry season. This is often done successfully, but frequently a larger percentage of the growing crop—if not the seed—is destroyed through an excessive amount of water laying there for a

lengthy period. It is quite possible to grow a crop of wheat on these lagoons with two irrigations through the summer months. The holders of these lagoons will usually buy a really good pumping plant for the flooding of same and expect to irrigate this low-lying flats because it looks level to the naked eye and has been flooded when the river overflows its banks.

IRRIGATING.

In commencing operations on these lagoons the pump is erected at the water-course at the nearest possible point to the lagoon. A few furrows are ploughed to the lagoon and continued on around the edge of the flat. The seed is sown and the pump set going, and immediately trouble begins. It is usual to have an assistant at this operation who usually tires first. However, both run along the plough furrows stopping up break-aways until at last the water reaches the spot where one begins distributing same over the lagoon. After some time it will probably be found that the water has broken away, and making for the lowest place in the lagoon. Now it is found that the lagoon is not quite so level as it was thought to be, and repeated attempts are made with shovels checking it in one place and another; but the water will have its own way if not governed. Too often the person doing the irrigating gives up in despair and says, "Let it go, if that is irrigating I am having no more of it; she will flood herself with this stream as the River has flooded times out of number before." Nevertheless, they repeat the operation during the next drought year on the same principle. They do not think of making any check banks to govern the water or make any provision for draining off excess water. The excess water would not be there if check banks were there to control the water. Nor do we think of converting the land abreast of the site where the pump is erected into a patch of permanent fodder beds. The plant is left to rust and is buried with leaves, bark, &c., and the pipes are taken away and used for rails around the horse yard.

In the construction of fodder beds under any system of irrigation, provision should be made to drain off any excess water. It is difficult to explain why fodder is not grown more extensively under irrigation, even if only a small patch on each holding. It is not the climatic conditions, for they will grow more fodder than can possibly be used or needed.

CULTIVATION.

In choosing any frontage on the River Murray with inundated land first select the higher site which is most convenient, especially if it can be connected with a lagoon. Make a rough survey of the high land already chosen and decide upon the most suitable sized pump required to irrigate. The land should then be thoroughly grubbed.

The next operation:—With a good strong single furrowed plough—one that will plough 12in. deep—plough the land and harrow. If necessary, after harrowing, grade off all small hills and fill hollows, leaving the surface even.

TAKING THE LEVELS.

The next performance is taking levels (in this case not with a naked eye). Use levelling instruments from which will be found the layout of the block. The highest point will be where the pump will have to deliver the water to and from where the channel will gravitate water to irrigate the beds. On the levelling operations the fall, if any, will be found out. Then the beds should be laid out with sighting pegs. Gather to pegs two plough furrows, use a grader to throw up banks, or a road former can be used. Whilst throwing up check banks use the same method on the site of the channel, gather enough earth together so that the channel can be banked well above the level of the surface of the beds.

When the banks are all thrown up, grade the beds, which should be half a chain wide and uniform. Great care should be taken in the grading of beds. The deep ploughing in the first place should be sufficient to enable completion of grading. Care should be taken not to remove all surface soil which would not be done if the system of laying out has been correct. If the grade in the beds is too steep—which will be noted in the levelling of the block, change the angle of the beds to reduce the grade. If unable to reduce the grade sufficiently, try terracing on the contour of the hills. No trouble should be experienced in keeping the beds half a chain in width. When paving the terrace beds, it is possible to have a slight fall from the outlet pipe; if, on the contrary, there is a slight rise from the outlet pipe and the bed is graded ready for planting, plough furrow through the centre, this will allow excess water to drain off to the channel. A 4in. to 6in. fall to the chain in beds is good watering.

CHANNELING.

The channel commences from the outlet of the delivery pipe. About 10yds. of concrete channel should be laid here to prevent any washaway of earth from the swirl of water as it is thrown from the delivery pipe. After the few yards of concrete channel, an earth channel is good enough for the main in almost all cases. The main

channel is all that is necessary and should have not more than a lin. fall to chain when excavated. The size of the channel depends on the size of the pump. The channel dimensions to serve most cases on a home irrigation patch would be 3ft. 6in. wide, 15in. deep, and 15in. wide in the bottom, excavated under 3in. of the level of the surface of the beds, 12in. above, with a shoulder not less than 2ft. 6in. wide. The most suitable outlet is a pipe, not less than 4ft. in length. In putting in outlet pipes, keep them 3in. to 4in. up the wall from the bottom of the channel. A hollow mallee is very serviceable for this purpose. If there is a fine surface on the beds they are then ready for planting.

THE BREEDING AND CARE OF FARM HORSES.

[Paper contributed by Mr. E. W. Pearson, of Brinkley, at the March meeting of the Murray Bridge Branch.]

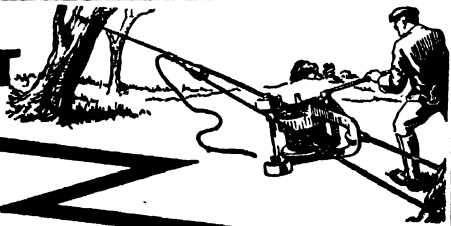
The subject under discussion is one that every tiller of the soil should be deeply interested in. The horse is by far the greatest asset on the farm, and too much care and attention cannot be given to enable him to carry out the work which is demanded of him. In recent years arguments have been brought forward in favour of mechanical power on the farm; quite a number of farmers have tried it out and have—after paying dearly for their experience—reverted to horse power, which fact, coupled with the increased demand and the higher prices ruling for horses to-day, is sufficient to lead one to say that the horse has regained his position on the farm which is his by right. The first question that a farmer has to consider is that of supply. Naturally, a farmer to begin with has to purchase his requirements, and should include among his purchases a few mares of a suitable type for breeding purposes. This with a view of maintaining the future strength of the team. It will be generally agreed that it is more satisfactory and more profitable for a farmer to breed all the horses he requires for his purpose; the purchase of horses in a saleyard often proves disappointing.

SUITABLE BREEDING STOCK.

The Sire.

This is a matter that is of the utmost importance if a suitable type of farm horse is to be secured. Unfortunately in the past there has been a tendency on the part of farmers to breed from any class of mare that would produce a foal—irrespective of class or type—with the result that quite a number of horses seen on farms at the present time cannot be classed a suitable type of farm horse, and I strongly urge every breeder of horses to do his utmost to raise the present standard by discarding

TEARING THEM OUT



Is the regular job of the Monkey Grubber. In fact it was born to the work.

TREES and STUMPS, it matters not, they are torn out with roots intact, a thorough job quickly done. Run to the job like a barn truck, and worked in the same manner as a boat is rowed. It develops the power of 250 men, progressively applied, and always under perfect control.

In any position, so long as the operator has space for a footing, the machine is efficiently worked. An Automatic Gear allows a load to be hauled or released at will. Besides the great power and portability there are embodied other labour saving features, such as special rope couplings, rope shortener, snatch block, etc.

Agriculturalists in Australia, New Zealand, Great Britain, South Africa, the Americas, as well as Planters in India, China, Central Africa, Fiji, the East and West Indies, recognised its merits and applied its help.

THE "MONKEY" GRUBBER

is fashioned from material mined and made within the Empire, by Empire craftsmen, to assist with the fast and efficient development of Her Soil's resources.

Patentees and Makers—Monkey Grubber, Monkey and Wallaby Jacks:
TREWHELLA BROS. PTY LTD. TRENTHAM, VIC. AUSTRALIA.

ADELAIDE STOCKISTS—

Harris, Scarfe & Co. Ltd.
Australasian Implement House Furnishing Co

Culton Palmer & Preston
South Australian Farmers Union.

any animal for breeding purposes that is unlikely to bring about that result. The most popular type of horse for farm purposes to-day is the Clydesdale, and for general all-round farm work can be recommended as being capable of doing any work on the farm. The point to be emphasised so far as breeding is concerned is to secure the service of the very best sire available. He should be a stud book horse if possible, which is a guarantee that his breeding is good; failing that he should at least bear a certificate of soundness. Breeding from unsound sires cannot be too strongly condemned, and the suitable class of stallion will never fully come into his own until the registration of all stallions is made compulsory, which measure is to be adopted in the near future.

The Brood Mare.

It is not necessary to describe the points of a suitable mare, because they are generally well known to the average man, but there are a few important matters which should not be overlooked to ensure a suitable mare becoming a successful breeder. To secure a reliable brood mare, she should possess a good, sound constitution and should be mated for breeding purposes at an early age, say at three to four. This method does not always prove successful, but in many instances a mare, unless bred from when young, proves very unreliable as she grows older. Another point to consider is the condition of the mare at the time of service. Always try to avoid a mare carrying too much condition—a thing which often happens in the spring of the year if the mare is not working.

CARE AND MANAGEMENT OF THE HORSE.

The care and management of the horse is a matter of great importance, because the efficiency of the horse depends very largely on the treatment it receives from its owner. Actually the care of the horse from a breeder's point of view begins before the foal is born. The in-foal mare, in order to produce a strong and robust foal, must receive treatment that will enable her to bring about that result. A mare during pregnancy can be worked at any ordinary farm work with benefit to herself and her unborn foal, assuming that this is done reasonably and intelligently. Good feeding, of course, is also necessary, always bearing in mind the fact that the mare has to support the life of the foal as well as her own. The practice of working the mare can safely be continued with care up to within a few weeks of foaling if necessary, but be careful to avoid any heavy lifting or work in shafts. At this stage it is advisable to separate mares due to foal and place them in a small paddock by themselves where they can be kept under constant observation, and when the time for the birth of the foal arrives, it is advisable for someone competent to give assistance to be on hand, for a little assistance at the critical moment may mean all the difference between a live foal or a dead one; probably the life of both mare and foal may be saved.

In the case of a young mare with her first foal, the mare's udder will probably be swollen, and if she is inclined to be restless, the foal will experience a difficulty in getting hold of the teat. If such is the case, tie up the mare and assist the foal, and having once sucked, there should be no further difficulty in that direction. A foal at birth is subject to bowel trouble, and if there are signs of costiveness, 1 tablespoon of castor oil will be of benefit. If a mare is required to work during the time she is suckling a foal, this can be done without injury to either, after the foal is 6 or 8 weeks old, but must not be overdone. Neither should the mare be separated from her foal for a longer period than 3 or 4 hours. If the mare is working, never allow the foal to follow its mother; it will not only prove a hindrance to the team, but is also very liable to receive injury.

At this stage if the foal is to be separated from its mother, tie it up, and if time will permit learn it to lead, and half the work of breaking in will have been accomplished when that time arrives.

At from 4 to 5 months old the foal should be weaned. This is perhaps the most critical period in the life of the horse. The foal should be separated from the mare and placed in a loose box or a yard that is foal-proof. It should have free access to water at all times and be fed at regular intervals on good nourishing food. This practice should be adopted until there is sufficient green feed in the paddock to enable the colt to look after himself. To enable a colt to grow and develop into a desirable animal, he must be fed, and fed well. No matter how he is bred, always bear in mind that "feed is half the breed," and from a utility point of view it may be considered the larger half.

At 2½ years a colt should be ready for breaking in. He should be carefully handled and mouthed before being put into the team, and should not be asked to do more than three hours' work a day for the first few days, especially if he shows signs of being a free worker. Remember that his shoulders are tender, and if overworked for a start may develop sore shoulders which may cause trouble for the rest of his life. If a good, well-fitting collar is provided, and the shoulders are not allowed to become overheated, no trouble should be experienced, but as a precaution it is advisable to bathe the shoulders in cold water, with a handful of salt added when the collar is taken off.

It can now be assumed that the horse is fairly started on the road with his life's work before him, and will be subject to all the ills that horseflesh has to contend with, and there is no doubt that at least some of the common ailments that the horse is subject to can be avoided if proper precautions are taken. Bear in mind at all times that "prevention is better than cure." If a farmer wishes to advertise his farm, he can use no better method than by paying strict attention to the breeding and care of his farm horses.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Marama	4/4/34	9	Formal	T. Hinkley
Nunkeri	26/3/36	20	Address—R. L. Griffiths .	E. Peltz
Kulkawirra	10/4/34	15	Discussion	H. Elliot
Taplan	21/3/34	11	Address—R. L. Griffiths .	P. R. Hodge
Jervois	22/2/34	14	Conference Report	T. Baily
Boolgun	29/3/34	13	"Sheep," Mr. McGowan .	G. Spencer

SOUTH AND HILLS DISTRICT.

HARTLEY (Average annual rainfall, 15in. to 16in.).

January 31st.—Attendance, 14.

VEGETABLE GROWING.—Mr. H. Brook read the following paper:—"If the land is prepared and well manured with horse manure, and weeds kept down for about 12 months before sowing the seeds, vegetables can be grown without very much trouble. Protection is needed from hot and cold winds, frost and hail. Our soils are fairly rich and easily worked. Most gardening is done in winter, because well water is salty. Dig deeply and keep the land well tilled before and after seeding. A list of the best plants to grow is as follows:—Cauliflower, cabbage, red beet, turnips, carrots, silver beet, and red radishes. Plant broad beans around the edges, because they grow to a fair height and shelter the other plants. Make the rows 18in. apart. Never grow the same crop in the same land two years in succession unless it is well manured. A little superphosphate will be beneficial to quick growing plants."

TRAINING A SHEEP DOG.—Paper read by the Hon. Secretary (Mr. D. C. Harvey)—"The recognised sheep dog of the world is the Border Collie, a breed highly recommended for its steadiness in driving a few sheep and ability to handle large mobs. It also has had marked success in field trials in England, Australia, and New Zealand. Make certain that the pup is bred from reliable stock and proved workers. A sheep dog crossed with a silent heeler cannot successfully work sheep. There are two good breeds of sheep dogs in Australia—the Border Collie and the Kelpie. The Kelpie has more dash than the Border Collie, and naturally drives the sheep faster. Although quite a good dog with large mobs, it does not meet with success in the trials. Allow the pup plenty of freedom, do not knock it about, or it will become nervous. Good feed at this stage is necessary; it means much to the growth and constitution of the dog. Plenty of new milk with cooked meat daily should be the diet, with raw meat three times a week. **Training.**—The most important part, at six months old, is to teach the pup to sit down. This is done by giving the dog a push down, at the same time saying 'sit down.' Then attach a cord 20ft. long to the pup, and allow it to run out from you. Give the cord a pull, the order to 'sit,' at the same time holding up your hand. After a few lessons the dog will respond readily to the command, which later on may be given by whistle instead of word of mouth. When the pup is sitting, make it stop there until ordered to 'get up.' Treat the animal with kindness and firmness at all times. This part of the training should all be done before the dog is taken near sheep. When old enough to work

sheep, use an old dog and round up a mob of about 50 sheep. Get them against the fence and stand back about 30yds. for a start; sit the pup down behind and then wave him out which way he is to go, and give the command 'get out.' When far enough round the sheep, whistle and make him sit down. This will make him approach the sheep gradually and drive them steadily to his master. Then make the pup sit behind you again, and wave him out the opposite way in the same manner. This will teach him to cast on both wings. It is best to walk in front of the flock and allow the pup to drive the sheep behind his master. Do not be disheartened if the pup makes mistakes. *Some Useful Hints.*—Treat him kindly but firmly, make him do as he is told. Never work a pup too long; 15 minutes is enough for a start. Do not expect big success for a start, persevere with the pup. Failure is often the fault of the master through expecting too much. A pup cannot be relied on until he is 18 months old. Never allow a dog to bite the sheep. Always make him work wide of the flock.''

INMAN VALLEY (Average annual rainfall, 26in. to 27in.).

March 18th.—Attendance, 9.

PASTURE DEVELOPMENT AND ROOT CROPS.—Points taken from an address delivered by Mr. R. Hill, District Instructor:—Improved pastures were an asset, but with good and methodical management the two combined made a financial success. Careful management assisted by subdivision brought about smaller paddocks, the growth on which was cut for meadow hay or ensilage. The stack silo was preferred to the pit. In the last four or five years farmers were finding out how to handle meadow hay to get the best results. With the cutting of hay it greatly minimised the risk of fires. Hand-feeding of sheep in the winter enabled one to carry a full quota of stock over the winter months, whereas prior to conservation of fodder, the surplus stock had to be sold after the spring months, when the markets were generally at their lowest. The possibility of growing root crops in this district was considered a sound and economical way of feeding livestock. Instances were given that 40 or 50 tons of mangolds could be grown per acre in some districts. These were eaten readily by pigs and cattle after being stowed, which greatly added to their usefulness, as they could be fed to livestock when green fodder was scarce. They could be grown successfully with about 4lbs. or 6lbs. of seed per acre planted in late spring. A liberal amount of manure with an additional amount of salt would greatly assist growth. Mention was also made of turnips and swedes, but grazing crops was considered the most economical way of feeding. Chou mollier is grown extensively in the South-East and could be grown successfully in this district. Seed should be sown at the rate of 2lbs. per acre. The feeding value was very high and the stalks and leaves were very palatable to livestock. One could reasonably count with success if sown in October or November. Sunflowers and Sudan grass could also be sown and grazed by livestock with beneficial results. (Secretary W. Mayfield.)

MILANG (Average annual rainfall, 14.97in.).

February 24th.—Attendance, 18.

EXPERIENCES OF THE PAST SEASON.—Mr. J. Bagley read the following paper:—“One of the most noticeable features during the past season was the absence of soursofs at harvest time on a piece of land very badly infested. The land was fallowed and worked during the year, and each working seemed to have no effect upon the weed; after every working the plants came up as strong as ever, until the last working—a harrowing in early June—and from then on they seemed to fade away, and at harvesting they showed no ill effect upon the wheat crop. It will be remembered at the time when the harrowing was done the weather was dry and warm with cold nights, being most suitable for weed killing. I had previously heard that there was a certain time when the weed could be checked with a working of the soil, and it now remains to be seen if they will come up as strong again in the coming year. *Smutty Wheat.*—Last season I secured some wheat for seed which contained a good sprinkling of smut. The variety was Currawa, one very subject to smut, in fact the greatest drawback the wheat has. I gave it a thorough pickling with copper carbonate. The weather at time of sowing was wet and showery, suitable condition for dry pickling. The crop at harvest time was almost free from smut. I have used the dry method of pickling wheat now for a number of years, and have found it very satisfactory. I always make a practice of using fresh pickle during the process of pickling, never using that which comes into the retainer, although the cost is a little more. *Wimmera Rye Grass.*—Another noteworthy feature during the year was the spread of this grass upon stubble land. The seed was sown with the previous wheat crop. Sheep readily ate the grass and did

well while grazing upon it. Anyone desirous of trying the grass should establish a broad leaf type. Another plant that is making its appearance—especially this last year—upon loamy soils is cluster clover. Stock relish it, and every effort and means should be adopted to encourage its growth and spread, for it will mean much to those who are engaged in grazing. *Fat Lambs.*—Three years ago a neighbor and I purchased a line of Merino ewes, taking half each; last season his were mated to Dorset Horn rams and mine to the Shropshire. Upon the same day, and to the same selling agents, we forwarded a consignment of 60 lambs each; in appearance three of his lambs would weigh four of mine dressed weight, yet mine valued 1s. more per head, the agents stating that mine were purchased by export buyers and his by local butchers. From this it plainly shows that as we have to rely on the export trade to get rid of our surplus of lambs, we shall have to study the requirements of the oversea purchaser in every way, not only in our lamb trade, but in our bacon and pork trade, and, in fact, everything we desire to export. In an endeavor to obtain fodder with as much nutriment as possible for use during autumn, I cut some Cape barley for hay very green, and so far all stock are cleaning it up, eating practically every straw. It is thrown out in the paddock for them to pick over. I have been particularly struck with the condition kept by two brood mares with foals at foot and supposed to be in foal again, their condition has been everything that can be desired. The mares have an abundance of milk for the foals. This hay is light and bulky, but if, on the other hand, it shows to be a good feed with more succulent nature than our other hays, it may pay to grow a little of it for autumn feeding personally. When it is cut care should be exercised in stooking, not stooking too soon and not building large round stooks, as it has a tendency to go fusty. Another point, in cutting tie the sheaves close to the butt, this will save a lot of trouble in handling. In the past year I have had considerable experience in keeping rabbits under control. The observation is simultaneous destruction of the pest is desirable, and all landholders should insist that this be done." A spirited discussion took place. Mr. A. Kelly thought barley hay for milking cows was too heating and gave the animals sore mouths. The writer replied, saying that probably the hay was cut too dry. Mr. M. Yelland said he often cut barley hay for feeding sows with litters. (Secretary, L. Yelland.)

March 24th.—Attendance, 27.

DEBATE.—The Milang Branch debated with Belvidere, to an excellent attendance of members and visitors, the subject being "Free Trade v. Protection." The visiting team being Messrs. I. Echett, M. Pearce, and S. Cheriton, and the local team Messrs. Beasley, A. Mattison, and L. Young. Belvidere supported free trade and Milang protection. After a spirited debate the adjudicator, Mr. Cochrane, announced that the Milang branch won by half a point, the results being 82½ to 82 points. (Secretary, L. Yelland.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Blackheath	5/4/34	8	Paper from <i>Journal</i>	E. Paech
Macclesfield	19/4/34	13	Address—K. Bowen	H. Ross
Hartley	18/4/34	9	Question Box	D. Harvey
Port Elliot	21/3/34	11	"Pastures," H. White ..	J. Colebatch
Yundi	18/4/34	All members	Address—M. Jacobs	T. Smart
Jervois	19/4/34	30	Addresses—E. Wilcox and C. Butler	F. Baily
Shoal Bay	27/3/34	10	Discussion	E. Bell
Tweedvale	16/3/34	16	Cinema Lecture—H. N. Wicks	B. Schapel
Kuitpo	28/3/34	8	Discussion	J. Pickup
Scott's Bottom .	24/2/34	7	"Beekeeping"—Mr. Ringwan	E. Atkinson
Scott's Bottom .	31/3/34	7	Discussion	E. Atkinson
Yundi	26/3/34	All Members	Addresses—R. Hill and H. C. Pritchard	T. Smart

WOMEN'S BRANCHES.

THE FOOD VALUE OF MILK.

(Continued from Page 1195.)

THE PLACE OF MILK IN THE DIET.

Milk contains an abundance of protein, fat, carbo-hydrate, and inorganic salts. Its unique proteins are not only of superior value when used alone, but are also especially adapted to supplement the deficiencies of the proteins of the cereals that form so large a part of the daily ration of mankind. The scientific investigations of milk that have been made in the past three decades have all demonstrated that it plays an essential role in the human dietary, and is of particular benefit to the very young. Furthermore, they have also furnished an explanation of the esteem in which milk and its products have been held by the human race since the dawn of civilisation.

Nevertheless, it is necessary to point out that milk is not a perfect food, inasmuch as it does not, when used as the sole source of nutriment, supply adequate quantities of all of the factors required for the normal growth and well-being of animals. Although the consumption of liberal quantities of milk along with a dietary of other natural foods enhances physical development and health, its exclusive use over long periods of time has always led to nutritional disaster. This conclusion is the result of many futile attempts to rear and propagate calves, dogs, pigs, rabbits, and rats on milk diets under experimental conditions. Calves fed milk alone may grow fairly well for two to four months, but their weights then remain stationary; the animals become indifferent to food, and their joints become enlarged and stiff, with resultant interference with locomotion. Nervous disorders are also common symptoms. When rats are fed exclusively on whole milk, either fresh, boiled, autoclaved, or dried, their initial growth may be satisfactory, but later on they become retarded in growth, and reproduction does not occur. If the diet is continued sufficiently long, nutritional anaemia may result, depending on the availability of copper and iron in the cage and bedding.

The unfortunate "experiments" that have been unwittingly conducted on babies reared with the mistaken idea that milk is their perfect food should be mentioned in this connection. Malnutrition, loss of appetite, inability to sit erect and walk at the normal age, fretfulness, anaemia, and rickets are some of the untoward effects of a diet of milk alone over very long periods of time. The evidence is overwhelmingly convincing that milk is not a complete food for either man or animal, and should never be used as the *sole* food for any prolonged period of time, either for babies or for adults.

THE NATURE OF THE DIETARY DEFICIENCY OF MILK.

The addition of various food products, natural or purified, to milk dietaries may improve the diet in varying degrees, depending on the nature of the added food and the proportions in which it is administered. Bunge long ago showed that milk contained very little iron, but that young animals are able to grow for a time by virtue of a storage of this substance in their bodies at birth. Daniels found that soy beans, either as the meal or *meal ash*, were a satisfactory addition in promoting growth and reproduction in rats. Hart and co-workers were able to prevent or cure the characteristic milk anaemia in rats and other animals by introducing small amounts of copper, in addition to iron, into the ration.

McCollum and his associates conducted some interesting experiments with rats in an effort to find what foods could supply the substances in which milk is deficient. They fed diets that in most cases contained 60 per cent. of whole milk

powder, the rest consisting of dextrinized starch, together with one of the following foods:—Wheat and its various products, casein, gelatine, alfalfa, butter fat, cod liver oil, lard, egg yolk and albumin, hemoglobin, agar agar, beef liver, orange juice, and inorganic iron and copper salts. Of 38 diets used, only 24 allowed for production of young, and only 4 of these produced fifth generation young. Of the natural foods, liver appeared to be the most potent in supplementing the milk, but gave no better growth and reproduction than was secured by inorganic iron and copper together.

The conclusions reached by numerous investigators are that the outstanding deficiencies in milk are iron and copper, and that when these are supplied, although only very small amounts are needed, a milk diet will allow the animal body to function normally.

EFFECT OF HEAT ON THE NUTRITIVE VALUE OF MILK.

When milk is subjected to heat, certain changes take place which affect its physical character more than its nutritive value. A film forms on the surface of the milk boiled in an open utensil. Constant removal of this film will result in a diminution of both protein and inorganic salt content.

Alterations of the protein occurs to such an extent that when the heated milk is coagulated by rennin or by the acid of the gastric juice a softer and finer textured curd is obtained than with raw milk. Digestion and absorption of the protein are thereby facilitated. The lactalbumin of the whey undergoes partial denaturation, but is not damaged from a nutritive standpoint, by long continued heating such as accompanies the commercial evaporation of milk. Hence, persons who are unable to drink raw milk can often take evaporated milk without disagreeable results.

When milk is heated, a small amount of both calcium and phosphorus may be precipitated, but the nutritive value and ease of assimilation of the inorganic salts are probably not changed. The lactose and fat undergo no change, except that the latter, in evaporated milks, is broken up into much finer globules, which are more evenly distributed, more thoroughly emulsified, and hence are more readily acted upon by the digestive enzymes. A slight caramelization of the sugar may occur, thereby changing the taste slightly to resemble that of boiled milk.

The scurvy-preventing substance, vitamin C, is the only vitamin that undergoes rapid destruction upon being heated under ordinary conditions. Although boiling without stirring for a short period of time may not destroy it, commercial methods of concentration, evaporation, or drying leave little vitamin C in the final product.

During pasteurisation the only constituent of milk that suffers deterioration is vitamin C. This is of no great consequence, however, since its original content in milk is so far below the optimal for the child that additional vitamin C must be supplied from earliest infancy.

BIOLOGICAL EFFECTS OF DIETS THAT CONTAIN MILK

Other experiments have been reported which show remarkable growth and reproduction in rats, and give a scientific explanation for the wholesome effects observed in man when milk forms a liberal part of his diet. Perhaps the most widely discussed study is that conducted over a period of years by Sherman and Campbell. Two groups of rats, consisting of 1 male and 3 females each, were fed similar diets, the only difference being that 1 contained one-sixth whole milk powder and five-sixths whole wheat, whereas the other consisted of one-third milk powder and two-thirds of whole wheat. On the latter diet the rats grew faster, reproduced earlier, gave birth to more young, and reared a larger number of young rats. At the end of a year there were 361 descendants from this group, in contrast to 77 from the group that received the lesser proportion of milk powder. Furthermore, the animals that received more milk were of a somewhat larger size at all ages, and when maintained on the diet until natural death ensued, on the average lived distinctly longer than the others.

THE DAILY MILK REQUIREMENT.

A discussion of the nutritive value of milk would not be complete without consideration of the quantity required to make a dietary optimal. During infancy and childhood, because of the rapid increase in size of the skeleton, the need for inorganic salts is relatively enormous. Their assimilation and retention by the growing body is proportional to the amount eaten. In other words, large salt intakes induce the utilisation of especially large amounts of calcium and phosphorus. Sherman and Hawley have found in children that maximum retention of these constituents occurs when a minimum of 1 quart of cow's milk is consumed daily. This amount then has been taken as the standard required by a child to supply sufficient material for the normal growth of its skeleton.

Many pediatricians, however, believe that on account of the bulkiness of a quart of milk, and its low caloric value, it may be difficult for a child to eat enough other foods to obtain a well-balanced dietary. Loss of appetite, poor gastric motility, and anaemia are among the symptoms attributed to excessive milk drinking. Eliot, in the bulletin published by the Children's Bureau, "The Care of the Pre-School Child," advises that at least 1½ pints of milk be consumed daily.

If 1 quart of milk be given, careful selection of other foods must be made in order to supplement the deficiencies of milk. As brought out in this article, these deficiencies are calories, iron and copper, and the vitamins other than A. Additional roughage is also advisable. Generous amounts of fruits and vegetables, both raw and cooked, egg yolk, glandular meats, cod liver oil, and small amounts of whole cereal grains to supply calories make ideal additions to a diet built around 1 quart of milk per day.

THE COST AND ECONOMY OF MILK.

Most students of the science of nutrition are united in the belief that, under the economic and social conditions existing in this country, milk furnishes more of the substances essential in human food for the same amount of money than does any other single item of the dietary. Many technical reasons for this belief in the superior food value of milk have been given in the preceding sections; the present section deals with the extent to which milk can be considered as an economical food.

The economy of milk involves much more than a mere consideration of cost, for the question of the unique food value of milk must also enter into the discussion. The cost is significant only in terms of food value received for money expended.

THE PLACE OF MILK IN THE CHILD'S DIET.

In order to reduce the problem to practical terms, it is necessary to consider the economy of milk from the relationship of the monetary value of a given quantity of milk to its content of the dietary essentials, and also to show the contribution of this given quantity to the total daily food requirements of an individual. The daily food needs of a school-age child have therefore been chosen as the dietary standard to be met, and 1 quart the unit quantity of milk. These selections were made on the basis of the Sherman-Hawley experiments, which showed that optimum storage of calcium in children is attained when 1 quart of milk is consumed daily.

Although the number of units of vitamin A in many foodstuffs is known, the quantity required by the human body has not been definitely established. The experience of many investigators has indicated, however, that 1 quart of milk supplies the requirements of the child for vitamin A.

The quantities of protein and iron in milk are measurable, and the food fuel or energy value of 1 quart of milk is known. The child's need for protein was calculated on the basis of 12 per cent. of the 2,500 caloric standard, and the daily iron requirement was taken as 0.015 gram.

It is clear that a liberal proportion of the essential constituents of a child's diet is supplied by the consumption of 1 quart of milk daily, and that milk is a satisfactory basic food around which to build an adequate diet. The next point for consideration is, therefore, the correct selection of foods with which to supplement the quart of milk in making up the dietary. The cost of these foods, when compared with the price paid for milk, will reveal to what extent milk can be considered an economical food.

MILK AN ECONOMICAL FOOD.

Obviously, with less than half of the dietary essentials to be supplied, and, at the same time, with more than two-thirds of the calories still lacking, there is a wide range of foods from which to choose the remainder of the diet. Many combinations that insure an adequate diet have been devised, and for the purpose of the present discussion, one of the simplest is here presented. According to this, the daily diet of a child should contain the following foods, if the diet is to be complete:—*In addition to the quart of milk*, two or more kinds of fruit, of which one should be a citrus fruit or tomato; two or more vegetables, one preferably raw; one or more servings of whole grain cereal or bread; one or more servings of a high protein food, such as meat, fish, eggs or cheese; and enough additional food to fulfil the energy requirement. The problem in this case then is to select foods that yield about 1,800 calories which, when added to the 675 calories supplied by the quart of milk, furnish the 2,500 calories required by the child. An illustrative list of foods that might be selected is shown in Table IV.

By supplementing milk with these foods, not only the necessary energy is supplied, but the diet is rendered adequate in other respects as well. Ample quantities of vitamin C are contained in the raw fruits and vegetables, and iron is provided by the meat, fruits, green vegetables, egg, and whole grain cereal. The protein and phosphorus requirements are met by the meat, cereal, and egg, and a liberal excess of vitamin A is supplied by the butter, egg yolk, and green vegetables, thus providing for the much desired "health reserve" of this vitamin. The calcium requirement has already been met by the milk, and properly so in view of the probability that the calcium of milk is more completely utilised by children than is that from other sources.

TABLE IV.—*An Illustrative List of Foodstuffs that Might be Served Daily to Supplement 1 Quart of Milk for a Child 10 to 12 Years Old.*

Foods.	Calories.
1 orange	75
1 apple	100
1 serving prunes	100
1 serving coleslaw	50
1 serving peas	50
1 serving whole grain cereal	100
1 egg	70
1 serving meat	100
4 servings bread stuffs	400
1 ½ oz. butter	300
1 medium-sized potato	100
1 serving Brown Betty	200
2 small cookies	100
Sugar or other sweets	100

Total 1,845

Let us now examine the cost of these foods. When 1 quart of milk, which forms the foundation of the diet, costs 6d.*, this sum has satisfied the child's requirement

for calcium; has provided all, or practically all, of the vitamin A needed; has supplied nearly all of the phosphorus, two-fifths of the protein, more than one-fourth of the energy, and one-sixth of the iron. On the other hand, what must be paid for the foods that supplement the milk in completing the diet? Purchased at moderately priced markets, and at a time when staple food products are extremely low in price, this supplementary list of food costs approximately 1s. 3d.* This brings the cost of the meals for one day to about 1s. 9d.[•] There is, of course, a considerable variation in the price that has to be paid for these supplementary foods, and the selection of a wider variety of foods of choice quality adds materially to the total cost. But, bearing in mind the large nutritive contribution made by the quart of milk and the small fraction of the cost of the day's meals for which it may be procured, it is clear that milk may be regarded as a fundamental item of the child's diet, and, in the true sense of the word, as an economical food.

COST OF CALCIUM IN VARIOUS FOODS.

A still closer analysis of certain of the dietary factors of milk taken singly shows that many of these can be supplied at lower cost in milk than in any other way. One of the most striking examples of this arises from a consideration of the requirement of the human body for calcium. The question is frequently raised whether adults ordinarily obtain sufficient calcium from other foods than milk. Fruits and vegetables are generally regarded as good sources of calcium, and are often depended upon to take the place of milk in this respect. The question really involves two quite different considerations:—First, is it possible to supply the calcium needed by substituting fruits and vegetables for milk; and, second, if this is so, is the substitution economical from the point of view of cost?

For the present discussion the calcium requirement of the adult is taken at the generally accepted standard of 0.67 gram. daily. This amount of calcium would be supplied by the ingestion of slightly more than 1 pint of milk, which is the quantity usually recommended for the adult. In what quantities must fruits and vegetables be eaten if milk is to be supplanted by them as a source of calcium? For convenience, let us take the fresh fruits and vegetables from the supplementary food in Table IV.—oranges, apples, peas, and cabbage. The calcium content of these foods is as follows:—

Foods.	Measure.	Calcium (gm.)
Apple.	1	0.011
Orange	1	0.066
Peas	$\frac{1}{2}$ cup	0.014
Cabbage (shredded)	1 cup	0.036
Total		0.127

It is evident that, when served in the quantities designated, these fruits and vegetables do not meet the daily calcium requirement of the adult—an amount nearly fulfilled by 1 pint of milk. The second bar represents the contribution made by the calcium present in the quantities of fruits and vegetables proposed. Only one-fifth of the day's calcium requirement is met by the fruits and vegetables if these are eaten in the amounts stipulated. It is clear that, if they are to be depended upon as the sole source of calcium, it would be necessary to consume five times the suggested quantity in order to meet the calcium requirement. In other words, it would require 5 oranges, 5 apples, 5 servings of peas, and 5 cups of cabbage to furnish the amount of calcium needed each day. Aside from the practical difficulty of consuming such quantities of these foods, there is the more pertinent question of cost.

To obtain the calcium needed for the day in milk may cost 3d.* To obtain the same amount of calcium in the form of oranges, apples, peas and cabbage the cost would be, at the lowest, 1s. 10½d.* But the reader may point out that it is not the primary function of fruits and vegetables to furnish calcium. It is true that these foods serve other useful purposes, and their value to the body should not be discounted on the basis of this discussion. The fact remains, however, that the person who buys adequate amounts of calcium in the form of fruits and vegetables instead of milk must eat far greater quantities of these than are required to fulfill their other functions in the body. Obviously, such a procedure would not be defensible if economy were the main consideration.

Although it is evidently impracticable to maintain the calcium intake at a proper level by depending alone on fruit and vegetables, one may still feel that the other foods in the diet, exclusive of milk, fruits and vegetables, may meet this requirement. That this is not the case may be shown by referring once more to the supplementary food list. The calcium content of the foods in this list is fairly representative, but the quantities recommended are those to be used in supplementing the daily quart of milk in the diet of a child. The energy value is approximately 1,800 calories, whereas an adult at a sedentary occupation requires approximately 2,800 calories. It is necessary therefore to increase the suggested quantities by approximately 50 per cent. Table V. gives the calcium content of the item of food in the supplementary food list. The total calcium that can be derived from this diet is about 0.3 grams. If this is increased by 50 per cent. in order to make up the amount of energy necessary for the adult, the intake of calcium would be 0.45 grams. It is clear, therefore, that this diet is markedly deficient in calcium. The substitution of cheese for a part of the protein would, however, do much toward correcting this deficiency, since cheese contains relatively more calcium than any of the other foods mentioned.

TABLE V.—*The Calcium Supplied by the Items of the Supplementary Diet Shown in Table IV.*

Foods.	Calcium (gm.)
Prunes	0.018
Rolled oats	0.017
Egg	0.032
Meat	0.008
Bread stuffs (4 servings)	0.076
Potato (1 serving)	0.017
	<hr/>
	0.168
Orange, apple, peas, and cabbage	0.127
	<hr/>
Total	0.295

The necessary quantities of these foods may be bought for from 9d.* to 1s. 0½d.* Again the economy of milk is evident. One pint supplies practically the whole of the adult's daily need of calcium for about 3d.* The other foods in the diet supply from one-half to two-thirds of the quantity needed at more than three times the cost.

Although a child's need for calcium is satisfied by 1 quart of milk, the equivalent in calcium is not only difficult to obtain on other foods, but is much more costly in comparison with the milk.

MILK IN THE LOW COST FOOD BUDGET.

In the making of food budgets, milk and its products have always been accorded a place. One widely used guide for the division of the food fund in the "one-fifth" plan first suggested by Gillett. This plan recommends spending one-fifth of the food

budget for milk and cheese, and approximately one-fifth for each of the other four main groups of foodstuffs. It should be noted particularly that this division is suggested for a family living at a fairly comfortable level of expenditure for foods. The extent to which Gillett regards milk as an economical food is revealed by her recommendations when the food fund is reduced below the comfort level. She has found from experience that, when there is less money to spend, it is necessary to use nearer one-third of the food money for milk and cheese in order to provide adequately for the needs of the family. As the total amount of money spent for food is decreased, care must be exercised to see that the quantity of milk used is not lessened.

In direct line with the above suggestions regarding the distribution of the food fund are the specific recommendations made by Sherman as to the purchase of foods when the diet must be reduced to its cheapest level. He says, in brief:—"The diet should be built around bread and milk. The lower the level of expenditure, the more one must forego other foods, and concentrate effort upon providing these two, supplemented by a little of some inexpensive fruit or vegetable." He follows this with the statement:—"Milk builds bone and muscle better than any other food, and, more than this, milk is both the cheapest and surest protection from nutritional deficiencies. . . ."

Gillett and Rice have recently shown, by a study of the budgets of city families, that those families which spent a larger proportion of their food fund for milk and cheese actually bought their total food supply more economically. The study involved a detailed investigation of the diets of city families on low incomes. One hundred of the families were "uninfluenced" in the buying of their food; an additional 20 families were "influenced" by investigators, who gave specific instructions in food values. The findings of the study made in 1928 were compared with the findings of a similar study made on approximately the same number of families and under similar conditions in 1914.

It is interesting to see the extent to which the investigators were successful in influencing families in the distribution of their food money with respect to the purchase of milk. (A graph published in the original bulletin shows the percentage of the food fund actually spent for milk and cheese by the four groups of families studied.) From this it is evident that there was a definite although small increase in the proportion spent for milk and cheese from 1914 to 1928. This was probably the result of the general dissemination of knowledge of food values over a period of years among the "uninfluenced" group. The pronounced and significant difference between the "uninfluenced" group and those under the tutelage of the trained advisors of both years, 1914 and 1928, is striking. The 1928 study was prompted by the desire to obtain information to guide in making revision, if such were necessary, of the suggestions on food expenditure for low-income families. Whether or not such change in the distribution of the food budget is significant rests entirely upon the effect on the cost and quality of the family diets. Is there, for instance, an advantage in so shifting the distribution of the food fund that more money is spent for milk? And, if so, is this advantage so pronounced that low-income groups ought to be urged to adopt this plan for their own food expenditure? The findings of the study appear sufficiently conclusive to answer the questions in the affirmative. The survey of family dietaries showed that, as the distribution of the food fund approached that recommended, it was possible to purchase diets of higher food value at less cost.

[*In the original Bulletin the money values referred to were quoted in cents. For the convenience of local readers, these have been converted to Australian coinage on the basis of 1 cent. equal to $\frac{1}{2}$ d.—Editor.]

POTATOES—50 WAYS FOR 50 DAYS

[By A. L. MARLATT.]

(Special Circular Issued by the University of Wisconsin, U.S.A.)

Thrifty housewives know that a "big potato crop" means a cut in the family food bill. When potatoes are plentiful they may be used widely, from soups to desserts, for their mild flavor does not become tiresome, and they are wholesome and easy to prepare.

The potato contains valuable proteins, minerals and vitamins, in addition to its starch, so that it need not be forbidden food for persons on a reducing diet, providing it is properly balanced with milk, meat, fish or eggs.

In comparing the value of the potato with such cereal foods as wheat, oatmeal and corn, scientists have found it has a better muscle repairing content; it is very high in alkaline salts, which are needed to offset the acid salts of meats; it is fair in iron; low in Vitamin A (as are the cereals), fair in vitamin B, but high in vitamin C; and that it contains one of the easiest starches to digest. Vitamin A, it will be remembered, is very important, as it gives increased resistance to infections. Vitamin B determines the quality of the appetite, and prevents poor nutrition conditions. Vitamin C, in which the potato is rich, prevents scurvy.

While the iron in potatoes is not high, yet if they are eaten in liberal quantities the iron becomes of value. The potato is also low in lime salt, but this is easily supplied by using plenty of milk when serving potatoes.

The high vitamin C value of the potato has been known for many years. In the famines in Ireland, when potatoes were the only food, there was no scurvy, and also in the days of sailing vessels it was commonly known that when ships had a plentiful supply of potatoes the sailors never suffered from scurvy. In Poland and Russia, where the potato is very important in the diet of the rural people, such diseases as pellagra and scurvy are practically unknown.

In America, where potatoes are used as a supplementary food to balance the proteins of milk, meat and eggs, the values of vitamins A, B, and C are adequate for all but very young children. For them, vitamin A must be enhanced by the use of butterfat, and for infants by the use of cod liver oil or sunshine as a protection against rickets.

POTATO BUILDS MUSCLE.

In several studies made with adults who were fed a uniform diet, including potatoes, to the extent of 2lbs. to 2½lbs. a day, the body weight stayed nearly constant, the digestion was excellent, and the people did not tire of the diet. These studies indicated that the potato is able to sustain the body in a state of nitrogen balance, so that even in muscle building this vegetable is a distinct aid in the diet when costs must be considered. In comparing the value of the potato with wheat bread, 1 3oz. potato (320 potatoes to the bushel) is equal to 2 slices of white bread, or 10 medium-sized potatoes will equal 1 lb. loaf of bread, or 1bush. of potatoes will equal in all ways 32 lb. loaves of wheat flour bread.

FOOD VALUE HIGH.

The main calorie or heat-producing value of the potato is in its starch, which has been known as one of the most satisfactory of starches for human food. It is of interest to know that in human feeding where the potato is used as one of the main foods, even up to 2lbs. or 3lbs. in the diet, steaming seemed to be the method that was found most satisfactory for the long period; but the potato lends itself to all methods of cooking. The problem is to reduce the quantity of mineral loss by safeguarding the methods.

LOSS OF MINERALS IN COOKING.

Studies in our agricultural laboratories at the University of Wisconsin have shown that steaming, baking, or cooking without water in the waterless cooker are all better than boiling the potato in the skins, or boiling it after peeling. In the latter case the percentage of loss in both mineral matter and protein may be very high. Recent work from these same laboratories indicates that loss of manganese, one of the minerals found in the potato, may, through pressure cooking or boiling in a moderate amount of water, be as high as 9 per cent. As manganese is now known to be an important element along with calcium, phosphorus, magnesium, iron, chlorine and iodine, the method of preparation in cooking the potato becomes important.

METHODS OF COOKING.

In careless preparation and cooking of the potato, as high as 30 per cent. of its food value may be wasted. This loss is greatest in the muscle-building material (protein), and in the mineral matter. For example:—

1. Peeling and slicing the potato, allowing it to stand a long time in water before cooking, will waste the protein and mineral matter.

2. Placing the peeled potato, without previous soaking, in cold water and bringing the water quickly to the boiling point will waste the protein and the mineral matter.

3. Placing the peeled potato at once in salted boiling water and boiling the water rapidly will waste less of its protein and mineral matter.

4. Baking or steaming the potato with the skin on wastes none of the protein or the mineral matter.

If roughage is needed in the diet, the baked potato should be eaten with the skins on.

5. Cooking the unpeeled potato without water in a heavy covered vessel over the direct heat destroys none of the protein or the mineral matter.

The rule should be to boil or steam the potato and remove the skin after it is cooked. Then the potato may be cut into the form appropriate to any one of the fifty or more ways in which it can be served.

If peeled and cooked in boiling water, the water in which it is cooked should be used with the potato, or saved to be used in making soup or in making bread, because the water in which the potato is boiled may contain 30 per cent. of the protein and 30 per cent. of the mineral matter. The most wasteful method of preparation and cooking may mean a loss of over half the protein and over a third of the mineral matter.

BAKED POTATOES.

1. Bake potatoes of medium size and smooth skin; 30 to 40 minutes should make them mealy.

2. Boil large potatoes for 5 minutes, and then bake for 40 minutes in a hot oven.

3. Rub the skin of potato with sweet fat, and then bake slowly in a moderate oven 50 to 60 minutes. This will keep the skin tender and edible.

4. Baked potatoes must be broken open as soon as tender. Too much cooking will, because of the confined steam, make the starch sticky and the potato soggy.

5. When potatoes are baked and the family is not ready for them, the potatoes may be cut in halves and the mealy centres removed, beaten smooth with cream or fat, returned to the shells, and kept warm in the oven.

BOILED POTATOES.

1. Place washed but unpeeled potatoes in boiling salted water (1 teaspoon salt to 1 quart water). Boil potatoes from 20 to 30 minutes, or until easily pierced with a fork. Drain the water. Heat the potatoes in a dry vessel until all water

from surface of potato is evaporated. Remove the skins, and prepare according to any rule calling for cooked potatoes.

STEAMED POTATOES.

1. Steam the potatoes without peeling. The steaming process must be continuous and rapid for about 30 minutes. When the potatoes are tender they should be removed from steam and dried in a hot oven. They are then ready for further preparation before serving, or they may be served in their jackets.

FLAVORINGS.

Because the potato is mild in flavor it lends itself to varied uses with other foods in preparation of dishes.

1. *Salt*: Because of its potash salts we demand instinctively the use of common salt in the cooking of the potato. This instinct is founded on a vital need, as the two salts balance each other in the normal human body.

2. *Pepper*: Black, sweet red (paprika), or cayenne may be used in all potato dishes.

3. *Onion* is always an excellent flavor for potato served as chowder, soup, creamed, or in form of bean or meat loaf.

4. *Garlic*, raw, may be chopped and used in potato salad, or the sections or cloves of garlic peeled and sliced may be cooked with the potato dishes in which tomato, onion, or meat form a part. The cooked garlic has a mild flavor quite different from the onion flavor.

5. *Herbs*: Thyme marjoram, bay leaf, summer savory, may be put into the water in which the potato is boiled, thus varying the flavor, but the amount used should be very small. Such variations in flavor should be used rarely. Mint leaves may be used in the water in which new potatoes are cooked.

6. *Curry Powder*: Curry powder, which is so commonly used in East Indian cookery, may be used in preparation of potato curries, in which potato takes the place of rice. Curry should be used only when the cook knows the family is fond of it.

The potato is native to the region including Peru, Ecuador, Bolivia, and North Chili. Along the arid desert which forms the Pacific coast of this region there is a succession of cemeteries in which mummies are found, accompanied not only by dried plants, but also by funeral vases of terra cotta, on some of which are pictured food staples and fruits of the ancient inhabitants. Dried potatoes have been found in these graves, and funeral vases picturing potatoes are abundant.

The potato was introduced into Europe in the latter part of the 16th century, although there is some question as to how this was done. In American agriculture the potato was unknown until the early part of the 18th century. In all countries, however, there was strong opposition to the introduction of this new vegetable. Some protested on account of its presumed harmful effect on the mind, and others because it was not mentioned in the Bible. The cultivation of the potato in France was first brought about by Parmentier; and in 1785 at a fete the king used the flowers of the potato as a buttonhole bouquet, and Marie Antoinette wore them in her hair.

BREAKFAST.

The preparation of breakfast should consume as little time as possible. Therefore use potato recipes which will call for potato which has been cooked, as hashed brown potato.

Boiled Potato with Gravy (serves 6).—Steam or boil the potato in its jacket until tender (20 to 30 min.); peel and serve unmashed with butter or with cream sauce or creamed dried fish or creamed dried beef.

Cream Sauce.—2 level tablespoons fat, 4 level tablespoons flour, 2 cups milk, 1 teaspoon salt, $\frac{1}{2}$ teaspoon pepper. Melt the fat, add the flour, and stir until a smooth mixture. Add all the milk, and place in the dish in another dish containing boiling water (double boiler), and cook until the mixture is smooth and thick like cream, stirring constantly. Add the seasoning.* (Any sweet clarified fat from beef, chicken, or pork may be used, or any of the butter substitutes may be used in place of butter.) One-fourth teaspoon of soup coloring will improve the color and flavor of the sauce.

Variations may be made by adding to the completed sauce 1 cup of finely divided salt fish, which has been allowed to soak in water over night and the water drained in the morning, or the same amount of finely divided dried beef may be soaked over night, drained, and added to the sauce. In both cases the sauce should be reheated thoroughly before serving.

Any left-over meat may be cut into $\frac{1}{2}$ in. cubes and added to the white sauce in the proportions of $\frac{1}{2}$ cup of meat to 2 cups of the sauce.

Potato Hash (serves 4-6).—Equal parts of finely chopped cooked potato and chopped cold cooked fish or meat may be used as a basis for a breakfast dish. 2 cups chopped potato, 2 cups chopped meat, 1 teaspoon salt, $\frac{1}{2}$ teaspoon pepper, 3 tablespoons fat, $\frac{1}{2}$ cup boiling water. Melt the fat in the frying pan; add the potato and meat mixture, pour over the top the water, and cook slowly without stirring until the under surface is a rich brown. Fold as an omelet and serve hot on a platter.

Omelet (serves 4).—1 cup mashed potato, $\frac{1}{2}$ teaspoon of pepper, 1 teaspoon salt, 3 eggs, 3 tablespoons cream or milk. Wash eggs and separate the whites and yolks. Add the yolks to the potato and beat until there are no lumps. Season with onion juice, if desired, and chopped parsley. Beat the whites until stiff, and fold into the potato mixture. Put into a well-oiled frying pan, and bake in oven until brown. Then turn and fold on hot platter. Serve at once.

LUNCHEON OR SUPPER.

The potato may be the principal ingredient in soups, chowders, or purees, the main vegetable served with hot breads and cheese dishes, or a part of a meat substitute dish, such as croquettes or a loaf. It may appear in the salad, in the hot breads, or in the dessert.

SOUPS.

Cream or Potato Soup (serves 4-6).—1 quart milk, $1\frac{1}{2}$ cups cold mashed potato or 3 medium potatoes boiled in their skins, peeled, and mashed, 2 tablespoons fat, $1\frac{1}{2}$ tablespoons flour, 1 tablespoon chopped onion or onion sprouts, 1 tablespoon chopped parsley (may be omitted), $1\frac{1}{2}$ teaspoons salt, $\frac{1}{2}$ teaspoon white pepper, or $\frac{1}{2}$ teaspoon red pepper, $\frac{1}{2}$ bay leaf (may be omitted). Heat the milk in a double boiler with onion and the bay leaf. These should be removed before the milk is used. Melt the fat, add the flour, mix until smooth; add the milk, return to the double boiler and cook, with stirring, until the mixture is smooth. Add the salt, pepper, and the mashed potato, beating until smooth. Heat thoroughly, and sprinkle in the chopped parsley just before serving.

Fish Chowder (serves 4-6).— $\frac{1}{2}$ lb. pound salt fish, 3 cups potato cut in small pieces, 4 cups milk, 2 ozs. salt pork, 1 small onion (chopped), $\frac{1}{2}$ teaspoon pepper, 2 tablespoons flour. The fish may be cod fish, smoked halibut, or any other dried fish. The fish should be free from bone and cut into small pieces. If very salt, it should soak in water over night. The salt pork should be cut into small pieces and cooked with the chopped onion until the onion is a golden brown. Add the

*All measures are level. Do not pack or press into the cup or spoon, but lightly fill the measure.

potato, and cook for 10 minutes. Add the milk and fish, and cook slowly in a double boiler or over a water bath until the potatoes are tender. Add the flour mixed to a smooth paste with an equal amount of cold water. Add the pepper and additional salt, if necessary. Cook until the mixture is creamy.

Corn and Potato Chowder.—In the above recipe substitute 1 pint of canned corn for the fish.

Potato and Tomato Chowder.—In the fish chowder recipe in place of 1 cup milk, use 1 cup of canned tomato pulp added after the flour has been thoroughly cooked in the chowder. Serve as soon as possible, else the tomato may curdle the milk.

VEGETABLES.

Scalloped Potatoes.—Cut the potatoes in slices $\frac{1}{2}$ in. thick. Place the potatoes in layers in a greased dish. Pour thin white sauce over them. Bake in a slow oven one hour, and, when half done, sprinkle with oiled crumbs.

Potato and Curry (serves 6).—4 cups potato, cut in dice, $\frac{1}{2}$ cup onion chopped fine, 1 cup boiling water (in which potato has been cooked), 4 tablespoons oil (corn), 1 teaspoon curry powder, 2 teaspoons salt, $\frac{1}{2}$ cup grated cheese. Peel and cut the raw potatoes into $\frac{1}{2}$ in. dice, boil until they are tender in just enough water to cover. Cook the chopped onion in the oil until the onion is golden brown. Add the potato and a half cup of boiling water to the onion. The water should just cover the potato. Additional boiling water should be added as needed. When the potato is tender (15 minutes) add the curry powder, which has been mixed with an equal quantity of cold water. Mix gently, and pour the potato mixture into the serving dish, sprinkle with the grated cheese, and serve at once.

Armenian Potatoes (serves 6).— $\frac{1}{4}$ cup oil, 1 quart of raw diced potato, $\frac{1}{2}$ cup tomato pulp, $\frac{1}{2}$ cup water, 1 $\frac{1}{2}$ teaspoons salt, 1 teaspoon paprika or white pepper, 1 garlic separated into cloves, and each clove peeled and sliced, 1 bunch parsley, or 1 tablespoon dried parsley. Mix in the order given, and bake in a covered dish in a slow oven 40 minutes.

POTATOES USED AS MAIN DISH.

Potato O'Brien (serves 4).—2 cups diced cooked potato, 1 tablespoon flour, 1 tablespoon fat, $\frac{1}{2}$ cup skimmed milk, 1 teaspoon salt, $\frac{1}{2}$ teaspoon pepper, 1 green pepper cooked and chopped, $\frac{1}{2}$ cup grated American cheese, $\frac{1}{2}$ cup bread crumbs. Make the sauce, using the fat, flour, milk and seasoning. Mix the potato and the green pepper with the white sauce and cheese. Put in a baking dish, and cover with the bread crumbs and brown in a hot oven. Note.—Canned red peppers can be used in place of green pepper.

Pittsburg Potatoes (serves 4).—1 quart potato cut in cubes, $\frac{1}{2}$ lb. milk cheese, $\frac{1}{2}$ can pimientos, 1 onion, 2 cups white sauce, $\frac{1}{2}$ teaspoon salt. Cook potato cubes and onions finely chopped in boiling salted water 5 minutes. Add pimientos cut in small pieces, and cook 7 minutes; then drain. Turn into oiled baking dish, and pour over white sauce mixed with cheese and salt. Bake in moderate oven until potatoes are soft.

Cheese and Potato (English) (serves 4).—3 cups raw potato sliced thin, 3 ozs. fat, 4 ozs. grated cheese, 2 cloves garlic chopped fine, 2 teaspoons salt, $\frac{1}{2}$ teaspoon pepper. Arrange in baking dish, using alternative layers of potato, cheese, fat, and seasoning. Cover tightly, and bake in moderate oven until the potatoes are tender (1 hour). Decorate with chopped parsley, and serve in the baking dish. (Note.—The use of garlic gives the cheese a flavor resembling parmesan.)

Juliennes Potato with Savory Sauce (serves 4).—3 cups potato cut in strings, 2 teaspoons mixed herbs, 2 ozs. fat, 2 small onions (chopped), 2 tablespoons flour, 1 pint milk, 2 teaspoons salt, $\frac{1}{2}$ teaspoon pepper. Cut the raw peeled potatoes into strings the size of macaroni. Cook them in boiling salted water 20 minutes.

Brown the chopped onion and the herbs in the fat. Add the flour, stirring thoroughly; add the milk, salt and pepper, and cook in a double boiler 20 minutes. Strain and pour over the cooked potato. Sprinkle with grated cheese and serve.

Potato and Lima Bean Loaf (serves 4-6).—1½ cups cooked lima bean (sieved), 2 tablespoons fat, ½ cup milk, 1 teaspoon salt, ½ teaspoon sage, 2 cups riced potato, ½ cup milk, ½ teaspoon fat, ½ teaspoon fat for brushing. Mix first five ingredients, and place in bottom of an oiled dish. Whip together the hot potato and the remaining ingredients. Place this mixture on top. Bake in quick oven. Serve with tomato sauce.

Potato and Bean Cutlets (serves 4).—1 cup riced potato, 1 cup riced lima beans, 1 can pimientos, ½ cup bread crumbs. Mix thoroughly, and salt to taste. Form into shapes to look like cutlets. Dip into beaten egg, and sprinkle with bread crumbs, and bake in a moderate oven until slightly brown. Turn carefully, and brown on the other side. Serve with a tomato or cheese sauce.

Cheese Sauce.—2 tablespoons fat, 2 tablespoons flour, 1½ cups milk, 1 cup grated cheese. Brown the flour in the melted fat, add the milk, and cook for 5 minutes, and add the cheese. Remove from the fire, and stir until the cheese is melted.

Potato Puffs (serves 4-6).—2 cups mashed potato, 2 eggs, ½ cup milk, 1 teaspoon salt, 1 cup grated cheese. Add the milk to the potato and beat until thoroughly blended. Add the beaten egg and salt, gradually adding the grated cheese. Bake in buttered tins or ramekins in a slow oven.

Stuffed Potatoes.—Select medium-sized, smooth-skinned oval potatoes. Bake in a hot oven until tender, being careful not to over-brown the skin. Cut the potatoes in two lengthwise; remove the potato pulp, being careful to leave shells unbroken. Mash the hot potato; add either milk or cream as for mashed potato. Season as follows:—To each cup of potato add ½ saltspoon salt and ½ saltspoon of pepper. Fill the shells with this mixture, rounding the surface so that it is the shape of the original potato. Bake for 10 minutes in a hot oven.

Variations.—Fold into the two cups of seasoned potato pulp the beaten white of an egg; pile lightly in the potato shells, and bake. Grated cheese ½ cupful to 2 cups of potato pulp may be used.

Surprise Potatoes.—Bake the potatoes as in the preceding recipe. Cut one end, hollow out the centre of the potato; place in each potato one egg which has previously been poached; cover with mashed potato, stand potato in the oven for 5 minutes, and serve.

American Kedgerie (serves 6).—1 pint diced potato (cooked), 1 pint kidney beans (cooked), 2 hard boiled eggs, 1 medium sized onion, 2 teaspoons curry powder, 1 teaspoon lemon juice or vinegar, 2 teaspoons salt, ½ teaspoon pepper, 2ozs. fat or oil. Chop the onion fine, brown in fat, add curry powder and lemon juice; cook 5 minutes; add the potato, beans, chopped white of the eggs. Heat in stew pan or baking dish. Serve with top covered with the yolk of eggs passed through sieve.

Vegetable Curry (East Indian) (serves 6).—2ozs. diced carrot, 2ozs. diced turnip, 2ozs. diced potato, 2ozs. cooked peas, 2ozs. cooked beans (navy, kidney, or haricot), 2 hard boiled eggs (sliced), 4 peeled bananas (sliced), 1 peeled apple (diced), 2ozs. oil or butter substitute, ½ pint water, ½ pint milk, 1 level tablespoon turmeric, 1 level tablespoon curry powder, 1 tablespoon flour (corn or rice). Brown the diced vegetables in the fat; add the fruit, the curry powder, turmeric and flour; mix thoroughly; add the water; then simmer for ½ hour. Add the milk and hard boiled eggs. Heat and serve with a border of boiled rice.

Quick Oven Browned Potatoes.—Cut potatoes in 1-inch slices. Place in an oiled baking pan; cover with fat, and bake in a moderate oven. Bacon drippings are especially good to use for the fat.

Meat Loaf (serves 4-6).—1lb. ground beef, $\frac{3}{4}$ lb. ground pork, $\frac{1}{2}$ cup mashed potatoes, $\frac{1}{4}$ cup milk, 1 teaspoon salt, $\frac{1}{4}$ teaspoon pepper, $\frac{1}{2}$ teaspoon minced onion, if desired. Mix all ingredients together, and form into a loaf. Bake in a hot oven from 45 minutes to 1 hour. Potato takes the place of egg as a binder.

SALADS.

Potato Salad (serves 4-6).—6 hot boiled potatoes, 1 tablespoon finely chopped onion, 2 tablespoons finely chopped parsley. Cut the potatoes into $\frac{1}{2}$ in. cubes, mix hot with the onion and the parsley, and add any salad dressing, French, boiled, or cheese. Mix thoroughly and chill. Using the potato hot allows the dressing to penetrate much more thoroughly, so that the flavor is uniform throughout.

Variations.—To the above any one of the following may be added:—1 cup chopped celery, 1 cup diced carrots, 1 cup peas, 1 cup diced cucumbers, 2 hard boiled eggs, the whites diced and the yolks rubbed through a sieve.

Salad Loaf.—Place a layer of potato salad in a glass dish, cover with layer of meat salad. Alternate until dish is full, pressing into firm layers. Chill and unmold on platter. Decorate with mayonnaise dressing and red pimento, and serve on lettuce leaf.

Macedoine Salad (serves 6).—1 cup diced potato (cooked), $\frac{1}{2}$ cup diced carrot (cooked), $\frac{1}{2}$ cup cooked peas, $\frac{1}{2}$ cup shredded cooked string beans, $\frac{1}{2}$ cup cooked diced beet. Mix with $\frac{1}{2}$ cup of French dressing or boiled dressing. Garnish with parsley or shredded cabbage.

Southern French Dressing.— $\frac{3}{4}$ cup oil, $\frac{1}{4}$ cup vinegar, juice of $\frac{1}{2}$ lemon, 1 teaspoon salt, 1 teaspoon sugar, 1 teaspoon mustard, $\frac{1}{2}$ teaspoon paprika or white pepper, 1 clove garlic (sliced). Pour into bottle, and shake thoroughly before using. This will keep in a cool place for an indefinite time, and is always ready.

Cheese Salad Dressing.—1 cup milk, 1 tablespoon flour, 1 tablespoon fat, $\frac{1}{4}$ cup vinegar (mild), $\frac{1}{2}$ cup grated cheese, $\frac{1}{4}$ teaspoon paprika or white pepper, $\frac{1}{2}$ teaspoon salt, 1 tablespoon onion juice (optional). Add flour to warm fat. Add milk, and cook as for white sauce; add vinegar and warm. Then add seasoning and cheese.

DINNER.

Potato cooked in some form has become the accepted accompaniment of the meats served at dinner. It may be served with the meat as the main source of starch to balance the protein of the meat as baked potato, potato puffs, mashed potato, potato croquettes, or as creamed potato. It may be reserved to serve as a side dish in the form of a potato salad, or it may be served as part of that popular dish, a New England dinner, corn beef and cabbage.

Mashed Potato.—Select medium-sized potatoes; scrub thoroughly, and cook in boiling water, or steam until tender. Peel, add 1 tablespoon hot milk or cream or fat, and 1 saltspoon of salt, and $\frac{1}{2}$ saltspoon of pepper to each cup of potato. Beat the mixture with a fork until light and white. Pile in a hot serving dish.

Variations.—Mash the potato with the seasoning, and put it through a potato ricer, letting it fall into a baking dish, so that it piles lightly. Brown the surface in a very hot oven or under the broiling flame.

Baked Potato.—See preceding rules.

Note.—The baked potato must never be allowed to wait without being broken open as soon as it is cooked. Even then it quickly loses its mealiness on standing. Therefore, the potato should be put into the oven at a time when it will be done at the moment when it should be served. In case of delay, following any of the rules for stuffed potato will prevent the potato from becoming soggy before serving.

Potato and Celery Hash (serves 4).—6 medium sized boiled potatoes, 1 cup cut celery, 1 teaspoon salt, 3 tablespoons fat. Mix the cold potatoes with finely cut celery. Add the salt and the melted fat, stir together, place in a hot oven, and bake until well browned on top. Stir the potatoes, and let brown again. Repeat this two or three times until the potatoes have browned throughout and the celery is well cooked.

Raw diced potatoes may be cooked with the celery in boiling salted water for 20 minutes. When tender reduce water by rapid boiling; add the fat, pour into baking pan, and cook 10 minutes in the oven.

Potato Balls (serves 4).—3 cups mashed potato, 1 teaspoon salt, $\frac{1}{2}$ teaspoon white pepper, 1 egg beaten slightly. Beat the potato, salt, pepper, and $\frac{1}{2}$ of the egg together. Measure in tablespoons; dip each in flour, and roll either in the form of balls or in cylinders; place in an oiled baking dish, brush the surface of each ball with the remainder of the egg mixed with an equal amount of milk. Brown in a hot oven 20 minutes.

Potato Souffle (serves 4-6).—4 cups hot mashed potato, 1 tablespoon melted fat, 2 tablespoons milk, 1 teaspoon salt, $\frac{1}{2}$ teaspoon pepper, yolks of 2 eggs, whites of 2 eggs beaten stiff. Mix all but the whites of the eggs in the order given; beat thoroughly, fold in the stiffly beaten whites, pile in a baking dish, and cook until the mixture puffs and is brown on the top.

Franconia Potatoes.—Select small (2oz. or 3oz.) potatoes. Peel; place around the roast in the baking dish 30 to 45 minutes before the meat will be cooked. The potatoes should be golden brown in color and tender when served.

Potato Peanut Loaf (serves 4-6).—1 pint mashed potatoes, 1 cup ground peanuts or $\frac{1}{2}$ cup peanut butter, 2 teaspoons salt, $\frac{1}{2}$ teaspoon pepper, $\frac{1}{2}$ cup milk, 2 tablespoons fat, 2 eggs. Beat the entire mixture together, and place in greased baking dish; set in a second pan containing hot water, and bake in the oven until firm. Serve with tomato sauce.

Potato Fish Loaf.—The same as above, except in place of ground peanuts use chopped cooked fish.

Shepherd's Pie (serves 4-6).—2 cups cooked flaked fish, 1 cup soup broth (beef), 1 tablespoon fat, 1 tablespoon flour, $\frac{1}{2}$ teaspoon salt, $\frac{1}{2}$ teaspoon pepper, 2 cups mashed potato. Put diced or flaked fish in baking dish. Add sauce made of the fat, flour, seasoning and broth. Cover top with mashed potato, brush with fat or cream, and brown in a hot oven.

DESSERTS.

Potato and Carrot Pudding (serves 6).— $\frac{1}{2}$ cup fat, 1 cup grated raw carrot, 1 cup grated raw potato, 1 cup brown sugar, $1\frac{1}{2}$ cups seeded raisins, 1 cup nuts, 2 eggs, 3 teaspoons baking powder, $\frac{1}{2}$ teaspoon cinnamon, $\frac{1}{2}$ teaspoon cloves, $\frac{1}{2}$ teaspoon nutmeg, 1 teaspoon salt, $1\frac{1}{2}$ cups flour. Cream butter, add sugar, beat; add eggs, beat. Add vegetables. Mix and sift baking powder and seasoning with flour, and beat; then add fruit dredged with small part of the flour. Steam 3 hours.

Lemon Potato Pie (serves 4-6).—1 3oz. potato, 1 cup sugar, grated rind of lemon, juice of 1 lemon, 1 cup boiling water, yolks of 2 eggs, whites of 2 eggs, 2 tablespoons powdered sugar. Peel and grate the potato into the water. Cook 5 minutes, stirring constantly. Add the sugar, grated rind, yolk of egg; cook until the mixture thickens, stirring constantly. Add the juice of the lemon and pour the mixture into the baked crust. Beat the whites of the eggs stiff, fold in the powdered sugar, spread over the filling so that the meringue touches the crust, but is rough over the entire surface. Bake in a moderate oven until a delicate brown.

Chocolate Potato Cake (serves 6).— $\frac{3}{4}$ cup mashed potato, $\frac{1}{2}$ cup fat, 1 cup sugar, 2 eggs, slightly beaten, $\frac{1}{2}$ cup grated chocolate, 1 cup flour, 1 teaspoon baking powder, $\frac{1}{2}$ teaspoon salt, $\frac{3}{4}$ cup milk. Cream fat and sugar. Add eggs and potato. Add the flour, mixed with the baking powder and salt, alternately with the milk. Add the chocolate last. Bake in layers or muffin tins.

Chocolate and Nut Potato Cake (serves 6).— $1\frac{1}{4}$ cups sugar, 1 cup lard or butter, 1 cup cooked potato, $\frac{1}{2}$ cup milk, 2 cups flour, 4 eggs beaten lightly, $\frac{1}{2}$ cup chocolate (melted), $\frac{1}{2}$ cup chopped nuts, $\frac{1}{2}$ teaspoon cloves, $\frac{1}{2}$ teaspoon cinnamon, 2 teaspoons baking powder. Cream sugar and fat. Add potato and mix thoroughly; add milk and flour alternately. Add the eggs beaten lightly, chocolate, nuts mixed with spices, and lastly sift over surface baking powder, and beat thoroughly. Cook in well oiled muffin tins 20 to 30 minutes in moderate oven.

White Potato Custard (serves 4-6).—2 cups riced baked potato, 4 eggs beaten slightly, 1 cup sugar, $\frac{1}{2}$ cup fat, $\frac{1}{2}$ cup thin cream or top milk, juice and rind of 1 lemon. Mix in the order given; beat hard for 5 minutes; pour into pans lined with pastry crust. Bake in hot oven 20 to 30 minutes, or until custard is set. This makes two pies.

Variations.—Cooked in the form of patties, this will make eight.

Potato Fondant.—Using mashed potato as a base, work it into powdered sugar until it has the consistency of fondant. Flavor and form into fancy candy shapes, color or coat with melted confectioner's chocolate, and serve as Christmas candies for children.

HOT BREADS AND YEAST BREADS.

Potato Pancakes I. (serves 4-6).—12 raw potatoes grated (large), 3 teaspoons salt, 2 tablespoons milk, 2 eggs beaten, $\frac{1}{2}$ cup flour. Mix the above ingredients, beat thoroughly, and cook on hot greased griddle.

Potato Pancakes II. (serves 4).—2 cups riced potatoes, 1 teaspoon salt, 2 eggs (beaten), 2 tablespoons flour, $\frac{1}{2}$ cup milk. Mix the above ingredients in the order given; beat thoroughly, and bake on hot greased griddle.

Potato Muffins (serves 6).—4 tablespoons fat, 2 tablespoons sugar, 1 egg, 1 cup mashed potato, $\frac{1}{2}$ teaspoon salt, 1 cup milk, 2 cups flour, 3 teaspoons baking powder. Cream the fat and sugar. Add the eggs, well beaten, then the potato. Mix thoroughly. Sift flour, baking powder, and salt. Add milk and flour and beat smooth. Bake in greased muffin tins 25 to 30 minutes.

Potato Biscuit (serves 4).—1 cup mashed potato, 1 cup flour, 4 teaspoons baking powder, 1 teaspoon salt, 2 tablespoons fat, $\frac{1}{2}$ cup water or milk. Sift together flour, baking powder and salt. Work in the fat with fork or knife. Add potato, and mix thoroughly. Then add enough liquid to make a soft dough. Roll the dough lightly to about $\frac{1}{4}$ in. in thickness. Cut into biscuits, and bake 12 to 15 minutes in hot oven.

Potet Lefse (Potato Lefse).—Take left-over mashed potatoes in which cream and salt have been added while mashing. When cool add white flour enough to make a stiff dough. Taking a spoonful at a time, roll into a sheet as thin as paper, and bake on top of a moderately warm stove or pancake griddle, browning both sides well. As they are cooked, place them in a covered dish and serve hot or cold. When hot they may be spread with butter and sprinkled with sugar and rolled before serving.

Variation.—They may be spread with butter and hot lutefisk, and rolled at the table just before eating.

Potato Bread I. (two loaves).— $\frac{1}{2}$ cup hot water or milk, 2 teaspoons salt, 2 teaspoons fat, 2 teaspoons sugar, 3 cups mashed potatoes, 6 cups flour (24 ozs.), $\frac{1}{2}$ cake compressed yeast, $\frac{1}{2}$ cup lukewarm water. Put hot water, salt, fat, and sugar in bowl, add mashed potatoes, mix well. Soften the yeast in lukewarm water, and add to the potatoes when lukewarm. Add one cup of flour and knead in

thoroughly; then add the second cup, kneading thoroughly, then the remaining cups. This dough will seem very stiff and difficult to knead, but all the flour must be added, or the dough will be very soft at the second kneading. Let rise until double its bulk (about 3 hours). Knead slightly, and shape into loaves. Let rise until double its bulk, and bake in a moderate oven 60 minutes.

A larger amount of potatoes may be used in this recipe, but, as potatoes are about 75 per cent. water, if the amount of potato is increased, the hot water should be omitted. If no water is used, 4 cups of flour will make two loaves of bread. The bread will be difficult to knead, but is of very good quality.

Potato Bread II.—Recipe for 6 Loaves (by weight).—6lbs. mashed or riced potato, 4ozs. sugar, 3ozs. salt, $\frac{1}{2}$ pint fat, 5ozs. compressed yeast, 6lbs. wheat flour. Put the mashed potato into a mixing bowl, add the sugar, salt, and fat. Mix the yeast cake with the lukewarm water, add to it the other materials, and stir in the flour until the dough will not stick to the sides of the bowl. Knead until elastic, 10 to 15 minutes. Moisten the top of the dough with a little water to prevent a hard crust forming, and set to rise in a warm place. When double its bulk, cut down from the sides of the bowl, and knead again for a few minutes. Divide the dough into three portions, shape into loaves, and put into slightly oiled pans. Let rise to double their bulk, and bake in a moderate oven for about 1 hour.

Denver Biscuits.—1 quart milk (scalded and cooled), 1 cup of mashed potato, 1 cup sugar, 1 cup melted lard, 1 cake compressed yeast softened in $\frac{1}{2}$ cup water, 2 teaspoons baking powder, 1 teaspoon soda, 2 teaspoons salt, flour to make a soft sponge. Let it rise until it is full of gas bubbles. Add more flour to make a stiff dough. Cut or knead thoroughly, and put in the ice box for 24 hours. It will keep 5 or 6 days. When any of the hot breads are desired, take the amount of dough necessary, and prepare it as for any of the hot breads—buns, dinner rolls, sticks, parker house rolls, Swedish rolls, hot cross buns, or clover leaf buns.

HOME TREATMENT OF MINOR AILMENTS.

[Paper read by Miss A. Bullen at a recent meeting of the Yurgo Branch.]

Bee Sting.—Remove the sting and apply ammonia or a solution of carb. of soda, common salt, or permanganate of potash. If the sting is about the eye, mouth, or ear, do not use ammonia. If the patient is suffering from shock, keep him warm and give stimulants, i.e., hot coffee or tea or sal volatile in water.

Biliousness.—Take 2 grains of calomel at bedtime and 2 drams of Epsom salts in half a glass of water in the morning. Very little and simple food should be taken.

Sick Headache.—If this is not the result of biliousness, it may probably be due to eye trouble, and an oculist should be consulted.

Indigestion.—Ten grains bismuth carbonate, 20 grains magnesium carbonate, 20 grains carbonate of soda. Take the above mixture in milk or sodawater 3 times a day $\frac{1}{2}$ hour after meals. Do not drink with meals or within $\frac{1}{2}$ hour—longer if possible—before or after a meal. Substitute wholemeal bread for brown and take meals as dry as possible—i.e., no soups or liquid foods.

Blister.—Prick the blister with a sterilized needle and cover with boracic ointment on a rag. If caused through ill-fitting shoes, dust the socks with boracic powder.

Boils.—In adults these are usually caused through rich foods. The patient should go on a light diet for a few days. Boiled Spanish onions are beneficial. Sponge the boil several times a day with a solution of 1 part carbolic acid to 20 parts of water unless in the region of the ear or nose, when a doctor should be consulted. In children, boils are often due to malnutrition, so the diet should be looked to. An addition of chemical food is a good tonic. The skin around the affected area should be sponged with boracic acid powder 1 dram, vaseline loz. Change of air and plenty of sun out of doors will help to build up the health.

Irritated or Painful Eyes.—Bathe with 1 part of boracic acid to 40 parts of water.

Ulcerated Mouth.—Wash out the mouth with loz. borax and 1 pint water, or mix 64 grains of borax with loz. of clarified honey, and use.

Sore Throat.—Gargle with loz. borax in 1 pint of water.

Constipation.—If this is chronic, the use of an aperient over a period is necessary, the quantity being gradually diminished and then relinquished. Liquid paraffin in doses of 1 teaspoon to 1 tablespoon is a good lubricant. Cascara Sagrada tablets have a mild action and can be taken over a period of 2 months. Constipation may yield to a change of diet—fresh fruits and vegetables and wholemeal bread in place of meat and white bread. If there is straining and a wish to empty the bowels, relief can often be obtained by using a warm stool or a stool containing warm water. To train the bowels, nothing is better than regular habits. As constipation may lead to greater evils, it should never be neglected.

Slight, Clean Cuts.—Cleanse by holding under a running tap of cold water. As soon as bleeding stops, bring the cut edges together, sprinkle with boracic powder and bandage.

Grazed Dirty Cuts.—Wash the graze and cleanse with a solution of peroxide of hydrogen or ordinary turpentine. Cover with boracic dressing. If festering occurs, wash with a solution of carb. soda in water and dress with boric or cyanide gauze.

Diarrhoea.—Where the attack has come on suddenly and food is probably the cause (usually food contaminated by flies), give ½ oz. or 1 oz. castor oil, or a smaller dose in the case of children, withholding all solid food. If this does not effect speedy improvement or the pain is severe, put the patient to bed between warm blankets, with hot water or hot bran bag on the abdomen and send for the doctor. The diet should be milk and sodawater or milk and limewater. In summer, milk must be boiled and cooled in a position to which flies cannot get access. As the attack passes, arrowroot and smooth milk puddings can be given, then poached eggs or steamed fish, leading up to the ordinary diet, avoiding stringy meat, fruit skins, and similar indigestible substances. There is a heavy list of infant mortalities from summer diarrhoea in Australia, the cause being usually food contaminated by flies and unwashed fruits, though it may follow from a chill due to sudden change in the weather.

Earache.—This may be due to a boil in the ear, neuralgia, impaction of wax, or teething in children among other causes. Heat some bran in a small muslin bag in the oven and apply to the ear as hot as can be borne. If the pain is continuous, a doctor should be seen.

German Measles.—The incubation period is 14 days. Symptoms: cold, running nose, sore throat, pains in back and legs, glands swell in neck. A rash quickly appears on face and neck, spreading down over the body. It lasts from three to five days. Put patient in bed and keep there until rash fades. Give light, digestible food, such as milk, junket, milk puddings, custard, &c., until appetite returns. Keep patient away from other children until all catarrhal symptoms in throat and nose have disappeared. Children exposed to infection should remain apart for 20 days.

Growing Pains.—These pains felt by children in the bones and around the joints are not due to growth, but are in most cases symptoms of rheumatism, and should have attention by a doctor.

Influenza.—Do not wait until it is impossible to perform ordinary duties, but as soon as the cold symptoms appear take a hot bath and get into a warm bed at once. Keep to a diet of slops until the temperature drops, and keep the bowels working freely with cascara. When the acute stage is passed, a light varied diet can be substituted, aided by tonics. If the attack has been severe, the patient should remain in bed four days after the temperature returns to normal. After influenza the patient is apt to suffer from marked depression, and a holiday by the sea is advised.

Cold.—It is as well to follow the directions for influenza by going to bed and confining one's diet to liquids for a day at least, until sure that it is no more than a cold. Do not go to public meetings until the risk of infection is over. Colds and influenza are highly contagious.

Tetanus or Lockjaw.—The cause is a microbe introduced through some wound or cut in the skin. For prevention, all wounds should be thoroughly cleansed at once. Where there is stiffness in the muscles in the region of the wound or in the jaw or neck, the patient should be given a warm bath and put to bed and the doctor sent for.

Measles.—Incubation period seven to 14 days. Resembles a severe cold in the initial stages, with temperature running up to 100deg. to 103deg. Three or four days later red spots appear on the neck, face, and body, and small pink spots inside the mouth. The rash begins to fade in three to four days and scale—convalescence is rapid. The chief danger is to the lungs and respiratory passages—a doctor should be informed if the child becomes croupy. As measles is highly contagious before the rash appears, the patient should be isolated in a large airy room at a temperature of about 65deg.

Slops should be given until the temperature drops, after that light foods. The patient should not leave bed until the temperature has been normal for seven days. Any complications need careful attention—the most serious being broncho-pneumonia, and requires constant medical attention. The safeguarding of young and delicate children from infection is of great importance.

Mumps.—Incubation period two to three weeks, quarantine 25 days. Symptoms are pain in the glands and feverishness, swelling of the parotid gland near the ear. The fever passes away in four to five days, and the swelling begins to subside in 10 to 12 days. The patient should be kept in bed for a week or 10 days, and in his room for another week. The diet should be fluid. A warm poultice or cotton wool should be applied to the swollen face; the mouth frequently rinsed with warm water containing a little permanganate of potash. Everything should be disinfected when the patient leaves the room—this applies to all contagious diseases.

Hives or Nettlerash.—In older children or adults they may be due to eating shellfish, mushrooms, cheese, eggs, pork, pickles, pastry, or strawberries; wearing rough flannel next the skin, violent emotion, worms, goutiness, bites of insects, use of cosmetics and hair dyes, and the taking of certain drugs. In treatment, the cause must be ascertained. If acid indigestion, take 10 to 15 grains of bicarbonate of soda in a wine-glass of water. If the disorder is severe in children with accompanying digestive disorder, give an emetic, $\frac{1}{2}$ teaspoon mustard in tumbler of warm water, and when this has acted 3 teaspoons of castor oil. Regulate the diet, restricting to milk at first, experimenting to find out which food seems to disagree. To relieve the itching, dissolve 1 teaspoon of carbonate of soda in a tumbler of warm water and bathe the affected parts. A simple dusting powder consists of 1 dram of zinc oxide and 1oz. starch. Sometimes a week in bed on a milk diet will cure the eruption.

Prickly Heat.—Bathe in a solution of 1oz. of bicarbonate of soda to each gallon of water, rubbing the skin afterwards with lemon juice or carbolic lotion (1 part carbolic to 60 parts water), or dust with equal parts of oxide of zinc, boric acid, and starch.

Scarlet Fever.—Symptoms: The onset is usually sudden. The temperature rises rapidly to 103deg. and more. The tongue is furred, the throat sore and vividly red, and the pulse rapid. The patient looks dull and stupid. Usually there is vomiting, and in younger children convulsions are frequent. The face is flushed. From 24 to 36 hours after the first symptoms the rash breaks out, generally on neck and chest. It consists of very fine red spots, each surrounded by red shading, so that the whole skin of the body becomes bright red. The chin and lips remain pale. Sometimes the rash occurs in patches and is mistaken for measles. The tongue in the beginning is covered with thick white fur, except the tips and edges, which are bright red. In a few days the coating falls off, leaving the tongue red, dry, and covered with redder spots. After three or four days the body rash begins to fade and the skin commences to peel, the process lasting three weeks or longer. Severe complications are possible, but in the lighter cases much the same treatment is used as in measles. Exceptional symptoms call for special medical treatment.

Convulsions.—In severe cases the face and limbs are contorted, the face is either dark or pale, there may be frothing at the mouth, and the tongue is often caught between the teeth and bleeds. They may occur at the beginning of many diseases, such as fevers, pneumonia, and influenza, but are often due to overloaded stomachs and some irritant in the bowels. They are frequently seen during teething, but apart from some digestive trouble, teething alone does not bring on convulsions. Place the child in a warm (not hot) bath, the temperature such as can be borne by the bare elbow. Apply cold water to the head. After the bath, place the child in a warmed bed and give a dose of castor oil. The food should be of a very light nature until all symptoms of convulsions have gone.

Whooping Cough.—The first symptoms are those of an ordinary cold with spasmodic coughing. This may last for a few days, or even a fortnight before the characteristic "whoop" develops. As the child cannot take air into its lungs at the proper rate, its face grows blue, there is a long, deep inspiration which causes the "whoop." The child should be isolated and either clothed in flannel or kept in bed, though in really warm weather they are better out in the sun. By attacking the early "cold" the disease may be shortened. The diet should be plain and nutritious, all rich food, such as meats, eggs, and foods fried in fat should be avoided. Fruit is beneficial. If the child is in bed chest fomentations three times a day should be given, cover warmly or add a warm bran bag after. The vapour from 1 teaspoon of compound tincture

of benzoin added to 1 pint of boiling water and inhaled brings relief. A hot bath and chest fomentations at bed time are beneficial. The child should drink water freely. If the child is running about, try some shredded garlic in the shoes, taking care there is something, such as muslin, between the bare feet and the garlic, or the feet will blister. It will cause the child's breath to smell, but should cure the cough very rapidly.

In all cases of contagious diseases everything used by the patient and everything in the room should be disinfected. It is a good plan to hang a sheet which has been dipped in some disinfectant in the doorway.

CHART FOR THE NURSERY.

Illness.	Time after Infection after which Illness Begins. Days.	Infection Ceases.	Isolation
			Period after Exposed to Infection. Days.
German measles	7-21	10 days after rash appears	21
Measles	10-14	2 weeks after rash appears	16
Mumps	10-14	3 weeks, and only then is swelling has subsided a week	24
Whooping cough	1-14	In 6 weeks from first "whoop" if cough has ceased 2 weeks	21
Chickenpox ..	11-24	After every scab is off	29

1 dram equals 1 teaspoon.

AUBURN (Average annual rainfall, 24 00in.).

April 6th.—Attendance, 19.

HOME NURSING.—Paper read by Mrs. Burfield—"For a fraternity of women who live in the country, sometimes many miles from a doctor, one feels that perhaps the advice about choosing a well ventilated room, free from draughts, and containing as little furniture as possible, &c., while being very good advice, might well be left to the good sense of the housewife, and a few suggestions as to prevention of illness and treatment of minor accidents be more useful. Burns and scalds are wounds needing very early treatment, for the exclusion of air to the part is very important. For this reason the white of egg is very useful, and is generally on hand, in which case break the egg, remove the yolk, and pour the white over the affected part, covering it with clean linen and bandaging it. This will relieve the pain and heat, and the burn can later be dressed with sterilized vaseline. The most effective treatment for burns, however, is the application of picric acid. A bottle of this can be kept on the kitchen mantelpiece with a jar containing clean linen and bandages, and is ready for any emergency. Soak the linen in the picric acid and apply very wet to the burn, cover with cotton wool, and bandage. It will give immediate relief. If the burn is extensive, there is always a certain amount of shock to be treated, which should be done by putting patient to bed, applying hot bottles to feet (being very sure to cover them well to prevent another burn), and giving the patient a hot drink. Burns to the eye by splashing fat or lime, &c., are best treated by dropping a few drops of castor oil into the eye. Sties in eyes can be most painful, and if, when they first appear, the eyelash in the centre of the swelling can be removed, and the lid frequently rubbed with castor oil, it will often relieve the trouble before it develops. When the swelling and redness persists, fomentations of Epsom salts will be found most beneficial. For children who have long distances to go to school in hot weather, and are prone to have trouble with their eyes, dark glasses are advised. Colds, if taken in the very early stages, can often be warded off by taking ammoniated quinine and cinnamon—2 tablets of quinine with 10 drops of cinnamon for adults, and half doses for children. Cuts and abrasions after being cleansed (with boracic lotion 1 teaspoon to 1 pint, or 1 teaspoon of salt to pint of boiling water) should be painted with iodine. Clean linen kept for treating wounds can be aseptic by ironing with a very hot iron. Any wounds caused by rusty nails or farm or garden implements should be taken to the nearest doctor for injection against tetanus, which is very prevalent. Croup in children can be relieved by giving the child a spoonful of olive oil with sugar sprinkled on it. If the first dose is ejected, follow it immediately by another and the croup will be relieved. This is a more simple remedy than the 1, 2, 3 compress, which is often used effectively, consisting of 1 tablespoon of methylated spirit, 2 of vinegar, and 3 of water. If a cloth is wrung out in this solution and wrapped around the throat it should be covered with a dry cloth to prevent the bed clothes being wet. In nursing case of sickness at home it is often a great anxiety to the mother when the patient refuses to eat, but it must be remembered that this

is often Nature's way of saying that food would be harmful to the complaint. Milk and eggs contain all the elements of food that the body requires. For those who object to drinking milk, a spoonful of Bovril can be added to a cup of milk and taken as soup, or if given as a drink, should be taken to the patient in a cup instead of a glass, to disguise the milky appearance. Milk jellies can be made very tempting, and tea, coffee, or cocoa may be made with boiling milk instead of water. Drinks of water in between these milk meals will relieve and cleanse the dry mouth, and will also tend to increase the flow of urine and thus dispose of much of the waste products of the body. Keeping the bowels open, either by a mild aperient or enemas of soap and water, will often remove the cause of all the trouble, except in cases of severe abdominal pain, which, if it does not clear up after the application of hot fomentations and cannot be traced to eating green fruit or indigestible food, should at once be reported to a doctor." (Secretary, Miss L. Dennison.)

BALUMBAH.

April 4th.—Attendance, 14.

Mrs. H. Van Heythuysen gave an address, "Scalds and Their Treatment." Immediately on scalding wrap the affected parts in soft cloth dipped in olive oil, which must be used plentifully to prevent sticking. It is very necessary to keep the air off the scald, as this causes it to burn and sting. Wherever it is even slightly red or inflamed, be sure to put on plenty of oil. Keep up this treatment for two or three days, then gently smear on zinc ointment or vaseline and keep well wrapped in lint. If, by any chance, the scald is blistered, do not break the blisters, but keep on with the oil treatment. Breaking the blisters causes them to sting much more than if left to break themselves. (Secretary, Miss V. Wohling.)

THE USE OF DRIED FRUIT IN THE HOME.

[Paper by Mesdames D. McFEAT and E. STACY.]

There is a wide variety of fruit grown in this district, and drying enables us to have fruit all the year round, which is a great help to the housewife with the problem of variety for the daily menu. Many kinds of fruit can be dried—nearly all vine fruits, several varieties of stone fruits, also apples, pears, &c. The vine produces one of the most nutritious of all fruits, and grows very luxuriantly in Clare. The vine embraces sultanas, currants, and lexias. The large, thin skinned grapes are used for puddings, and dried on the stems in clusters make an ideal dessert. Raisins are a life-giving food; 1lb. of raisins has been proved to represent an energising food value equal to 1½lbs. of beef, 6lbs. of apples, 5lbs. of bananas, 4½lbs. of potatoes, 20 eggs, or 4lbs. milk. The remarkable food value of raisins makes their daily use a blessing of health.

To prepare the fruit for cooking, a good plan is to wash and pick it as soon as the grocer has fulfilled the order. When quite dry store in tins or jars, and it is ready for use when required. Breakfast dishes can be made more nutritious by the addition of raisins. For oatmeal porridge, add raisins 10 minutes before the porridge is done. Weeties, grape nuts, crispies, &c., are improved by adding plump seeded raisins or sultanas. To plump raisins, put required quantity in small basin, and cover with boiling water; place plate on top, and stand until cool. Raisin bread toasted is delicious for breakfast. Put raisins in bread puddings—it will make a plain dish into a more healthful one. Add a few raisins to the seasoning for poultry, and you will never again omit them. For those who have vines growing a good plan is to dry the fruit. Raisins and sultanas are dried in small bunches, dipped in a solution of caustic soda, and put on trays to dry in the sun. Currants are dried in the sun without any preparation, but are more trouble to clean. They are best left to the factory process of stemming and brushing, and are then ready for use. All dried vine fruit contains vitamins—fruit sugar (75 per cent. in raisins), iron (a splendid tonic), and laxative juices. Dried vine fruit minced with lemon peel and juice of lemon makes an excellent sweet, minced with the

addition of lemon juice, can be used for sandwiches. Savories can also be made with these fruits and other ingredients. A few recipes are added that may be of use to the housewife looking for a change.

Drying Fruit.—Dehydration means artificial heat. Taking the apricot, as an example:—First, it must be just at the right stage for picking—not too ripe nor too green on account of the sugar substances. They have to be cut in halves and put on trays. These trays are packed and put into airtight places, and go through a process of sulphuring, which gives them a bright color. From there they are then put into large boxes for a couple of days; then the packers pack them between grease-proof paper into boxes for sale. Most fruits go through a similar process; where the apricot is sulphured the prune is dipped. When fresh fruit cannot be obtained dried fruits are very much appreciated.

Apricots are a beautiful fruit, and very nice when dried. When dried by modern methods they are almost like fresh fruit when soaked in water until soft, and can be used for pies and tarts, and also made into jam. Dried plums or prunes have a very high food value. They can be used for pies and tarts, and make a very nourishing breakfast dish. Soak overnight in cold water, boil until soft, serve with sugar and cream; rice may be added. Prunes minced and mixed with senna powder and glycerine makes an excellent laxative. To cook dried prunes: Wash thoroughly, soak in water to cover from 10 to 24 hours, adding more water if necessary. Simmer gently in the water they are soaked in until tender (about 20 minutes); add sugar, and cook 5 minutes longer. To 1lb. prunes use 1 pint of water and 4ozs. sugar. Apples and pears are also dried, and are a great help in the winter. Dried apples are very good for pies and puddings. An improvement is to mix dried apples with melon for pies. All dried fruit should be well washed and soaked in cold water for at least 12 hours. Dried pears are best steamed until soft. If very sweet, the addition of lemon juice is an improvement. Dried pears can be eaten without any preparation as a dessert. Quinces can also be dried, and a few added to dried apple pies give them a lovely flavor. Dried figs are a very useful fruit. For home drying, make a fairly strong syrup; put in the figs, and boil 2 hours; drain, and place on trays to dry them in the sun. When dry, make a very strong syrup, and dip the figs again while boiling, and dry quickly. These will keep a long time, and are useful for cakes and puddings.

CLARE (Average annual rainfall, 24.56in.).

February 3rd.—Attendance, 25.

DRIED FRUIT RECIPES.—Supplied by Mrs. D. McFeat:—**Apricot Cakes.**—Weight of 6 eggs in butter, 2 in sugar, 2 in cornflour. Method: Beat butter and sugar to a cream, add 4 eggs well beaten, enough S.R. flour to roll out to a smooth paste. Stew dried apricots, sweetened with sugar. Place apricot between rounds of paste and bake in a moderate oven. When cold, sprinkle with cocoanut. **Dried Apricot Cake.**—2 eggs, their weight in butter, 1 sugar, 6ozs. flour, 2ozs. dried apricots, $\frac{1}{2}$ teaspoon baking powder. Method: Beat butter and sugar to a cream. Sift the flour and divide it into two portions. Break 1 egg into cake, add 1 tablespoon flour. Beat well. Stir in half flour. Repeat with other egg. Add fruit to mixture. Leave a little flour to mix with baking powder and add this last. Bake from 1½-2 hours. Prunes, pears, preserved ginger, and cherries may be substituted. **Dried Apricot Jam.**—2lbs. apricots, wash well and leave to soak in 13 cups cold water overnight. Then put on to boil and boil for about $\frac{1}{2}$ hour; add 7½lbs. sugar and boil until clear—about $\frac{1}{2}$ hour. **Dried Fruit Dessert** (Mrs. E. Stacey).—Soak overnight 2 cups dried apricots, 1 cup each peaches and nectarines; have some cooked apples; next day just boil, with sugar to taste, the dried fruit and take skin off peaches. Make a champagne pastry (no cinnamon); line a flat dish and put all fruit in and spread it on; put another pastry on top. Mix icing sugar with water and brush on top, sprinkle with mixed nuts or cocoanut and bake. This will burn quickly; use a moderate oven. Cut in squares and serve hot with custard. Makes a good dessert or is very nice eaten cold. **Aunt Betsy Pudding.**—2 cups plain flour, 1 cup bread crumbs, 1 teaspoon each salt and soda, $\frac{1}{2}$ cup sugar, $\frac{1}{2}$ packet spice, 1 teaspoon ginger, 1 cup each currants and raisins, lemon or orange peel, 1 cup hot water, 2 tablespoons dripping. Method: Mix flour, salt, and

soda sifted, add bread crumbs. Mix spices with sugar, add to flour, then fruit. Melt dripping in hot water and mix pudding. Boil 3 hours. *Sago Plum Pudding*.—1 cup breadcrumbs, $\frac{1}{2}$ cup sugar, 2 tablespoons sago (soaked over night in enough water to cover), 2 tablespoons butter, 1 cup seeded raisins or mixture currants and sultanas, 1 level teaspoon soda dissolved in boiling water. Method: Mix dry ingredients together, stir in 1 cup milk or enough to mix well and allow for swelling while cooking. Pour in greased moulds and boil 3 hours. *A Savory*.—To 1 cup of seeded lemons or sultanas add 4ozs. to 6ozs. cold ham (minced), 2 or 3 tablespoons cucumber pickles, salt and pepper to taste. Stir in sufficient cream or mayonnaise to bind, spread easily. Serve on triangles of toast as a savory, or on lettuce leaf for luncheon, or serve between thin slices of brown bread as a sandwich. *Vine Fruit Pie*.—1 cup each sultanas, currants, and seeded raisins, 2 pieces shredded lemon peel, 2 diced apples, $\frac{1}{2}$ cup sugar, $\frac{1}{2}$ cup water, nutmeg. Method: Put in saucepan and simmer $\frac{1}{2}$ hour. Line tart plate with paste, spread with filling, cover with paste, and bake 30-40 minutes. *Dried Prune Chutney*.—2lbs. prunes, 1lb. green apples, $\frac{1}{2}$ lb. green tomatoes, 2 or 3 large onions, $\frac{1}{2}$ lb. raisins, $\frac{1}{2}$ oz. ginger, $\frac{1}{2}$ lb. brown sugar, $\frac{1}{2}$ lb. salt, 1 teaspoon mustard seed, $\frac{1}{2}$ teaspoon cayenne, 3 pints vinegar, 1 teaspoon powdered cloves. Method: Soak prunes overnight, wash and drain, cut open and remove stones. Cut onion and apples small, slice tomato; place all ingredients in preserving pan and cook 3 or 4 hours. Stir occasionally. Try a little on a saucer and if there are no watery particles, it is ready to bottle while hot. Keep for a few weeks before using. *Dried Prune Jam*.—3lbs. prunes, 3 quarts water, 8lbs. sugar, juice of 4 lemons. Method: Wash prunes and soak overnight in water. Next day boil until soft, add sugar and juice of 4 lemons. Bring to boil again. Boil 1 hour or until a little placed on a cold saucer will set in a few minutes. Remove from fire, bottle while hot, cover when cold. *Prune Brown Betty*.—2 cups soft breadcrumbs, 2ozs. butter, $\frac{1}{2}$ cup brown sugar, $\frac{1}{2}$ teaspoon each cinnamon and nutmeg, juice and grated rind of $\frac{1}{2}$ lemon, 2 cups prunes stoned and cut up; $\frac{1}{2}$ cup of prune juice according to dryness of crumbs. Method: Melt butter and stir into crumbs, put layer of crumbs in buttered piedish, then layer of prunes; sprinkle with some sugar and spices. Repeat layers until dish is full, making the top layer of crumbs. Pour prune juice over the mixture and bake in a moderate oven 30 minutes. Cover during the first 15 minutes, then allow to brown. Serve with sauce or cream.

The meeting of March 3rd took the form of a Question Box. (1) The member who asked the best way to prevent sauce from burning was advised—(a) to grease the bottom and sides of pan well; (b) to put several glass marbles into pan, which, when contents of pan begin to boil, keep up a constant movement; (c) or to put two florins into pan, these having previously been scalded. (2) Which is the best way to take tar out of wool carpet? Advised to treat with eucalyptus. (3) How to put dressing back into material after washing, which goes limp and creases? A little liquid glue in the rinsing stiffens things. (4) How to keep brown sugar from going hard? Must be kept perfectly airtight after being rolled in a damp cloth. (5) Which is the best way to wash new blankets? (a) Lux; (b) borax and cloudy ammonia; (c) 2 tablespoons soft soap, 1 tablespoon each borax and ammonia dissolved, add to water, stir well, and allow articles to soak. (6) How to keep an airtight cushion when not in use? Rub on French chalk, free cushion from air, hang in a dry place. (7) How to store dried fruits to keep them free from the moth as long as possible? Scald with boiling water and put into new calico bags. Hang to dry. (8) How to stop the grub from getting into tomatoes? Spray before coming into flower with arsenate of lead. (9) How to pot butter? When butter is thoroughly clean, work several times a small piece of saltpetre with a teaspoon of sugar into the butter. Press each layer of butter down well, put thick layer of salt on top. (10) How to remove an inkstain from an Arras tablecloth, also from carpet? Sour milk and citric acid have been tried; took some colour out, but stain is still there. Advised to allow the article to remain in cold water for a length of time, repeat when water is coloured. (11) How to make a non-slippery floor polish. Members used a good mop-oil. (Secretary, Mrs. W. McKendrick.)

COONAWARRA.

Attendance, 50.

The younger members of the Branch took charge of the meeting, and the following papers were read, visitors being present from Penola and Kalangadoo:—

SAVORIES (Miss O. Lear).—"So important a place do savories now occupy in meal planning that all housewives who are most desirous of pleasing are now making a serious study of them. Even the lightest and creamiest of cakes cannot shake the popularity of savories for afternoon or evening parties. Tempting savories are greatly appreciated by the majority of people, and may be served either hot or cold. Introduced as a dinner dish, a savory is very much relished. Stew is rendered more palatable if savory balls are dropped in and boiled for half an hour before serving. Small

individual pyrex ware dishes are used by many hostesses for serving savories at dinner or supper. Savories served in such dishes, or small scallops can be prepared some time previous, placed ready on an oven slide, and put in a moderately hot oven about 15 minutes before required. Then each small dish is placed on a plate, covered with a dainty d'oyley for convenience in handling. These scallop dishes are, of course, best served at a small gathering—unless the hostess possesses a very large number of small fire-proof dishes. The dishes must not be too full—all savory containers should be small and dainty. Savory dishes must be attractively garnished with decorations that blend well with the flavour of the dish, and a contrast in colour should be made between the dish itself and the garnish. Capers, olives, gherkins, small strips of beetroot, tomato, celery shoots, lettuce (small leaves or shredded), stuffed olives, and shrimps are some suggestions for garnishing. Small savory cases can be made from numerous mixtures, such as cheese straw, choux pastry, rough puff pastry, short crust, and cheese pastry. Cold savories are particularly appetising during summer, and in very hot weather are generally preferred to sweet cakes. Savory salads at this time of the year greatly assist in overtaking the fugitive appetite of the peckish quicker than anything. In hot weather they are piquant, fresh, and wholesome, and easy to make. Not the least important item at a party is the supper, and many a hostess finds the selection of suitable dainties rather a task. One cannot go wrong with savories, for careful cooks and popular hostesses know that delicious flavours which tempt the appetite and delight the taste have a satisfying distinctiveness and richness of flavour with which they may win admiration of guests. Delicious and quickly prepared savories can be made with meat pastes, cream cheese, and home-made fish pastes made up and kept for emergency purposes. Men, especially, are fond of savories, and some consider a dinner quite incomplete without this agreeable relish, which offers such a pleasing variation. They are always served in very small proportions, therefore daintiness is essential. It is essential for a savory to be piquant, as flavour is the main thing. The preparation of savories is simple, and only care is required to present a dish which is tempting and appetising. The following recipes are useful and do not require a great deal of time in preparation:—

A Savory Dish.—2lbs. mutton chops, pare off all fat, roll in flour, place in casserole or in a saucepan with a good lid. Mix 1 tablespoon flour, 1 small teaspoon mustard, 1 tablespoon each of tomato sauce and Worcestershire sauce, and a little water, making sufficient liquid to cook meat. Add meat and simmer gently for about 2½ hours.

Savory Balls.—6ozs. flour, 1 teaspoon baking powder, 2ozs. suet, pinch salt, 1 teaspoon chopped parsley, pinch of dried herbs. Chop suet finely, add the ingredients, and mix to soft dough with water. Form into balls and cook in stew for 20 to 30 minutes.

Macaroni and Tomatoes.—4ozs. macaroni, 3 tomatoes, 3ozs. butter, 1 onion, 2ozs. grated cheese, bread crumbs, cayenne, and salt. Wash macaroni and put in salted boiling water. Boil 20 minutes, then drain. Cut onion in thin rings and put in pie dish in oven with half the butter. Pour boiling water over tomatoes and take off skin. Cut in thin slices and add to onion; then add macaroni, season with salt and cayenne. Sprinkle cheese over top, then few crumbs, and lastly remainder of butter in small pieces. Cook in quick oven 20 minutes.

Tomato Savory.—Cut tomatoes into rounds and fry in a little butter. Have ready some small rounds of hot buttered toast or fried bread, put a slice of tomato on each round (they should be about the same size) and cover thickly with grated cheese. Decorate the top with a few capers. Put in oven a few minutes and serve very hot.

Savory Eggs.—2ozs. fresh bread crumbs, 2ozs. grated cheese, 1 teacup milk, 3 or 4 eggs, pepper, and salt. Boil milk and crumbs 2 or 3 minutes, then pour into sandwich tin which is well buttered. Drop in eggs, sprinkle with pepper and salt, then sprinkle the cheese all over, add small pieces of butter and bake until eggs are cooked and top is browned.

Welsh Rarebit.—3ozs. grated cheese, 1oz. butter, 2 tablespoons cream, 1 egg, ½ teaspoon made mustard and salt. Put cheese in saucepan with butter, cream, and seasoning. Stir over fire until smooth, beat in a well whisked egg, and pour over neat pieces hot buttered toast. Serve at once on a hot dish.

Savory Tarts.—½lb. cheese, 1 egg, pastry, ½lb. bacon, 1 onion, pepper and salt to taste. Make a good short crust and roll out about ¼in. thick. Line small patty tins with pastry and prepare the following mixture:—Chop the onion finely and put on to boil. Cook until tender. Drain well and mix with the diced bacon, grated cheese, and egg. Fill the patty cases with mixture and bake in moderate hot oven until golden brown and pastry cooked through. Serve hot for afternoon teas, supper, or Sunday night tea.

Salmon Patties.— $\frac{1}{2}$ cup chopped salmon, pepper and salt, $\frac{1}{2}$ cup thick white sauce, 1 dessertspoon cream. Mix salmon with white sauce, pepper, salt, and cream. Fill pastry patty cases with this mixture. Garnish each patty with a sprig of parsley and 2 capers. Serve hot or cold.

Cold Savories.—Mix Marmite and butter together and spread on plain biscuit, then sprinkle with chopped nuts. Butter plain biscuits and sprinkle with chopped hard-boiled eggs and parsley, or chopped capers on egg. Decorate with half an olive each end of biscuit. A small patty case filled with celery and mashed cheese, or mushroom and cheese.

Butter plain biscuits and sprinkle with chopped pickled walnuts. Fry fingers of bread in butter and serve cold with a slice of tomato and a sardine on each.

Spread a mixture of fish or other paste and butter on brown or malt bread, and sprinkle with chopped nuts. Roll each slice and fasten with a wooden toothpick until required.

Bubble Bread.—1 tablespoon butter, 1 cup flour, small teaspoon salt, 1 tablespoon grated cheese, $\frac{1}{2}$ teaspoon cayenne pepper. Rub butter into flour, &c., and mix to a stiff paste with milk. Roll out like paper.

Cheese Filling for Choux Pastry, Etc.— $\frac{1}{2}$ cup grated cheese, $\frac{1}{2}$ cup milk, cayenne pepper and salt to taste. Put the grated cheese, cayenne, and salt into a basin, and pour over the milk. Leave standing about $\frac{1}{2}$ hours and the milk will combine to make a smooth cream cheese. Mix lightly and use the filling for cheese eclairs, &c. If too rich with cheese, a little whipped and seasoned cream can be added. This will make the cream cheese go much further. This cream cheese can be used for either hot or cold savories.

SALADS (Miss R. Winton).—Salads are a valuable part of the daily food, especially in summer. They are frequently eaten with cold meat or fish, and act as an appetiser when attractively arranged. The mineral salts and acids contained in young, crisp leaves of vegetables prevent acidity of the blood, and help to regulate bodily functions. Salads are of three varieties:—1. (Uncooked) Chiefly lettuce, cucumber, tomato, cress, celery, and radish. 2. (Cooked vegetables) Potato, beetroot, asparagus, peas, beans, and cauliflower. 3. (Fruit) A mixture of fruit in season.

General Rules.—All plants must be young, sound, and crisp. All uncooked vegetables must be well washed to rid them of insects and dirt, and dried by shaking in a clean cloth without bruising the leaves. Salads should be made just before serving, that they may be fresh and crisp. Flavours should be blended carefully, no one predominating. Tear lettuce with the fingers or cut with silver knife, never use steel. Cold cooked vegetables left over from a meal may be cut into small pieces, or fancy shapes, and made the basis of a salad with garnishes and dressing. Colours should be chosen with care to make the salads attractive. Serve in a glass or china bowl. The dressing is put separately in a glass jug.

Garnishing.—A plain salad may be made more appetising by the addition of a garnish. This may consist of vegetables of contrasting colour cut into dice. Slices of cucumber, tomato, or beetroot, hard boiled eggs, parsley, young lettuce leaves, capers, gherkins, &c. Salad dressing is a sauce added to increase the food value of the salad. It should contain vinegar to soften the cellulose, oil or cream to add fuel value.

Beetroot Mould.—Ingredients: 2 bunches of beetroot, 1 small lettuce, 2 dessertspoons gelatine, 2 cups hot water, pepper, salt, and vinegar. Directions: Cook beetroot until tender, peel and cut into slices, line a fluted mould with the slices, then fill centre with small dice-shaped pieces of beetroot. Dissolve gelatine in hot water, pour over beetroot and allow to set. Garnish with shredded lettuce and sliced tomato. Serve with mayonnaise dressing or vinegar.

SANDWICHES (Miss D. Modistach).—*Sandwich Butter.*— $\frac{1}{2}$ lb. butter, $\frac{1}{2}$ teaspoon white pepper, juice of 1 lemon, nutmeg, cayenne and salt to taste, 2 small sprigs parsley. Wash and mince parsley, add to above ingredients, except lemon juice. Work together with wooden spoon until mixture is green, gradually add lemon juice and work well together. It takes 10 to 15 minutes to blend ingredients. If a deeper green is required, add more parsley. Drain off any liquid before using.

Cheese and Raisin.—Mince cheese and raisins together and spread between buttered slices. *Mock Chicken.*—Take 1 egg (hard boiled), small piece onion, $\frac{1}{2}$ teaspoon mixed herbs, 1 teaspoon butter, salt and pepper to taste. Chop all together finely and spread between thin slices bread and butter. *Cheese and Tomato.*—Grate cheese and slice tomato thinly, arrange between buttered slices, flavour with salt and pepper. *Gherkin Sandwiches.*—Cut gherkins finely and place between buttered slices. *Raisin and Ginger.*—Equal quantities of raisins and ginger minced together with a squeeze of lemon juice. *Banana Sandwich.*—Cut banana finely and spread between buttered

slices. *Cheese and Almond*.—Grate cheese and mince almonds. Spread between buttered slices. *Ginger, Date, and Nut*.—Mince preserved ginger, nuts, and dates together, add a little water, and mix well. Spread between buttered slices. *Apple Sandwich*.—Grate a ripe apple finely. Blanche and halve some almonds. Mix with apple and arrange between slices of buttered bread; add a little whipped cream if desired.

QUESTION BOX.—The meeting held on March 21st took the form of a Question Box. *Attendance, 35. Before varnishing new woodwork apply a coat of glue, then one coat of varnish will be sufficient.

Melon and Fig Jam (Mrs. Modistach).—7lbs. figs, 5lbs. melon, 9lbs. sugar, juice of two lemons; preserved ginger may also be used.

Cocoanut Cakes (Mrs. R. Redman).—3 tablespoons butter, 1 small cup sugar, $1\frac{1}{2}$ cups self raising flour, $\frac{1}{2}$ cup cocoanut soaked in $\frac{1}{2}$ cup milk for $\frac{1}{2}$ hour, 2 eggs. Cream butter and sugar, add eggs separately, then other ingredients. (Secretary, Mrs. F. Skinner.)

MANGALO (Average annual rainfall, 14in. to 15in.).

March 14th.—Attendance, 16.

COWS ON THE FARM.—Paper read by Mrs. A. Turner:—"Cows on the farm are a necessity to a household, particularly when there are children in the home. It is always best to select a good type of cow. In many instances a farmer has to begin with the best animals that are procurable in the district, but from then on it is his work to select the best heifers—those that are of a quiet and contented disposition. The cows should be fed twice a day and have a shed in which to be milked and fed. They will then give much less trouble in milking and feeding. The shed and all utensils used with milk must be kept clean. The main points in keeping cows are—select good types of heifers, feed twice a day, keep shed and yard clean, and particularly buckets, pans, separator, and any utensils used in the process."

April 11th.—Attendance, 17.

FIRST AID HINTS.—Mrs. H. Klingberg contributed the following paper:—"No one has any wish to have the opportunity of assisting at accidents, nevertheless it is an advantage to know what to do in case one is called upon to act whilst waiting for the doctor. Some of the first things to do are—remove the cause of injury or damage whenever possible. Severe haemorrhage must receive the first attention, no matter what the other injuries may be. The patient must be in a position in which breathing is possible; the air passages must be free from obstruction. A restful position of the body will assist the vital functions; support of the injured part will help to prevent further damage, and is essential in the case of fractured limbs. After an accident keep the patient warm to prevent the fall of temperature below normal. When the skin is broken the wound should be promptly covered with a clean absorbent dressing. Poisons swallowed should be got rid of, or when that is inexpedient neutralised. Strong tea acts as a neutraliser of many poisons, and is always safe. A handful of tea should be thrown into a kettle and boiled. Clothes should not be taken off unnecessarily, but when it is needful to remove them, the following rules will be found of service in serious cases:—Remove the coat from the sound side first, and, if necessary, slit the seam of sleeve on the injured side. The shirt and vest should be slit down the front and removed. Trousers should be slit up outer seams, and boot slit down back seam and unlaced. The sock should be cut off. It is incorrect to suppose that alcohol is the only form of stimulant, and far too frequent use of spirits is made to restore a patient after an accident, often with serious results. The safest rule is to wait the arrival of the doctor, and when the patient is able to swallow, strong tea or coffee or milk as hot as can be drunk may be given. Smelling salts may be held to the nose." (Secretary, Mrs. B. Coles.)

MORCHARD (Average annual rainfall, 13.59in.).

April 6th.—Attendance, 14.

THE FARM DAIRY.—Paper read by Mrs. B. McCallum:—"A dairy is necessary for the preservation of food during summer. The following are the details of a dairy under construction on our homestead:—The dairy is situated about 4ft. from the verandah, almost opposite the kitchen door, the porch for the steps of the dairy connecting it to the verandah, thus enabling one to step from the verandah on to the steps of the porch, which are of cement half way down, and where they enter the dairy the steps will be constructed of wood with a hand rail. The length of the

dairy is 12ft., width 7ft. 6in., and depth below surface level 6ft. The reinforced cement concrete wall below surface level is 4in. in width, and a 14in. stone wall is built above surface level to the height of 3ft. with gable ends. The roof will be of galvanized iron steep gable design, ceiled with matchboard. For ventilation there is a window 2 x 2 x 3 inches in the end wall of the dairy, two fairly large air bricks each side covered with wire gauze on the inside, and a panel of gauze in the door, which is opposite the window. Under the window across the end of the dairy there is a cement shelf 18in. wide and about 2ft. 6in. high, with the outer edge raised a few inches to allow it to hold water for the purpose of placing in it cream, butter, jellies, &c., during hot weather. This ledge, or shelf, should prove a boon during a heat wave. The dairy is plastered with lime and cement mixture, and has a cement concrete floor.'

LEMON YEAST (by Mrs. F. S. Twigden).—"Boil a medium size potato, when cooked strain off water and mash potato well. Gradually mix water back on the mashed potato, mix in $\frac{1}{2}$ cup sugar, let cool, then mix $\frac{1}{2}$ cup flour, or more, according to the quantity of water. Strain in the juice of 3 lemons and mix to the thickness of batter. It should be put into a wide mouthed jar and covered to keep it free from flies and dust. This yeast will take 3 to 4 days before ready for use the first time, then after it has started, make it at dinner time and it will be ready to mix bread at night, after the evening meal. *To Mix Bread.*—To 6lbs. of flour add 1 handful of salt. Mix thoroughly into the flour 1 large breakfast cup of yeast, sufficient warm water to knead the bread into a nice dough, and knead well. Bread should be set over night and covered well to rise. When well risen, make into 2lb. loaves, put into tins, and leave to rise again. When risen sufficiently (it rises more quickly in summer and does not need so much covering as in winter) put into a hot oven and bake 1 hour and 20 minutes.'

WHAT TO DO WITH HONEY.—Paper read by Mrs. C. Schulz (Hon. Secretary).—"Honey is one of Nature's foods that does not spoil and should be more extensively used. Cakes and biscuits made with honey will keep a long time. It is also useful for home remedies. For colds, a hot drink of lemon and honey. For croup, give frequently half a dessertspoon each of olive oil and honey. Oatmeal and honey for the toilet:—Sift a quantity of oatmeal and make into a paste with an equal quantity of honey. Wash hands and face well with water and soap, partly dry, and rub mixture well on to the skin, after a few minutes massage wipe off with sponge or washer and dry thoroughly. Pure honey is equally good for the hands, and 1 teaspoon of honey in a large bowl of water is a good final rinse for the hair.

RECIPES.

Honeycomb Toffee.—4 tablespoons sugar, 2 tablespoons honey or golden syrup, 1teaspoon carbonate soda. Boil sugar and honey for 7 minutes, take off fire, add carbonate soda, mix well and pour into well buttered dish. Use large saucepan.

Honey Cake.—Boil 2lbs. each honey and sugar, $\frac{1}{2}$ cup water, and $\frac{1}{2}$ lb. butter for $\frac{1}{2}$ hour. Pour into a dish and let cool. Then add 6 well-beaten eggs, 3 teaspoons baking powder, $\frac{1}{2}$ packet mixed spice, and flour enough to make a stiff paste. Put in a well greased tin and bake in a hot oven.

Honey Biscuits.—2lbs. each sugar and honey, 1 cup water, $\frac{1}{2}$ lb. lard or butter. Boil together for 10 minutes. Pour into a dish and let cool; add 4 well-beaten eggs, 4 teaspoons carbonate soda, $1\frac{1}{2}$ teaspoons cloves, 4 teaspoons cinnamon, 2 teaspoons allspice, enough flour to roll out. Put almonds on top.

Spiced Honey Nuts.—Cream 2ozs. butter with 2ozs. sugar, add 1 egg (well beaten), $\frac{1}{2}$ cup honey, 6ozs. S.R. flour, a pinch salt, 2 teaspoons cinnamon. Beat thoroughly and blend in 1 cup chopped nuts; drop in teaspoonsful on greased baking sheet, leaving room for spreading.

Honey Crispies.—1 tablespoon honey, cup sugar, 2 tablespoons boiling water, 1 cup flour, $\frac{1}{2}$ cup butter, $\frac{1}{2}$ cup cocoanut, 1 teaspoon carbonate soda, 2 cups rolled oats. Bake 20 minutes.

Honey Jumbles.—Melt $\frac{1}{2}$ lb. butter in $\frac{1}{2}$ lb. honey. Mix 1lb. S.R. flour with $\frac{1}{2}$ lb. sugar; then mix to a smooth paste with melted butter and honey. Smooth into floured fingers, put on a greased oven slide, and bake for 15 minutes.

One Day Yeast.—2 dessertspoons each flour and sugar, 1 dessertspoon honey, 2 potatoes boiled and mashed, 1 teaspoon tartaric acid. Mix together with 2 cups of warm mash. Ready for use in 4 hours.

MUNDALLA (Average annual rainfall, 19.26in.).

March 27th.—Attendance, 16.

The meeting took the form of an exhibition of needlework staged by members of the Branch. (Secretary, Miss L. Kemp.)

NELSHABY (Average annual rainfall, 17in.).

March 1st.—Attendance, 16.

SUMMER SALADS.—Paper read by Mrs. Bain:—"During summer, salads whether fruit or vegetable, are appreciated, and while wholesome and appetising, are easily prepared at a very low cost. Any fruit or vegetable in season has nutritive value, and no meal is complete that does not contain some fresh fruit or vegetables. Raw vegetables, such as carrots, celery, silver beet, turnips, radishes, watercress, cabbages, or young beans were at one time never used in the preparation of a salad, but now they are looked upon as necessary in an up-to-date salad menu. Lettuces are used perhaps more than any other vegetable, but they do not keep fresh for any length of time. Cabbage is an excellent substitute. There are numerous dressings which make a salad more appetising and digestible, but these should never be added until ready to serve. When serving cucumbers or onions never allow to stand any length of time, and always use the juice of the cucumber. Avoid using sugar or vinegar, and displace these with brown sugar, dates, honey, and lemon juice. Olive oil or cream is absolutely necessary so that the salad shall not be indigestible. Peanut butter can be used in place of cream. When onion is used, pour a little boiling water over after it has been finely chopped. This takes away the unpleasant odor. *Tomato Salad.*—Cut up tomatoes, cucumber, and onion very fine, sprinkle with pepper and salt, and add a little lemon juice or vinegar if preferred. *Beetroot Salad.*—Boil a bunch of beetroot until quite soft, then cut into thin slices. Place in a bowl one layer of beetroot and one layer of onion and cucumber or celery until dish is full. This may also be served in cupped lettuce leaves as individual salads. *American Salad.*—Put a cupped lettuce leaf on each server, place in the centre one large tomato, cut downwards in the form of a cross, allowing to open like petals. Intersperse with petals cut from hard boiled eggs. Fill the centre with dressing, garnish with small lettuce leaves standing in the centre; eggs may be omitted and cheese substituted. *Tomato Salad.*—A layer of shredded lettuce, grated onions, sliced tomatoes, and grated cucumber. Repeat until dish is full, garnishing with sliced tomato and lettuce hearts; serve with dressing. *Oyster Salad.*—Place a small cupped leaf on each server. Into this put a mixture of shredded lettuce, grated cucumber, the yolk of a hard boiled egg, a few oysters, 1 tablespoon of dressing to which has been added the liquor from the oysters, finely chopped parsley, and a good sprinkling of cayenne pepper; garnish with lemon. *Madame's Salad.*—1 fresh crisp lettuce finely cut, a few sticks of celery finely chopped, parsley, 1 small grated carrot, a few light leaves from the heart of a young cabbage, and a little grated raw cauliflower. Onions grated may be added if desired

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Mix and garnish the top with grated cheese and chopped parsley; serve with dressing. Parsley may be omitted and mint substituted when serving with lamb. *Date and Banana Salad*.—Fill a dish with alternate layers of dates or figs and sliced bananas; squeeze over the juice of $\frac{1}{2}$ a lemon. Cover with whipped cream sweetened. Sprinkle with ground cinnamon. *Cabbage and Carrot Salad*.—Shred the cabbage and place a layer in a salad bowl, then a layer of grated carrot and onion, repeat until dish is full, adding lastly a ring of cabbage and then a ring of carrot until top is covered. Serve with cream and lemon juice which has been salted. *Twin Souls*.—1 orange, 2 bananas (sufficient for four people), peel and pith the orange, cut crosswise into four. Lay a slice of orange on each plate surrounded with laced lettuce. Cut banana in half, lengthways and crossways. Lay 2 pieces on the orange, cover with honey and chopped nuts. Serve with whipped cream. *Dried Fruit Salad*.—1 cup chopped dates, $\frac{1}{2}$ cup each prunes, figs, and raisins and 1 cup dried apricots washed in hot water. A few finely chopped walnuts, 1 apple (grated), a sprinkling of cinnamon and juice of 1 lemon. Serve with whipped cream or junket. *A Natural Dressing*.—4 tablespoons honey, $\frac{1}{2}$ cup cream, 1 teaspoon salt, a sprinkle of pepper, juice of 1 lemon. Mix all thoroughly together. A little mustard may be added if desired and milk with a little butter may be used instead of cream.

O'LOUGHLIN.

March 6th.

JAM MAKING.—Mrs. W. Pfeiffer read the following paper:—“Practically all kinds of fruit are suitable for jam, some may not be quite so useful on their own, but make a good combination with other kinds of fruit. Where the fruit can be picked from the garden it can be used just at the right stage of ripeness, but when the fruit has to be purchased in cases, especially if it has to travel some distance, it has to be carefully picked over. Any soft fruit should be stewed for immediate use. For best results the fruit should be firm, but just ripe, better results are obtained from slightly under-ripe fruit than that which is over-ripe. For the various kinds of fruit there are different methods of preparing. Apricots should be halved and stoned and then weighed; plums likewise, excepting the Damson. Some plums are easy to stone, but some are not, in which case it is perhaps better to allow the fruit to boil without sugar for a while, and try to skim off the stones that come to the surface. But as this method is very tiresome—standing by the fire especially on a hot day—it is preferable if at all possible, to stone the fruit before it goes on the fire. It may take longer to prepare, but it does not tire so much. A sharp, stiff knife is necessary, cut around the fruit, then put both hands on it, and twist the hands in opposite directions, one half is then free and the other is cut as close as possible to the stone with the point of the knife. When accustomed to this method there is less waste than by skimming. These fruits do not need peeling, but any blemishes on the skin should be cut off. With the use of sugar, there are exceptions, but as a general rule, $\frac{1}{2}$ lb. to 1 lb. of fruit is sufficient, but with figs and several of the berry fruits $\frac{1}{2}$ lb. is quite enough. Do not add water to any jam, it usually means longer boiling to make it set, and thus the color is often spoilt. I usually add half the amount of sugar, mix it lightly with the fruit and allow it to stand several hours, because the sugar brings out sufficient moisture to start for boiling. Warm the remaining amount of sugar by standing it in the oven and add it after the jam has boiled about 1 hour. Most fruits with the exception of quinces, apples, and pears should be boiled quickly, the latter need long, slow boiling to get the right color. A reasonably large vessel is more satisfactory than a small one. If the pan is too small the jam cannot be stirred properly, which may cause it to burn. Always stir off the bottom. A board about 3in. wide, tapered on one end to use as a handle, and left wide at the other end and planed to rid it of splinters and well scrubbed, is more satisfactory than a wooden spoon. A child's wooden spade is quite good. While the jam is boiling see that it does not burn, that spoils both flavor and color. It needs most watching until it comes to the boil and more so when nearly done. When the jam has a glassy transparent appearance and bubbles start to come and break into a number of little ones, which is called jellying, it is nearly done. Then it is advisable to take out a little and pour it on to a saucer and allow it to stand in a cool place. If a thin skin has formed on it when it has cooled, then the jam is ready, if however, it is watery, it needs a bit longer boiling. When the jam has cooled off a little, put it into bottles, either pickle jars, or ordinary bottles with the neck cut off. They should be thoroughly clean and dry; this is most essential. If stood in the oven for a while to warm, there is less danger of them cracking when the hot jam is poured in. Fill them right to the brim, as it always contracts a little when it cools. When the jam is well cooled, preferably next day, it should have a nice firm skin. It should be sealed, either paper pasted over it and labelled, or melt pure clean tallow and pour it

over. It should be stored in a cool, dark, and dry place. Where storing space has to be considered, it has to be put into large jars, and perhaps tins. Better results can be obtained from a small lot of jam, say 10lbs. or 12lbs. fruit, than from a much larger quantity. It can be watched more closely, and it does not have to boil so long, thus preserving the color." (Secretary, Mrs. A. Pfeiffer.)

PARRAKIE (Average annual rainfall, 14.64in.).

March 27th.—Attendance, 12.

The meeting took the form of a Question Box. When is the correct time to strike fuchsia cuttings? *Ans.*: One member planted late in August, in a warm position, and was successful. A remedy for keeping moths out of woollens? *Ans.*: Wrap the garments in newspaper, and after cleaning the room spray it with flytox. What is the correct amount of water to add to 12lbs. quinces for jam? *Ans.*: Almost cover the quinces with water. Which is the better for making sponge cakes: Cream of tartar and soda or self-raising flour? *Ans.*: Both give good results; a matter of choice. What is the reason for thick creamy buttermilk? *Ans.*: Butter was made from cream not quite sufficiently matured. (Secretary, Miss J. Halliday.)

PENOLA (Average annual rainfall, 26.06in.).

April 4th.—Attendance, 23.

QUESTION BOX.—What is the best way of cleaning burnt aluminium saucepan? *Ans.*: Put salt in water in saucepan and boil. Tip water out and dry quickly. Leave in sun. What can be done with brown sugar which has become hard and lumpy? *Ans.*: Put in a damp place. A recipe for yellow filling and icing for sponge cake? *Ans.*: Mock cream made with equal parts of butter, sugar, and water. Banana essence is very nice. Will fig jam keep if the figs are gathered after the rain, or will the jam develop mould? *Ans.*: Do not use figs immediately after rain, the jam is likely to ferment. Why is a lesser quantity of rising (especially cream of tartar) used in cakes or rolls containing honey? *Ans.*: Because there is an equivalent acidity in honey. What causes milk puddings to "break" whilst cooking? *Ans.*: A slow oven is essential; a hot oven will always make them break. Stand pudding in dish of water to cook. Recipe for biscuit mixture sometimes used as pastry? *Ans.*: 2 cups flour, $\frac{1}{2}$ lb. butter, 1 cup sugar, 1 teaspoon cream of tartar, $\frac{1}{2}$ lb. carbonate of soda, 1 egg, 1 tablespoon milk. How to make scones? *Ans.*: 1lb. flour, 2 teaspoons cream of tartar, 1 carbonate of soda, pinch of salt. A teaspoon icing sugar and the addition of cream improves the flavour. Some people prefer to pat dough into position for cutting with the hands, others always roll the dough. How to keep flowers fresh in wreaths, make-ups, &c.? *Ans.*: Pick flowers in the cool of the evening or early morning, and handle carefully to avoid bruising. Place in deep water with an aspro until needed. When working wreath do not bruise flowers, and never work the flowers dry. After completing work spray well, back and front. Pack carefully, and keep in an air-tight box. How to salt mutton? *Ans.*: Mix the following and rub well into the meat, turn meat every second day, and apply more of the mixture:—2 cups salt, $\frac{1}{2}$ cup sugar, 2 teaspoons carbonate of soda, 1 teaspoon saltpetre. (Secretary, Mrs. F. Kidman.)

RENDELSHAM.

March 7th.—Attendance, 7.

SALMON RISsoles.—Recipe supplied by Mrs. Smith:—1 tin salmon (with juice drained off), about 3 cups finely mashed potatoes, 1 tablespoon butter, salt and pepper to taste, 1 onion grated or chopped finely, 1 handful chopped parsley, 1 egg. Method: Shred salmon, whip butter, pepper, and salt in the mashed potato, then mix all ingredients thoroughly together, form into rissoles, roll in flour or finely crushed crumbs. Fry a golden brown in butter. (Secretary, Mrs. Andrews.)

April 4th.—Attendance, 12.

SAVOURIES FOR BREAKFAST AND LUNCHEON.—Paper read by Mrs. M. McArthur:—"Breakfast is usually a hurried and quickly prepared meal. The following are some tasty and quickly prepared savouries. Toasts can be served in a variety of ways which are both wholesome and easily digested. The proper foundation for all toasts is twice baked or dry toast. *French Toast*.—2 or 3 eggs, add as much milk as will

do to soak enough bread sliced for the family. Beat eggs and milk, add salt and pepper to taste. Dip bread and fry in boiling fat or butter until a golden brown. *A Tasty Savoury*.—Allow a slice of toast to each person, place some cheese on top, some fried bacon, and a little of fried tomato. Place in oven for a few minutes and serve hot. *Omelette*.—4 eggs, a little butter, salt and pepper, chopped parsley and meat. Beat eggs, mix all together and fry a golden brown. *Scrambled Eggs and Ham*.—Mince ham and fry for a few minutes, then add lightly beaten eggs and a little milk, salt and pepper to taste. *Rossos*.—Cut any cooked meat into very small pieces, break an egg into a basin, add salt and pepper and 1 cup of flour. Mix well with $\frac{1}{2}$ cup milk, then add cut-up meat, mix all together and drop spoonful into pan of hot fat and fry. Midday meal is usually a light luncheon, as most people have their dinner at night. *Beef Olives*.—Cut 2 or 3 pieces of steak, make a stuffing, and roll it in the steak; tie with string or skewer together. Simmer in water until tender. A little gravy in roast meat improves the flavour. *Fricassed Brains*.—Two sets of sheep's brains, 1 egg, a little parsley, butter, pepper and salt. Soak brains in salt and water for 20 minutes. Wash well and remove any skin; put into saucepan and simmer for five minutes. Drain and beat with a fork; add egg, pepper, salt, butter, and parsley. Fry or stir over fire until thick. Serve hot on toast or cold in sandwiches. *Cheese Straws*.—3ozs. each flour, butter, and cheese, yolk of 1 egg, squeeze of lemon juice, a little cayenne and pinch of salt. Sift flour, add butter and grated cheese; mix yolk of egg and lemon juice; work all into a lump, then roll out and cut into biscuits and bake from 5 to 10 minutes, until a pale straw colour. *Savoury Puffs*.—Make a light scone dough, roll out thin, cut into squares, put 1 tablespoon of savoury mince on each square and press together like turnovers; fry in boiling fat. Serve very hot and garnish with parsley."

MUSHROOM KETCHUP (Mrs. Sly).—Break 6lbs. mushrooms into an earthenware jar and sprinkle with $\frac{1}{2}$ lb. salt. Put in a cool oven or near a fire for 12 hours to extract the juice. Then strain and measure syrup. Allow it to settle and boil for $\frac{1}{2}$ hour. To each quart of syrup add $\frac{1}{2}$ oz. all spice, $\frac{1}{2}$ oz. whole ginger (bruised), 2 blades of mace, 1oz. peppercorns. Boil quickly for $\frac{1}{2}$ hour. Strain and cool before bottling. Cork well and seal. Try and gather dry mushrooms to ensure long keeping. (Secretary, Mrs. E. Andrews.)

SADDLEWORTH (Average annual rainfall, 19.55in.).

April 3rd.—Attendance, 10.

THE USES OF GRAPES.—Paper read by Mrs. Coleman:—"Grapes are such a beautiful and wholesome fruit and the soil and climate of our State is so well adapted to the growth of the grape that much more use should be made of this fruit by the people of South Australia. There is a growing demand for the dried products of the vine, no doubt owing to the publicity campaign of the Dried Fruits Association. We should do all we can by a more liberal use of raisins, sultanas, and currants in our cooking to increase the demand, and so help the vine-growers. From the 1931-1932 'Commonwealth Year Book':—Export value of raisins and currants, £3,034,304—about one-quarter the value of wheat exported, but nearly double that of wine. From 1933 'Production Bulletin' the following values are of interest:—From 1930-1933 from all States—Grapes for table use, £289,719; dried vine fruits, £2,621,000; grapes for wine, £585,523. These figures show the importance of the vine-growing industry to the progress of the Commonwealth and our State in particular. For a number of years I have preserved grape juice for use as a drink during summer. A variety of blends can be made. The Muscatel grape I consider the best flavour. The Black Muscat has a red colour, and looks more attractive. The following is a good recipe:—Wash grapes and mash slightly; beat in a pan or double boiler until seeds are free from pulp and mixture is soft. Turn into fine strainer or jelly-bag and let drip. Fill juice into bottles and sterilize as in preserving fruit, and seal, using good new corks, and cover with wax, or use Fowler's fruit juice bottles with china stoppers, ring, and spring. To make a sweeter mixture: After straining, add 1 cup of sugar to 4 cups of juice, heat again, fill bottles, and cork immediately. To use: Take $\frac{1}{2}$ tumbler of juice and add cold or ice water. Lemonade or lemon juice is also an improvement. *To make Grape Cup*—Use about 1 cup of grape juice, fresh or bottled, juice of 2 lemons, 2 passion fruit, sugar to taste, about 1 pint of water or aerated water, slices of lemon to float. Ice. This is very good for use at evening parties. 'The Ideal Recipe Book,' price 6d., edited by Emily Stanton, contains recipes for use of grapes, raisins, &c. I can recommend them, as I have them in constant use. Grape juice is especially good for invalids as part of their diet; it is so easily assimilated. Raisins have a high energising value, and are especially useful in the diet for children. There are many ways they can be used at every meal. Raisins with cereals for breakfast, raisin and sago plum puddings or

raisin tarts for lunch or dinner, raisin and lemon mixture for afternoon tea sandwiches, raisin bread and cakes for tea. The following table shows the value of raisins in energising power:—1lb. of raisins is equal to 1½lbs. of beef, 6lbs. of apples, 5lbs. of bananas, 4½lbs. of potatoes, 4lbs. of milk, 20 eggs." (Secretary, Miss G. Frost.)

TANTANOOLA.

March 28th.—Attendance, 13.

SWEETS MAKING.—Mrs. Considine read the following paper:—"Have all ingredients, weights, measures, and dishes ready at hand. I always use a hollowware saucepan. *French Delight.*—Soak 2ozs. gelatine in 1 cup of cold water for ½ an hour, boil 2lbs. sugar and 1 cup water for 15 minutes. Put in the gelatine and boil for 35 minutes. Add a few pieces of citric acid, and flavour with ½ teaspoon of essence of lemon. Colour half with cochineal and pour on dishes dipped in water. Cut up when set and roll in icing sugar. *Date Creams.*—2 cups sugar, ½ cup milk, small piece of butter. Boil all slowly for 7 minutes. Add pinch of cream of tartar. Take off fire, place pan in basin of water, and beat mixture to a cream. Have dates all stoned and put portion of mixture into each. *Cocoanut Ice.*—Take 2 cups sugar, ¾ cup milk; boil 5 minutes, then add 3 tablespoons cocoanut and boil 4 minutes. A small tablespoon of butter and pinch of cream of tartar or citric acid can be added. Beat until thick, colour half pink. Pour into buttered dish; cut in squares. *Walnut Creams.*—Make paste same as above. Halve walnuts and place portion of mixture between each. Almond creams can be made the same way. *Ginger Balls.*—Make paste same as for date creams: flavour with ginger essence, colour to suit; take small pieces of preserved ginger and roll in paste. *Acid Drops.*—Take 1 cup water, 1lb. loaf sugar, 1 tablespoon vinegar, ½oz. tartaric acid, essence of lemon. Put sugar, vinegar, and water into a saucepan and boil until it becomes brittle. Melt the tartaric acid in a little hot water, add essence of lemon. Mix well, drop into the saucepan, and stir. Turn it out and cut into small squares and roll." (Secretary, Mrs. Telfer.)

TAPLAN, March 21st.

WOOL AND ITS USES.—Mrs. Hodge read the following paper:—"Wool for knitting is now very cheap, and 4-ply wool at 4½d. per skein makes nice jumpers, cardigans, &c., for school girls, and is cheaper than other woollen materials, because only 8 skeins are required, or even less for smaller girls. This would cost 3s., and if the girls are able to knit, they can quite easily make jumpers themselves with an occasional helping hand. I start jumpers on No. 11 needles and knit 1 purl, 1 plain for the band about 2½in., and then change to No. 9 bone needles. This works out at a tension of 8 stitches to the inch. It is easy to work out a larger size jumper on this scale, plain knitting. For woman's size—36in. bust measurement—I use 8 skeins 4-ply, less of 3-ply, and as the cost is so small, two or more jumpers can be made; they are comfortable and can be worn on most occasions. Any wool that is left over can be used for knitting cosies, bows for dresses, collars and cuffs; in bright and contrasting colors they will brighten a dark woollen dress. Men's and boys' hand-knitted socks are much more comfortable, and wear longer than those purchased in stores. The former can be re-footed when the feet and heels wear out, which saves a lot of knitting and wool."

FARM HOME SURROUNDINGS.—Paper read by Mrs. Stewart:—"How often when driving along a road does one hear the remark: "There's a lovely home." On closer examination the house itself is found to be a very ordinary structure. Why, then, the exclamation? Because the surroundings were prettily laid out and cared for as if someone enjoyed living in the home. Something fresh and green is what our senses crave in this hot, dry and dusty district. Trees first; Two rings of them around the home, of course a good distance away. Sugar gums are favored, for after trying half a dozen different kinds of trees I find the gums stand the climate much better than other varieties. The white cedar does quite well, as does the kurrajong, but both grow more slowly. Surround the home with trees, and no matter how poor or how grand the house, it will look like a home. The residence that looks, and is, a real home is the desire of every woman. During these days of depression it may not be possible to improve the actual house or renew or redecorate the interior. The shabby linoleum, the faded woodwork, the lessening crockery, and the emptying linen press are too depressing, so let us see what we can do to make the home look as if we are prosperous. Water is still available. The gums around the house help to break the wind; but if some breaks of hophbush are erected the work of making a garden will be more satisfactory. If possible have the flower garden opposite the kitchen window, or somewhere where you can constantly see it as you go in and out about your work. No work is dull if in the midst you are cheered by the sight of a

gay garden. The vegetable patch, too, must not be very distant from the house because of watering. A trellis of vines is an acquisition to any farm home. Fruit trees are a luxury rather than a paying proposition. They take so much water to do justice to themselves. The apricot, peach, nectarine, and citrus trees give good returns. Be very careful not to plant the fruit trees too close to the flower garden or the useful vegetables. At first, while the trees are quite young, vegetables can quite well be grown amongst them; but soon the trees will take all the moisture. A small lawn will give endless pleasure to children and adults if placed where the shade of a tree falls upon it. Have you a shady spot for pot plants? If so, be sure and utilise it for the growing of ferns, &c. Sword ferns do particularly well if there is a sheltered corner facing the east. On the hottest day this corner will always look fresh and cool. If it is possible, have neat fences, paths, and breaks. This will add greatly to the appearance of the home. Farmers cannot be expected to do these things all at once; but little by little the surroundings of the home may be improved. Not only from an aesthetic point of view are we repaid for our labors, when the time for selling comes a prospective buyer will be more favorably impressed by happily laid-out grounds around the homestead than if there is just the bare house. Since we live in this district let us make the best of our one big favor—the water. Plant and tend until one is closed in from the dry burnt land outside by a bower of greenery." (Secretary, Mrs. Flynn.)

WARRAMBOO.

April 10th.—Attendance, 12.

EVERY DAY HAPPENINGS.—Answers supplied by members and visitors. Raw or boiled potato for yeast in summer? *Ans.*: Boiled potato preferred (Mrs. Chilman). Washing bread tins after baking? *Ans.*: Unnecessary to wash them (Mrs. Daniel). Best pastry for meat pies and pasties? *Ans.*: Short pastry with rising meat not cooked previously (Mrs. Dolphin). Which is better, to warm the butter or sugar for biscuits? *Ans.*: Warm the butter in cold weather (Mrs. Adams). Which is preferable for sponges, stale eggs or fresh? *Ans.*: Not too fresh; eggs must be cold (Mrs. Murphy). Why do custards go watery when baked? *Ans.*: Too much sugar, separated milk, too hot oven (Mrs. J. Sampson). The quickest cure for insect bites? *Ans.*: Bathe with peroxide, apply Doan's ointment (Mrs. Mitchell). First remedy for colds and coughs? *Ans.*: Asperin and hot lemon; irritating cough, honey and warm milk (Mrs. G. Simmons). To keep silverfish and moths from clothes. *Ans.*: Camphor balls and flytox (Miss Hampel); other suggestions—Epsom salts sprinkled around, and turps, pepper, and newspaper. Ways of cleaning grease from clothing and hats, &c.? *Ans.*: Petrol, eucalyptus, gall soap (Miss Steer); removing ink and pencil marks, glycerine. Feeding young chicks? *Ans.*: Grind wheat through mincer (Miss Chilman). (Secretary, Mrs. A. Steer.)

WASLEYS.

April 5th.—Attendance, 37.

The meeting took the form of a dahlia show, and many fine blooms were exhibited. The prize winners for six dahlias were—Mrs. M. Richter first, Mrs. C. Marshall second. Best collection of dahlias—Mrs. M. Richter first, Mrs. C. Marshall second. Mr. and Mrs. P. H. Gwynne, of Gawler, were the adjudicators. Mr. Gwynne gave a very interesting talk on "Flower Culture," and answered questions. (Hon. Secretary, Miss J. Braun.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
McLaren Flat...	6/4/34	21	Annual Meeting	Miss I. Nicolle
Clare	7/4/34	50	Address—Dr. E. Hillier .	Mrs. A. Pollock
Gladstone	17/4/34	26	Address—C. F. Anderson	Mrs. L. Sargent
Balhannah	18/4/34	20	"Wool," Mrs. Mattner...	Miss D. Spoehr
Williamstown...	4/4/34	6	Paper—Mrs. Hammatt ..	Mrs. A. Cundy
Parrakie	24/4/34	15	Homestead Meeting	Miss J. Halliday
Warcoowie	27/3/34	12	Addresses—S. Ward and E. L. Orchard	Mrs. Crossman
Balhannah	21/3/34	26	Address—Miss Campbell .	Miss D. Spoehr

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All communications to be addressed:

“The Editor, Journal of Agriculture, Education Building, Adelaide.”

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A. P. BLESING,
Minister of Agriculture.

AGRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Agricultural Bureau Conferences.

District Conferences will be held as follows:—

Eyre's Peninsula (West), at Ceduna, Wednesday, July 4th, A. R. Maguire, Mudamuckla (Secretary).

Upper North, at Wilmington, Wednesday, July 18th, Chas. Cole (Secretary).

Murray Lands (West), at Karoonda (Nunkeri Branch), Tuesday, July 31st, E. R. Peltz, Nunkeri (Secretary).

Southern, at Strathalbyn, Thursday, August 16th, F. W. Allison (Secretary).

Hills, at Coromandel Valley (Blackwood Branch), Thursday, August 23rd, H. Goldsack, Coromandel Valley (Secretary).

Eyre's Peninsula (Southern), at Yeelanna, Wednesday, September 5th, R. B. Wilson (Secretary).

Eyre's Peninsula (Central), at Kyancutta, Friday, September 7th, E. A. Kelly (Secretary).

Pinnaroo Line, at Pinnaroo (Parilla Well Branch), Tuesday, September 18th, E. C. Slater, Pinnaroo (Secretary).

Murray Lands (East), at Caliph, Thursday, September 20th, W. H. Todd (Secretary).

Fruit (Non-irrigated Districts), at Balhannah, Tuesday, November 6th, C. G. Grasby (Secretary).

In each case the Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda.

Agricultural Shows.

We have been advised by Secretaries of Agricultural Show Societies that their shows will be held as follows:—

Maitland, Wednesday, September 26th.

Denial Bay, Friday, September 28th.

Jamestown, Wednesday, October 10th.

Loxton, Wednesday, October 10th.

Burra, Wednesday, October 24th.

Minlaton, Wednesday, October 24th.

Murray Bridge, Thursday, October 25th.

Woodside, Saturday, November 3rd.

Pruning Competitions.


River Murray—Mypolonga (date to be fixed); Cadell, June 26th; Waikerie, June 27th; Moorook, June 28th; Barmora, June 29th; Berri, July 3rd; Renmark, July 4th; and the championship at Berri, July 5th.

Noxious Weed.

The weed known as Horny Thorn Apple (*Datura tatula*) has been declared a noxious weed throughout the whole of the State, under the Noxious Weeds Act, 1931. A description of this plant will appear in a subsequent issue of this *Journal* as part of the series of articles by Mr. G. H. Clarke.

Suppression of Weeds by Fertilizers and Chemicals.

The literature giving information on the use of fertilizers is very extensive, as is that dealing with weed destruction by chemical means, and experiment and research covering both is of world-wide importance. A valuable effect of fertilizers is the



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fact that they enable crops to grow vigorously and overcome weeds. Towards the end of last century, spraying with copper sulphate to kill charlock and wild radish was introduced in France, and soon became widespread in England and elsewhere. At the present time the use of a solution of sulphuric acid is rapidly becoming a recognised means of destroying various annual weeds in cereal crops, as is the fertilizer cyanamide, while chlorates may in the future grow in importance for the destruction of certain weeds in some circumstances. Mr. H. C. Long, of the Ministry of Agriculture of England, has prepared a simple and concise account of the subject in a brochure entitled "The Suppression of Weeds by Fertilizers and Chemicals." He has had the benefit of the assistance of Dr. Winifred Brechley, of Rothamsted Experimental Station, and the subject is introduced by a foreword from the pen of Sir Daniel Hall. The booklet extends to 57 pages, together with 17 photographic illustrations and five line drawings. It may be obtained from the author at "The Birkins," Orchard Road, Hook, Surbiton; price 2s. net (by post 2s. 2d.).

Poisoning Trees.

Inquiries have been received seeking information on the best means of poisoning large trees. At our request a paper on this subject was written by Mr. F. R. Dinning, who has had a wide experience in the work at Mundulla, and the article will be found on page 1309 of the May issue.

Declared Noxious Weeds.

The following are declared noxious weeds throughout the whole of South Australia under the First Schedule of the Noxious Weeds Act, 1931:—

- Cotton Bush { (*Asclepias fruticosa*).
(*Asclepias rotundifolia*).
- Wild Onion (*Asphodelus fistulosus*).
- Saffron Thistle (*Carthamus lanatus*).
- Innocent Weed (*Cenchrus tribuloides*).
- Purple Star Thistle (*Centaurea calotritra*).
- Yellow Cockspur (*Centaurea solstitialis*).
- Canada Thistle (*Cirsium arvense*).
- Hemlock (*Conium maculatum*).
- Dodder (*Cuscuta* spp.).
- Horny Thorn Apple (*Datura tatula*).
- Thorn Apple (*Datura stramonium*).
- False Caper (*Euphorbia terracina*).
- Cape Tulip { (*Homeria dollina*).
(*Homeria miniata*).
- St. John's Wort (*Hypericum perforatum*).
- Horehound (*Marrubium vulgare*).
- Black Eyed Susan (*Ornithogalum thyrsoides*).
- Dyer's Weed (Weld) (*Reseda luteola*).
- Buffalo Burr (*Solanum rostratum*).
- Apple of Sodom (*Solanum sodomaeum*).
- Californian Burr (*Xanthium californicum*).
- Bathurst Burr (*Xanthium spinosum*).

The Weeds under the Second Schedule are:—

White Goosefoot ("Fat Hen") (*Chenopodium album*)—City of Adelaide and Waikerie Irrigation Area only.

Fennel (*Foeniculum vulgare*)—Municipality of Mount Gambier only.

Variegated Thistle (*Silybum marianum*)—Municipality of Mount Gambier only.

Hoary Cress (*Lepidium draba*)—District Council of Tatiara only.

African Boxthorn (*Lycium ferocissimum*)—Declared a noxious weed for the whole of the State, except where grown as a hedge on the 17th March, 1932, and kept trimmed to a width not exceeding 4ft. 6in. in any part and a height not exceeding 7ft.

VETERINARY INQUIRIES.

[*Replies supplied by Veterinary Officers of the Stock and Brands Department.*]

Ellston has cow on first calf. One teat has lumps in it, and gives milk tinged with blood.

Reply—The presence of blood in the milk is due to the rupture of a small blood-vessel in the lining of the teat duct. The occurrence of such a haemorrhage would undoubtedly be assisted by the presence in the teat of the lumps you report. These are small growths or tumours caused by an infection of the quarter with a mild chronic form of mammitis. There is no satisfactory treatment for the removal of these lumps, though their removal by operation may be attempted by a properly qualified veterinary surgeon. The only treatment you can adopt, when the blood is found in the milk, is to milk the quarter out as gently as possible three or four times a day for a few days, so as to allow the ruptured blood vessel every chance to heal up again.

Mannum reports dog with undue proportion of the white of the eye showing, and has difficulty in seeing any object.

Reply—Keep the dog quiet, and feed on light nutritious diet, such as meat and vegetable soup, finely minced raw red meat, stale dry bread. Keep the animal's bowels in regular order by giving once weekly a dose of castor oil, 2 tablespoons; olive oil, 2 tablespoons; calomel, 1 grain—all mixed together and given as one drench. Three drops of Fowler's solution of arsenic should also be given in a little milk, night and morning for a fortnight. Then discontinue its administration for a fortnight, and repeat the course again.

Pinnaroo reports yearling colt with a cut under and in the corner of the eye. The wound is healing, but the eye has a blue skin over it.

Reply—If possible, keep the animal in some shady position where the eye is protected from the direct sunlight. Clean any mattery discharge by bathing with warm boracic lotion, and three or four times daily put a few drops of the following lotion into the eye sac and hold the lids closed for a minute until the lotion becomes distributed all over the front of the eyeball:—Zinc sulphate, 4 grs.; acid boric, 4 grs.; boiled or distilled water, 2 tablespoons.

Milang Agricultural Bureau reports cow with weeping sores and scabs on all legs.

Reply—It is impossible to definitely diagnose the nature of the trouble without seeing the animal, but the condition is probably due to infection of slight skin wounds, such as scratches, &c., with the *Bacillus Necrophorus* (or *Necrosis Bacillus*), which germ is a common inhabitant of soils. This condition usually responds readily to treatment by removing the scabs after softening them by bathing with a warm antiseptic solution, and then dressing the raw sores with either 3 to 5 per cent. solution of milk oil fluid or 3 to 5 per cent. carbolized vaseline.

The condition as a rule is not highly contagious, and the only precaution to take is to isolate the animal until recovery. Occasionally it may happen that several members of a herd may become affected at or about the same time, in which case it is advisable after separating the affected from the non-affected animals to move the latter to a fresh pasture.

Pata forwards flies for identification.

Reply—The specimens were submitted to the Museum Entomologist, Mr. Walmesley, who advised as follows:—

Both flies belong to the same group, the larger one being the common botfly (*Gastrophilus Equi*), which deposits its eggs anywhere on the horse, and the smaller one being the *Gastrophilus Veterinus* (*G. Nasalis*), which deposits its eggs around jaw and head.

In both cases the eggs have to be swallowed, and in the stomach they develop into the maggot or larval stage. They remain attached to the stomach near entrance to small intestine all winter, and in late spring are passed out in the faeces. They then burrow into the ground, where they remain from 3-5 weeks, when the winged fly emerges. Bots, contrary to popular opinion, do not cause the damage that is attributed to them, but they occasionally cause death through obstructing the passage of food, etc., into the intestine.

Caliph Agricultural Bureau reports death of three horses. Post-mortem showed heavy infestation of bots, which were suspected of causing the deaths.

Reply—In my opinion "bots" were not the cause of the death of the horses. At this time of the year digestive disturbances in horses are common. They have been "turned out" and on "low rations." When brought in they are usually in poor condition, and as they are usually wanted for work at once, are put on to better feed. Their poor condition, the sudden change of feed, especially if it is given in large amounts frequently leads to digestive troubles, especially in districts where "sand" is common.

The remedy is to give horses "turned out" a little supplementary feed. When they are brought in, give a bran mash for 2-3 days and gradually change on to new feed.

To prevent botfly strike, clip hair over areas liable to strike and apply following dressing daily:—Creosote, 1 part; oil of turpentine, 6 parts; raw linseed oil, 20 parts.

Morgan asks: (1) Cause and treatment of spavin, and (2) whether wheat can be fed to a cow without causing bloat.

Replies—(1) *Re "Spavin."*—The predisposing cause of this condition is faulty conformation of the hock joint. The actual or exciting causes are sprain and concussion. The result of treatment for alleviating the lameness caused by this condition is always problematic, as it depends on many factors, such as the position of the spavin on the joint, temperament of animal, nature of work to be performed, presence of faulty conformation, &c. Treatment consists of rest and either the application of a 1 to 8 "Red" blister (obtainable from any chemist) over the site of the spavin or "firing." This latter treatment can be given only by a qualified veterinary surgeon.

(2) *Re Cow "Bloating."*—Wheat is a feed that is very prone to induce bloating in stock unless it is fed in limited quantities only, the stock have been gradually accustomed to it and care is taken not to give it to them when they are empty and hungry, so that they "bolt" it. Take the precaution of always taking the edge off the cow's appetite by first feeding it a little hay, prior to giving the wheat and chaff feed, and the tendency to "bloating" will be very greatly reduced.

Strathalbyn asks if it is advisable to drench ewes with bluestone that are due to lamb in two months' time.

Reply—If the ewes are showing signs of parasitic infestation, it would be advisable to drench them now, and provided they are carefully handled, this treatment could be carried out quite safely. Otherwise, if they appear in good health, drenching should be left over until after lambing. Then it might be possible for you to drench the ewes once at the same time as you are marking the lambs. Regular monthly drenchings of both the ewes and lambs could be instituted from October or early November onward until the following April or May.

Agricultural Bureau, Elbow Hill, asks treatment for removal of worms in horses.

Reply—A routine treatment is to starve the animal for 24 hours and then give the following drench:—Raw linseed oil, 1-2 pints; oil of turpentine, 2oz. Shake well before administering, and do not feed the horse for two hours after drenching. Procure a 1lb. bottle of Fowler's solution of arsenic and give 1 tablespoon night and morning sprinkled on the feed until the bottle is finished, and then repeat the oil and turpentine drench.

Worms can largely be prevented by seeing that the horses do not eat food contaminated with manure, and drink water that has been polluted with animal droppings. Stable yards and stables should be cleaned regularly, and manure piled up in heaps in a compact mass, or carted out and spread on land which is to be used for cropping purposes.

If from dams, the water used for drenching should be always taken from a trough. It is pointed out that trough water is often known to contain numerous small red bodies about $\frac{1}{16}$ in. to $\frac{1}{8}$ in. in length, which are often mistaken for "blood worms," but they are the larval form of an insect which, as an adult, is like a mosquito. These larvae differ from the "blood worms" in appearance, in that the body has distinct constrictions and a beadlike appearance, whereas in "blood worms" the body is uniformly plain and round.

Agricultural Bureau, Yurgo, asks treatment for pink eye in sheep.

Reply—Pink eye in sheep is due to a germ infection and the disease is usually introduced with bought sheep. Symptoms—Spreads rapidly through flock, and causes rapid loss of condition. Eyes watery, lining membrane red; later the affected eye goes whitish in colour, and the surface may ulcerate and rupture.

Isolate all affected sheep (when handling sheep disinfect hands after each one to avoid spreading infection) and put in a suitable and handy spot. (The ideal is a small paddock with plenty of shade and water.) Feed by hand. Put a few drops of 2 per cent. solution of zinc sulphate into the eye daily for a few days. (To make solution, dissolve 3 drams of zinc sulphate in 1 pint of boiled water.)

Tarcowie reports mare swollen leg of long standing. Recently discharging from just above fetlock. Leg is very stiff.

Reply—The animal is suffering from lymphangitis, an inflammatory oedema of the leg. She should be kept in a small yard where she can take quiet voluntary exercise. A dose of physic should be given and the animal kept on light restricted diet, such as mash or greenfeed. A careful search of the affected limb should be made for any wounds, and these dressed with antiseptics. The leg should be treated with hot fomentations applied by means of a large piece of flannel or blanket dipped in real hot water and wrung out almost dry. This latter point is essential, otherwise the skin of the leg may be injured by scalding. These daily fomentations should be followed by massage in an upward direction and the limb kept bandaged between times from the foot up to above the hock. When the acute stage is passed, the animal should be given 15-20 minutes walking two or three times daily.

Once this trouble has occurred in a limb, it is very liable to recur again, and after each succeeding attack the limb shows less tendency to return to normal size, becoming more or less chronically enlarged. An animal affected chronically with this disease should be kept at reasonable work as constantly as possible, and when being spelled should be kept in an open yard instead of being stabled.

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AGRICULTURAL EDUCATION.

[*An address broadcast through 5 CL, Adelaide, by DR. A. R. CALLAGHAN, Principal, Roseworthy Agricultural College.*]

With the limited time at my disposal I do not purpose covering all the ramifications and perplexities which confront the educationalist in dealing with the problem of industrial education. In any case, it would be presumptuous on my part to obtrude my opinion on such an important and specialised matter. What I do purpose doing, however, is to outline what in my opinion, as an agriculturalist rather than an educationalist, is considered to be some of the essential fundamentals in the training of young men in agriculture.

Before proceeding with any educational programme one must have some definite idea in mind respecting the immediate object and ultimate result.

At the outset it must be fully realised that experience is the greatest teacher of all, and in no phase of life can experience be truly transferred. So that no school or college system can ever succeed in moulding experienced farmers, or experienced agriculturalists, but what it can do is to inculcate a proper sense of values, foster a keen sense of observation, and develop a reasoning, clear-thinking mind, thereby making the subject of agriculture live from the very beginning. In other words, early educational efforts in agriculture should be directed towards the training of young men to be agriculturally minded, that is, to think along agricultural lines and to be able to parse and analyse the problems, failures, and successes of the man on the land. With such a training any young man can approach the practical work of the farm with the knowledge that the essential experience, which is the precursor of success, will be fully taken advantage of, and bear good fruit earlier than would otherwise be possible. One of the gravest mistakes, to my mind, is to begin specialisation too early. A sound fundamental education is just as essential for success in agricultural pursuits as it is for success in any other profession. Without a good working education a lad cannot ever hope to grapple with the underlying sciences and principles of agriculture. His mind is not sufficiently well trained to understand the work that is involved when specialisation does begin, nor has he acquired that thinking habit so essential to the proper interpretation of what he is learning and doing. It almost goes without saying, that the higher the degree of intelligence, and the sounder the educational foundation, the better chance there is of making a sound agriculturalist. It is a grave fallacy for parents to conclude that, because their son has failed to qualify for other professions, his only chance of success is to go on the land.

Agriculture involves scientific as well as business principles; it involves the application of some of the most profound branches of human knowledge, and above all, requires a clear, commonsense attitude; consequently, to be truly successful, there is need for a sound educational background combined with intelligence. With the crowding of other professions it is very agreeable and heartening to note the increased number of boys of sound education and of high intellectual calibre who are entering Roseworthy Agricultural College. They have chosen agriculture as the business of their lives, and with their minds adequately equipped in the first place the task of training them along more specialised lines is made both easier and more pleasurable.

The knowledge of the world, and matters of science particularly, both natural and physical, has grown stupendously; so much so that education has of necessity developed along mundane and utilitarian lines, and the strictly scholarly aims have to a large extent been modified to meet the times. Education must keep in step with time, for every boy has eventually to plunge into the whirlpool of real living, and his education very largely determines whether he will sink, swim, or float aimlessly about. This encumbers upon our system the necessity to specialise,

and one of the lines of specialisation most important to the future of Australia as a whole, and South Australia in particular, is that of agricultural education.

Now assuming that a reasonably sound educational background, involving the three "R's" well done, has been received, introductory work of a foundational nature should begin the specialisation, and this can best commence while the boy is still at the secondary school. Elementary chemistry, physics, and botany might well enter into this foundational work, but rather than attempt the lot and confuse the young mind, I consider it preferable to take one or two, and make sure that what is taught, is taught, not with the idea of assimilating a series of cold facts, which are meaningless, but with the idea of teaching living facts and principles which are of definite applicability and use in life.

A boy leaving school and entering an agricultural college, such as Roseworthy, with a sound introductory schooling of this sort, has a decided advantage over the boy whose general education has been neglected or is incomplete, merely because he has been gleaning something of what the College is to teach him in detail later on. From this it should not be concluded that I am against the teaching of agriculture and kindred subjects at agricultural high schools. These institutions serve a wonderful purpose, especially for country children, but for boys who anticipate going further by taking a course at Roseworthy, greater time might, I consider—speaking again as an agriculturalist rather than an educationalist—be given to matters of general education and introductory work on the physical and natural sciences, than to subjects of a purely agricultural nature, which demand more practical than theoretical teaching.

I am firmly convinced that no system of agricultural education is complete, or even possible, without some intimate form of practical work. The very basis of agriculture and livestock husbandry is practical. What is more, it all involves actual labour, yet underlying this are the intellectual aspects; these aspire to make the efforts involved more productive, more profitable, and last but not least, more enjoyable. My conclusion from this is that any college which neglects the practical and everyday tasks involved in farming, and which neglects to portray by practical example what it portends to teach, is nothing more or less than a machine for cramming cold, meaningless, and indigestible facts likely to ruin the digestion of its students.

Whatever the branch of education, be it agricultural or not, the teaching of things which may be mechanically memorised, just as mechanically transcribed to examination papers, and in many cases automatically forgotten, is defeating the objects of true education. To ring true, facts must be shown to be more than mere words; they must be interpreted to reveal their worth, their practical application or utility, or at least to be clearly understood as something really worth while knowing, for the sake of knowledge itself, and not for the purpose of passing an examination. And so it is that all agricultural colleges deserving of the name are so situated as to be in a position to practise the subjects which they aim at teaching. Students are thereby afforded the opportunities, not only of following the practical procedure adopted, but also of actually doing the work. The theoretical training which accompanies, and is an integral part of the practical operations, teaches them to appreciate the why's and wherefore's of certain procedure, and enables them to take an intelligent, thinking interest in their work. There is a world of difference in knowing what to do and how to do it, and ambitious as it may sound, the objects of Roseworthy are to teach both; but without careful attention to practical work, the "how to do it" part would obviously not even receive its introduction. The attainment of sufficient agricultural knowledge and training to enable students to think along the right lines is a big step in the right direction, and although experience must mellow the early training, when such experience is superimposed on a sound agricultural education, it is not only more profitable and lasting, but it is also more satisfying and liveable.

LAND SETTLEMENT ACTIVITIES OF THE EMPLOYMENT PROMOTION COUNCIL.

[By W. J. SPAFFORD, Chairman of Land Settlement Committee.]

After prompting by representatives of various organisations interested in attempts to overcome some of the unemployment prevalent at the time, the Government of the day created the Employment Promotion Council, and promised to subsidise £ for £ up to £25,000 funds raised by the Council by public subscription. After careful consideration Members of the Council decided that the time was inopportune to hope to obtain a large sum of money from the general public on an appeal, but they were saved from their dilemma by a grant made by the Commonwealth Government of £25,000, the conditions of the grant being:—

1. That the State subsidise the grant £ for £.
2. That £20,000 be used for land settlement and £5,000 for mining.
3. That the State subsidy be used for the same purpose as the grant, and in the same proportions.

The State Government accepted the conditions, and the Employment Promotion Council immediately functioned in providing work connected with mining and in placing men on the land.

To facilitate the work of the Council the Honourable Minister of Employment and Industry made provision for Committees to work under the Council, and at present Committees on Finance, Mining, Land Settlement, and Publicity do the spade work, and submit recommendations for the consideration of the full Council.

THE COUNCIL.

The Employment Promotion Council was constituted on September 5th, 1932, and consisted of the following members, each representing an organisation of some kind:—

The Lord Mayor of Adelaide.

The Council of Churches (Rev. B. E. C. Tuck and Rev. Wm. Hawke—the latter was replaced by Mr. L. V. M. Leal).

The Lord Bishop of Adelaide (represented by Rev. Canon Bleby).

The Archbishop of Adelaide (represented by Mr. H. J. Savage).

Kuitpo Industrial Colony (Rev. S. Forsyth).

Young People's Employment Council (Mr. E. D. A. Bagot).

Chamber of Commerce (Mr. Norman H. Taylor).

Returned Sailors and Soldiers' Imperial League (Mr. H. Thomson, M.C., K.C.—afterwards replaced by Mr. R. Jacob).

Commercial Travellers' Association (Mr. R. B. Norton).

Local Government Association (Mr. J. S. McEwin).

Commonwealth Employment Council (Mr. W. Queale).

Adelaide Trades and Labour Council (Mr. A. G. Angel).

Port Adelaide Trades and Labour Council (Mr. J. C. Bietz).

Chairman of Unemployment Relief Council (Mr. B. H. Gillman).

Superintendent of the Labour Exchange (Mr. A. C. H. Richardson).

Lands and Survey Department (Mr. W. J. Colebatch—afterwards replaced by the Surveyor-General (Mr. J. H. McNamara)).

Chairman of the Finance Committee (Mr. R. R. Stuckey, C.M.G.).

Chairman of the Mining Committee (Dr. L. Keith Ward).

Chairman of the Publicity Committee (Mr. V. H. Ryan).

Chairman of the Land Settlement Committee (Mr. W. J. Spafford).

At a later date the Chamber of Building Manufacturers was represented by Mr. P. R. Claridge.

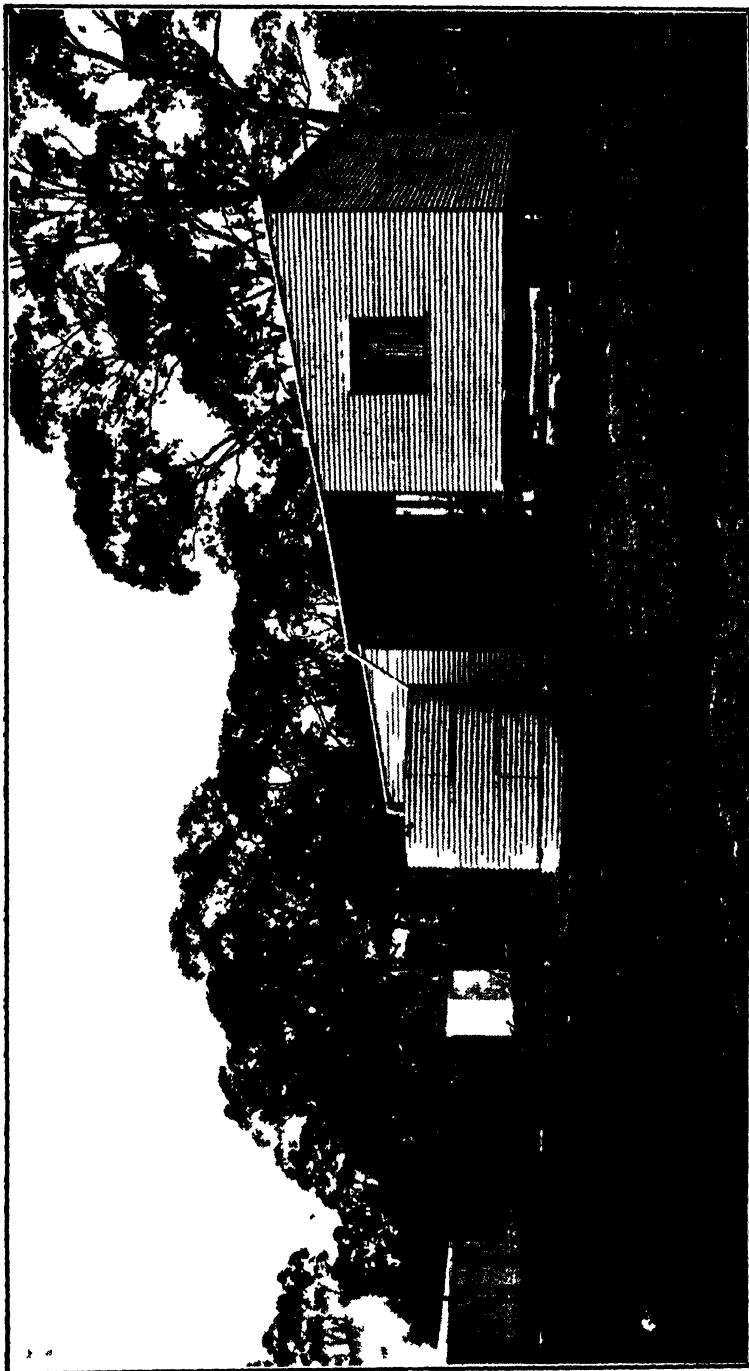


Photo 1/6/34

Dwelling, shed, and tank as supplied by the Employment Promotion Council, at the time of giving possession to a settler

By Govt Photo lithographer

Mr. B. H. Gillman withdrew from the Council when he relinquished the position of Chairman of the Unemployment Relief Council, but as his successor, Mr. A. C. H. Richardson, was already on the Council it was unnecessary to replace Mr. Gillman.

Owing to the inability of the appointed Chairman (the Lord Mayor) to attend the meetings of the Council, it was necessary to place someone else in this position, and to the intense gratification of all members, the Government appointed Mr. Norman H. Taylor to be chairman of the Council.

The Secretary of the Employment Promotion Council is Mr. F. K. Dwyer (who is also Secretary of the Unemployment Relief Council), with an Assistant Secretary in the person of Mr. B. Pollard.

FINANCE COMMITTEE.

The Committee which deals with all financial matters for the Council consisted of:—Chairman (Mr. R. R. Stuckey, C.M.G., Under Treasurer), Messrs. R. B. Norton, W. Queale, Norman H. Taylor, and H. Thomson, K.C.

MINING COMMITTEE.

To investigate all requests for help in mining ventures, and to make recommendations on these matters to the Council, the Mining Committee was formed, consisting of:—Chairman (Dr. L. Keith Ward, Director of Mines and Government Geologist), Rev. B. E. C. Tuck, Messrs. E. D. A. Bagot, J. C. Bietz, and W. Queale, with whom were co-opted Messrs. Walkley (Sharebroker) and Gartrell (Instructor in Mining at the School of Mines).

PUBLICITY COMMITTEE.

At first it was considered important to have a strong Publicity Committee, as a lot of work would have been required to launch successfully and maintain a public appeal, but with the altered conditions, which meant working on financial grants, there was no need for extensive propaganda and publicity. The Committee consisted of:—Chairman (Mr. V. H. Ryan, Director of Immigration and Tourist Bureau), Lord Mayor, Canon Bleby, Messrs. E. D. A. Bagot and H. J. Savage.

LAND SETTLEMENT COMMITTEE.

Originally two Committees were formed, one the Land Settlement Committee and the other known as the Land Selection Committee, but it was soon found that there was no work for both groups, and so they were amalgamated shortly after the Council began to function. This made the Land Settlement Committee a rather large one, but so far it has not proved unwieldy, and its personnel consisted of:—Chairman (Mr. W. J. Spafford, Deputy Director of Agriculture), Rev. S. Forsyth, Rev. Wm. Hawke, Messrs. A. G. Angell, J. C. Bietz, B. H. Gillman, J. S. McEwin, J. H. McNamara, A. C. H. Richardson, and Norman H. Taylor, with whom were co-opted Messrs. H. J. Bishop and J. J. Macgowan of the Unemployment Relief Council.

WORK OF THE LAND SETTLEMENT COMMITTEE.

Where the settlement on land of men without financial resources of any kind is concerned, the sum of £40,000 is very small indeed, and because of this limitation of money, and remembering that little success has been secured anywhere in the World when it has been necessary to give 100 per cent. financial aid to settlers, the Land Settlement Committee was hard pressed to decide on a scheme which would get many people on land with a reasonable chance of earning enough to enable them to live without further Government aid, and to permit of them getting off the rations in a short space of time. After full consideration being given to all forms of primary production possible in our climate, and remembering that



Photo 1/6 34

Fowl houses and poultry yards after being in use for a few months Chon moeller growing right up to the poultry yards

By Govt Photolithographer

it would prove uneconomic to start men producing articles with which markets were already over-supplied, it was decided to concentrate on small holdings for mixed farming where poultry keeping would be the principal activity. At the time Great Britain was importing annually 259,252,010 dozens of eggs in the shell, and about 86,688,000 dozens as pulp, and of this total of 345,940,010 dozens, only 62,278,130 dozens were received from Empire countries, and the Commonwealth's share was but 9,182,060 dozens in the shell, and about 1,200,000 dozens as pulp.

It was believed that this type of settlement could be brought about at a lower cost per settler than any other, payable returns could be secured quickly, and provided the poultry activities were directed towards the production of eggs for export, no local industries would be interfered with, and further that there appeared to be every chance of the British Markets admitting our eggs without hindrance.

LAND FOR SETTLEMENT.

Because greenfeed constitutes such an important part of the food of poultry, indeed a plentiful supply appears essential to success, it was necessary to select land in localities where green fodders can be grown with certainty, and so all of the land-settlement activities of the Employment Promotion Council have been confined to the heavy-rainfall portions of the Adelaide Hills.

The Land Settlement Committee appointed a sub-committee to select land and decide on its subdivision into holdings, and this sub-committee has kept in mind at all times that each block must be capable of being made self-supporting as far as a water supply is concerned, it must possess sufficient land suitable for gardening purposes so that summer fodders such as Chou Moellier, Silver Beet, Mangels, Millet, &c., can be grown in large quantities as well as all of the vegetables and most fruits required by an ordinary household, and it must be large enough to support wholly at least two head of large stock. Preference to be given to scrub land, because of the lower value at allotment time, and because the presence of trees for posts for boundaries, fields, and poultry yards keeps down the money advances for equipment.

PROVISION OF LAND.

At the commencement of the Land Settlement Scheme, a careful combing of all districts with sufficiently good climate for the kind of settlement desired was made in search of Crown Lands that might become available, and although there was not a great deal to be found suitable country for subdivision into 33 blocks was acquired. When this land had been allotted it became necessary to purchase land, which added to the cost of settlement, but has proved satisfactory otherwise.

SELECTING THE SETTLERS.

As in the case of the choice of land, a sub-committee was appointed to select settlers, and in doing so has followed the direction given by the Council, and besides choosing men likely to make a success of their holdings has endeavoured to place large families so that a lot of children are removed from the city to be reared in the country.

No difficulty has been experienced in the number of men available, for even though the Council has never advertised the fact that land settlement was taking place and settlers were wanted, over 1,600 applications have been received for land from married men who claim to have had agricultural experience.

All applicants are required to fill in a questionnaire, and when land is available the sub-committee for the selection of settlers goes through the application forms and interviews about three times as many men as are required—first collectively, when an explanation is given of what help is forthcoming, and then individually to allow the members of the Committee to form an opinion of the experience and



By Govt. Photo-lithographer.
View of the principal buildings supplied, showing dwelling, shed, and fowl houses.

Photo 1/6/34.

capability of the applicants. At the interview each applicant is required to supply the names of two or three prominent persons to whom reference can be made as to the character of the applicant and what his behaviour has been during the past couple of years or so. The most promising of those interviewed are listed, the persons referred to are approached, and if the reports are favourable, a woman inspector is sent to the homes of the applicants and reports her opinion on the cleanliness, tidiness, and suitability of the wife of the applicant. This latter is a recent innovation which past happenings decided the Committee to adopt.

STARTING A SETTLEMENT.

Although it is the fixed policy of the Employment Promotion Council to encourage every man to work out his own salvation and to have no community ownership or community work after the blocks have been allotted, in the original opening up of a settlement there is need of community work such as clearing sites for buildings, making roads passable, bridging creeks, cutting fencing posts and fowl-yard poles, &c. For the purpose, the Council has loaned tents and camping equipment, and the men have lived on the settlement as single men until dwellings have been erected and all community work completed.

BALLOT FOR BLOCKS.

As soon as dwellings are available and community work finished, a ballot for blocks is taken in the presence of an officer of the Council, and after settlers have been given the opportunity to interchange blocks, a statement is signed by each of them affirming agreement with the ballot and satisfaction with the block received.

TERMS OF ALLOTMENT.

Land is allotted on Perpetual Lease under Section 33 of the Crown Lands Acts, the rent being fixed at $2\frac{1}{4}$ per cent. of the land value, with reductions during the first three years, so that the first year's rent is one-fifth of the amount which would be paid annually; the second year's rent is one-third of the said amount, and the third year's rent is two-thirds of the said amount.

BUILDINGS ERECTED.

The simplest of dwelling quarters have been provided, consisting of three-roomed habitations of wood and galvanized iron, with lean-to verandah, with the rooms unlined except for the ceilings, but with boarded floors and fireplace and cooking stove forming parts of the home. Close to the cottage is a galvanized iron shed and 2,000gall. tank, and somewhat removed, a closet.

For the proper management of the fowls, four poultry houses, capable of carrying 600 laying hens, have been erected to the specifications of the Government Poultry Expert (Mr. C. F. Anderson).

All other buildings, including cellar to hold eggs, cow shed, pig sties, and other sheds are provided by the settlers from materials on the holdings.

EQUIPMENT SUPPLIED AND WORK DONE.

The Employment Promotion Council has made provision to plough thoroughly 1 acre of gardening land, after it has been properly cleared, so that summer-growing green fodders and vegetables can be grown, and arranges to have 2 acres seeded down with Subterranean Clover and Superphosphate to provide greenfeed for a cow.

Ordinary gardening, fencing, and scrub-clearing tools are advanced, as well as greenfeed cutters, egg scales, and other poultry-handling appliances.

Seeds of vegetables and green fodders, and a few fruit trees are supplied to make certain that the homes are provided with vegetables and fruits, and that the greenfeed required by the livestock is produced on the holdings.

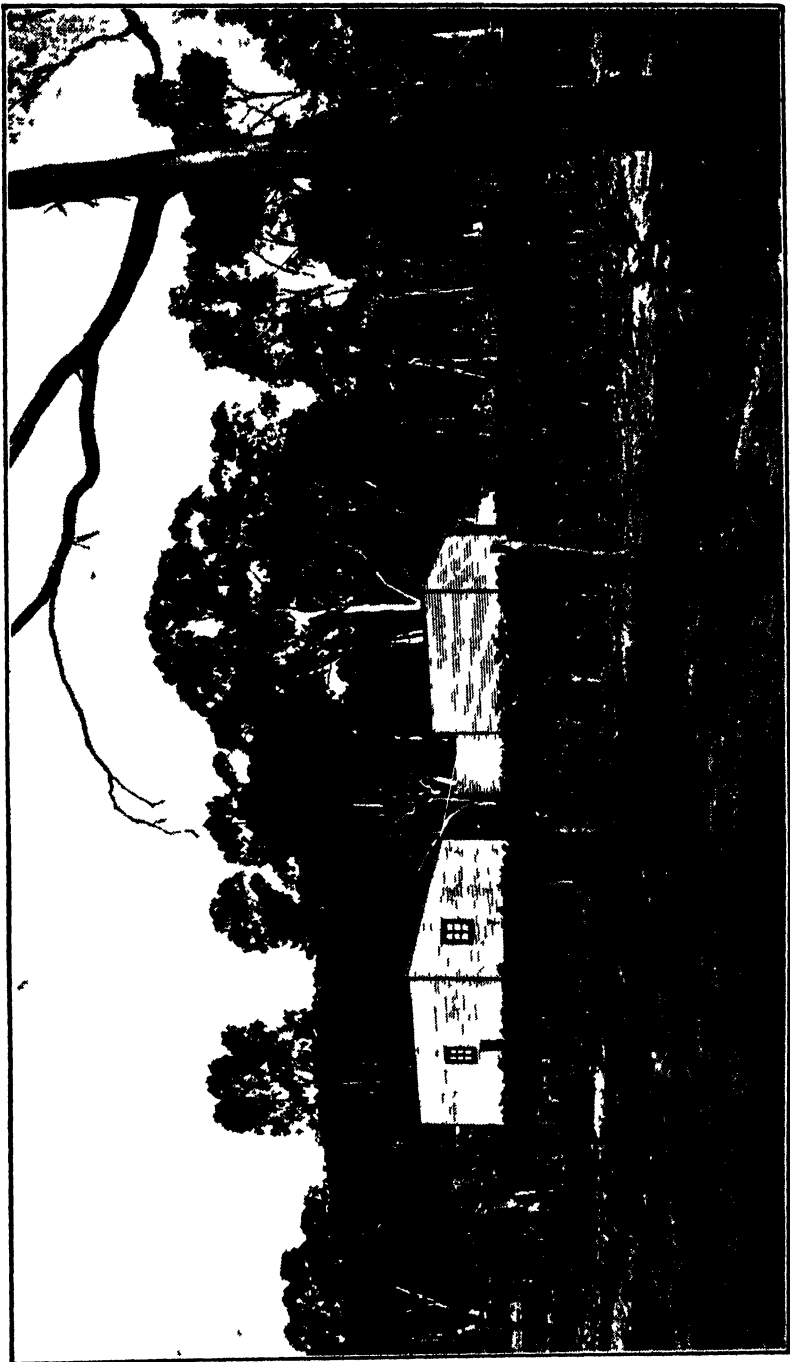


Photo 1/6 34
A plentiful supply of green forage is being grown for the birds on land which was under forest less than 12 months ago.

Ry Govt Photographer

Sufficient materials to fence the blocks, and prov to paddocks for big stock as well as some netting to protect the gardens from rabbits are forwarded to each man.

Foodstuffs for the poultry are provided from the Council's funds for at least six months after the pullets are supplied.

Where settlers prefer sinking for water sufficient rope is provided to assist in the work, otherwise contracts are let to sink earth dams to hold water.

LIVESTOCK PROVIDED.

The aim of the Council has been to supply each settler with 30 to 40 laying hens as soon as his poultry-houses and yards are ready to receive them, so that his family will have a supply of eggs for home use.

During the first Spring after occupation an effort is made to secure 400 White Leghorn pullets, eight weeks old, from the July-September hatching, and to add another 200 to the flock during the second year.

When sufficient greenfeed is available to do away with the need of providing foodstuffs, a cow is supplied, and when the cow is in occupation, a weaner pig is advanced every three months for one year, making four in all.

REPAYMENTS OF ADVANCES.

The Council has not yet decided what shall be the terms of repayment for advances made, but the present intention is to make them attractive enough to give settlers a chance of "Getting on their feet" before full interest and instalments are demanded.

REVENUE FOR THE SALE OF EGGS.

Until final arrangements have been made for the repayment of advances, settlers are receiving all monies paid for eggs, but the allocation of egg money must of necessity form a part of any financial arrangement decided upon.

SETTLEMENTS OCCUPIED.

In the search for Crown Lands suitable for the purposes of the Employment Promotion Council, a small block was found by the Land Selection Committee at Echunga, another at Bridgewater, and a very small Reserve near Jupiter Creek. Fortunately at about this time a fairly extensive block on the southern side of Willunga Hill was surrendered to the Crown which proved to be adaptable for really small holdings.

No more Crown Lands could be secured to help the Council place unemployed persons, and it then became necessary to purchase land that could be subdivided into small blocks. A small section adjoining the Echunga settlement was secured, and a good block of land at Meadows was purchased soon after.

SETTLERS PLACED ON HOLDINGS.

The land procured and subdivided by the Council is all within the heavy-rainfall zone of the Adelaide Hills, and has been subdivided to carry only as many families as have a good chance of making a success of their holdings.

At Echunga there are twelve settlers, nine of whom formed the first settlement of the Council, and three others were placed later, after purchasing a block of land adjoining the original settlement.

The small block near Jupiter Creek is occupied by one family.

At Bridgewater the block was large enough to carry four settlers.

The area on the south-east side of Willunga Hill was sufficiently extensive to be subdivided into nineteen sections, with every chance of the settlers doing well. As this group was rather isolated from the township, it was necessary to provide a school, and the name chosen for this poultry settlement was "Yundi"—an aboriginal word meaning "Feathers."



Photo 1/6/34

Although clearing land of timber is heavy work, a young daughter of a settler has already become efficient with the axe

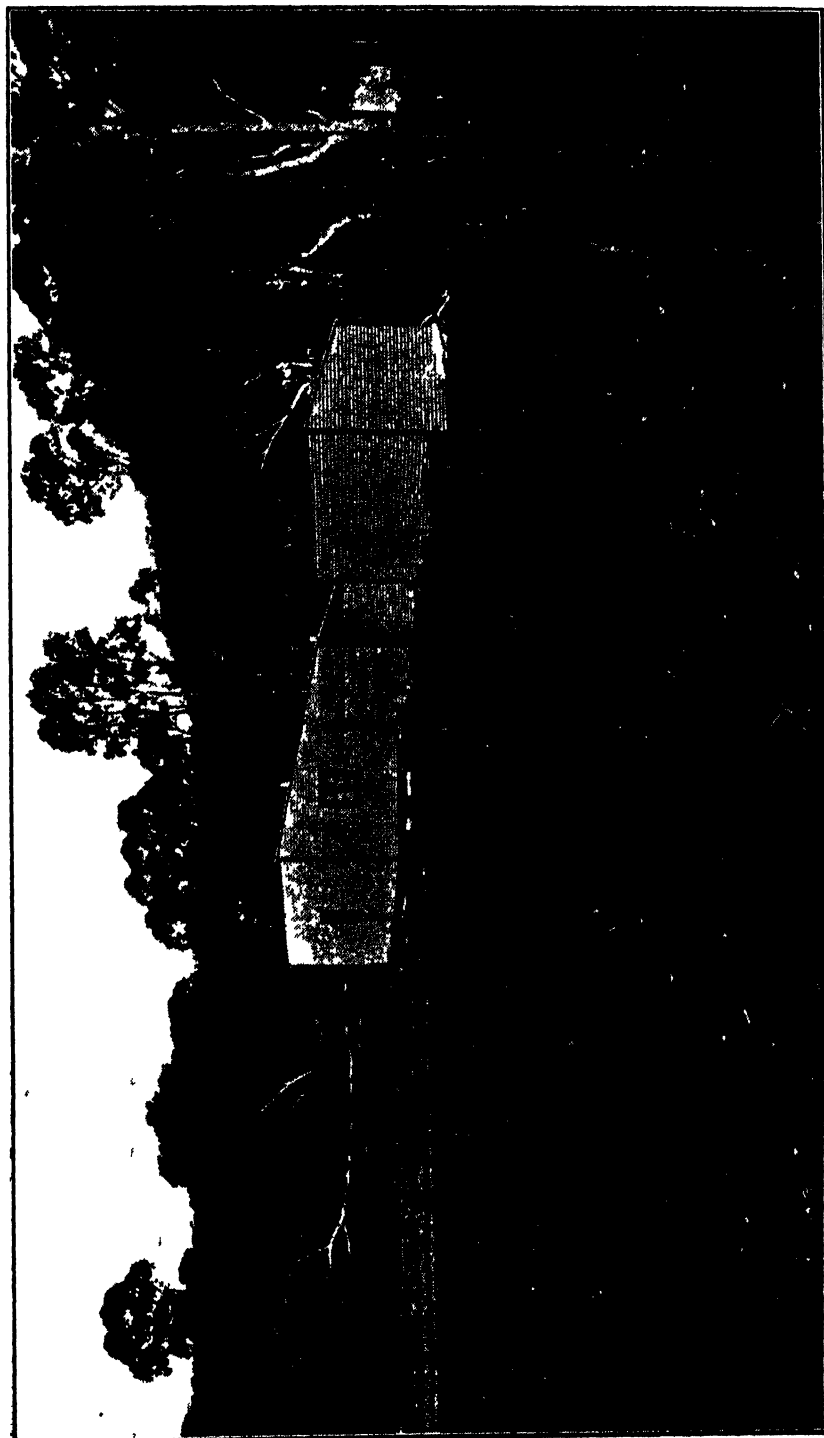
By Gert Photo lithographer



Photo. 1/6/34.

Extensive clearing and spoil from well are sure evidence of unremitting toil.

By Govt. Photo-lithographer.



Pl 00 1/6/34

A good assortment of well-grown forage plants, consisting of chou moellier, silver beet, mangels, millet and barley.

By Goot. Photo-lithographer.

After many inspections of properties in suitable districts, an area of good quality land was purchased on the south-western corner of the township of Meadows which has been surveyed into 24 attractive blocks, admirably suited to the requirements of the Council.

REARING CHILDREN IN THE COUNTRY.

Keeping in mind the intention of the Council to try and place men likely to make a success of their holdings, and at the same time to get as many children as possible out into the country where they will be reared in health-promoting surroundings, no man has been selected who has less than four children in the family unless he has special qualifications. This policy has meant that a large number of persons have been transplanted to the country, and the occupied settlements contain:—

Bridgewater	4 families	27 persons	19 children
Echunga (including 1 at Jupiter Creek)	13 families	91 persons	65 children
Yundi	19 families	142 persons	104 children
Meadows	24 families	182 persons	134 children
Total	60 families	442 persons	322 children

EXPENDITURE ON EACH SETTLER.

Although there will be slight differences for individual settlers the Council has made all its calculations on an expenditure of £400 per settler, exclusive of the purchase of land, and if nothing extraordinary happens, it appears that this sum will be sufficient to enable settlers to make a success of their holdings.

Below is set out the actual expenditure on a settler at the first settlement started, *i.e.*, Echunga, and an estimate of what is still required to put him on his feet, and in ordinary circumstances no further expenditure should be necessary for any man, still the Council proposes keeping a reserve fund in case of any unforeseen happening:—

Actual Expenditure of an Echunga Settler Typical of that Area.

	£	s.	d.
<i>Dwelling</i> (Tank—Shed—Closet)	97	8	0
Ceilings (Timber—Small-fluted Iron—Nails) . . .	4	3	2
Ridge-capping (Nails)	0	7	2
<i>Poultry Houses</i>	69	10	0
Sand for floors	0	17	6
Timber for gates	0	9	5
Feeding troughs	1	15	6
Netting	7	1	1
Guttering	3	5	2
<i>Tools</i> —			
Wheelbarrow	1	5	10
Mattock and handle	0	4	6
Spade	0	6	10
Hoe and handle	0	5	6
Rake	0	3	1
File	0	0	8
Fencing bar	0	7	6
Maul rings	0	0	6
Greenfeed cutter (cartage)	1	17	5
Broom	0	2	10
Axe	0	8	8
Egg scales	0	16	4
Egg cases (3, cartage)	0	19	4
Stencil (share)	0	0	10
Wheel hoe and seeder	3	10	6
<i>Seeds, Manures, Trees, &c.</i> —			
Superphosphate and sulphate of ammonia	1	7	3
Seeds (various)	0	18	0
Fruit trees	0	7	3
Subterranean Clover	1	6	6

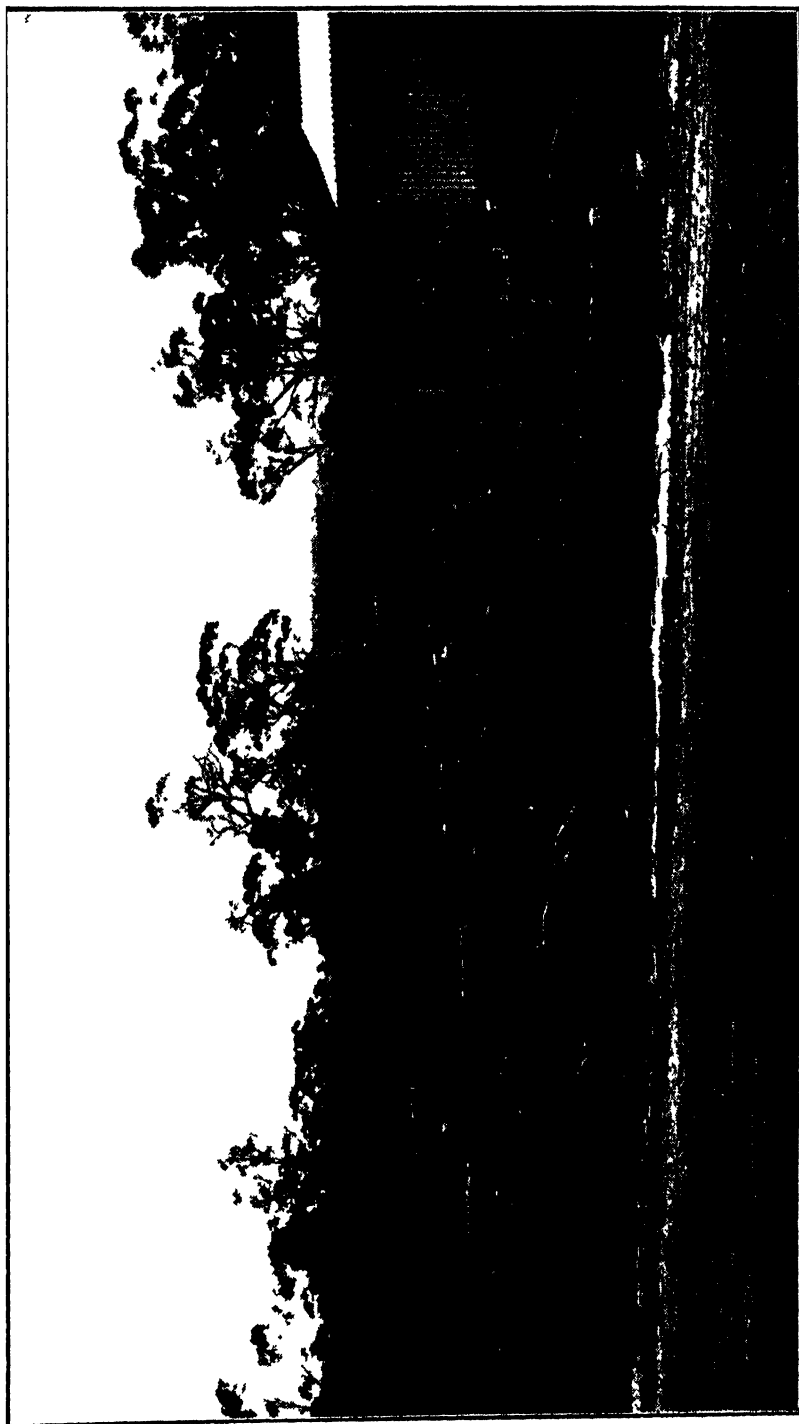


Photo 1/6/34

Well cleared land on which Subterranean clover and Yorkshire Fog grass were seeded this autumn.
By Govt. Photo lithographer

<i>Fencing—</i>		
Carting posts	0	16 9
Netting	2	13 9
Wire	1	19 5
<i>Poultry—</i>		
30 hens (cartage)	5	14 5
300 pullets	52	10 0
<i>Poultry Feed—</i>		
Foodstuffs (some cartage)	34	5 10
Shell grit	0	1 9
Lucerne chaff	0	10 6
Medicines	0	7 6
<i>Shifting Furniture</i>	1	11 5
<i>Miscellaneous—</i>		
Lease fee, rent, &c.	2	2 6
Insurance	0	11 9
Subscription to Red Comb (share)	0	1 7
Egg-laying Competition (6 birds)	2	5 0
Ploughing	1	2 6
Rope	0	3 7
Paris green	0	2 2
Cartage (not otherwise accounted for)	1	4 1
Odds and ends	2	7 5

£309 18 3

Necessary Expenditure Still Required.

	£	s.	d.
Yorkshire Fog seed (not yet charged)	0	3	0
Seeding Subterranean Clover (2 acres)	2	0	0
Pullets (300 at 3s. 9d., including cartage)	56	5	0
Cockerels (3 at 7s.)	1	1	0
Cow	5	0	0
Pigs (4)	4	0	0
Fencing materials	2	10	6
Tar" (4galls.)	0	3	6
Fruit trees	0	5	0
Egg cases (3)	1	0	0
<i>Seeds—</i>			
Subterranean Clover (12lbs.)	0	12	0
Vegetable	0	7	0
Manures (2 bags super)	0	14	0
Foodstuffs (may be required)	10	0	0
Cartage	1	0	0
Scythe, handle, and stone	0	14	0
Rent (30s. for two years)	3	0	0
Insurance (10s. for two years)	1	0	0
Red Comb Association—Subscription (2 years)	0	5	0

£90 0 0

SUPERVISION.

When the Employment Promotion Council was formed the Hon. Minister of Employment and Industry arranged that any Government Officer who could be spared was to be available to help the Council in its work, and for the supervision of the settlement. The following Officers were chosen:—Mr. S. G. Brealey (Inspector of Buildings in Police Settlement Department), who attends to all matters connected with buildings and community work; Mr. C. F. Anderson (Government Poultry Expert), who attends to the purchase of pullets and fowls, and sees that matters are proceeding in the care and management of poultry; Mr. R. Hill (Agricultural Inspector), who attends the agricultural operations of the settlement.

Without these supervisors the scheme could not function, and much of the success attained so far has been due to their enthusiasm in trying to help and encourage these unfortunate to become farmers.



Photo. 1/6/34.
Extensive improvements, as well as land clearing, have been carried out by some settlers. The cellar and woodwork structures are well built.

By Govt. Photographer

PROGRESS MADE.

Considering that the settlers being helped by the Employment Promotion Council have been in occupation of their blocks of land for such a short time the amount of work done and the general progress made is really remarkable. The first settlement to be occupied was that at Echunga, where the men went into residence in the second week in June, 1933; the Bridgewater men were transported to their homes in the first week of July of that year; whilst those at Yundi were not placed until towards the end of September, 1933. The three settlers located at Echunga No. 2 Settlement were placed in possession of their blocks in the middle of February, 1934, whilst the 24 at Meadows had their furniture shifted and their families transported to their new homes towards the end of May, 1934.

The Council made all provision to supply those settlers in residence before the end of October, 1933, with at least 30 laying hens and 400 spring-hatched pullets of an age of 8 weeks, and although poultry raisers accepted orders fully sufficient for the purposes of the Council, some of them failed so dismally that the season closed with the Echunga and Bridgewater settlers receiving 30 hens and 300 pullets, whilst those at Yundi only obtained 40 hens and 240 pullets. This shortage of pullets has naturally affected the returns received by the settlers, and must delay the day when they will get off the rations. Every effort has been made to make good the shortage from the coming spring hatching as well as to provide a further lot of pullets for each settler.

All of the earlier settlers grew some summer fodders for greenfeed for the poultry, such as Chou Moellier, Silver Beet, Mangels, Millet, and Sudan Grass, the more successful ones producing all that was required by the birds. Early in the autumn plots of Barley, Rye, and Mustard were seeded, and the growth, which is really good in most cases, is being cut for the poultry at the present time.

On all holdings, two acres of land have been cultivated and sown with Subterranean Clover and Yorkshire Fog Grass, at the same time giving a dressing of superphosphate.

Almost without exception, settlers have produced quite a lot of vegetables, some men proving themselves to be such expert gardeners that they had a surplus to give to their neighbours. Those who were in residence soon enough were supplied with a few fruit trees, some of which have done really well.

Settlers at Echunga and Bridgewater have been sending eggs to market for some time, and although dwellings were not erected at Yundi until late September of last year eggs are now being marketed from this settlement as well. Cheques received for eggs have already aggregated £200, and although the rations of settlers have not been reduced by this sum, a considerable reduction has been made.

The Council only provides a simple dwelling of three rooms, but in practically every case settlers have soon made additions to these buildings, and quite a number of them have been converted into comfortable cottages.

EFFECT ON SETTLERS.

Considering that most of the settlers have been out of work for years, or at all events have only had casual employment, it is to be expected that the allotment of a block of land, giving as it does a fresh chance in life, would have a marked effect upon them. This has certainly proved to be so, and almost without exception the men have gone into camp with the enthusiasm of schoolboys, and by the time the ballot has been taken for the blocks of land, have recovered their self-respect and gained physical fitness, so that their general appearance is quite other than when they were first interviewed by the Selection Committee.



By Goot Photo lithographer.

Glimpse of clearings through the forest trees still left standing

Photo 1/6/34

The long period of unemployment appears to have so affected practically everyone selected that their main desire is to work, and the energy displayed in clearing land, attention to crops, and care of livestock has been really remarkable,

Although the wives of settlers were not known to members of the Council before taking up residence on the settlements, the effect of this transference to a block of land they can call their own has been obvious to all visitors who have interviewed them, for they clearly show that hope has returned to them, and in practically every case they are contented to remain in the country and work hard to help their husbands make a success of their holdings.

Equally important from all points of view, and probably more so from that of the value to the State, is the fact that the large numbers of children put in these settlements are being maintained in happy and healthy conditions, seeing their parents working hard, and when old enough taking part in most of the manual operations.

POSSIBILITIES OF SUCCESS.

Land Settlement schemes involving 100 per cent. financial aid have not been very successful anywhere in the world, and it is extremely difficult to hazard a guess as to what proportion of settlers will come out on top, although now that the original settlements have been in existence for more than a year, the position looks much more hopeful than it did at the commencement. If the price of export eggs is maintained at about the figure which has ruled during the past season, and if nothing is done to interfere seriously with the acceptance of Australian eggs on the British market, it appears probable that the proportionate success will be greater than the 40 per cent. thought likely when the scheme was inaugurated. Even if a high proportion of the settlers fail to make good as farmers, the successful settlement of some of them, the rehabilitation of the men to a frame of mind and physical fitness to appreciate work, the return of hope and contentment to the womenfolk, and the fact that so many children have been reared in healthy surroundings in the country, will make the trial well worth while.

TETANUS.

The Secretary of the Laura Bay Branch of the Agricultural Bureau reports the following symptoms of a sick horse:—"Nostrils distended, ears pricked, neck stretched out and stiff, eyes rolling and turned back when the head is moved suddenly."

Replying to this question, Mr. Alan H. Robin, B.V.Sc. (Government Veterinary Officer) says there appears to be no doubt that the case is one of tetanus. The following suggestions are given for the general treatment of animals affected with this disease:—"The patient should be placed if possible in slings in a darkened and isolated loosebox, the floor of which is soft, and a purgative dose of medicine given at the outset. Quietness of surroundings on the part of the person attending to the animal is essential, and if necessary to further deaden extraneous sounds, the animal's ears can be lightly plugged with cotton wool. So long as the animal can move its jaws freely, solid food may be given, but if the jaws become locked, then all food must be in the form of slops. Every three or four hours a lump the size of a pigeon's egg of green extract of Belladonna should be placed between the animal's teeth so that it can gradually swallow it down.

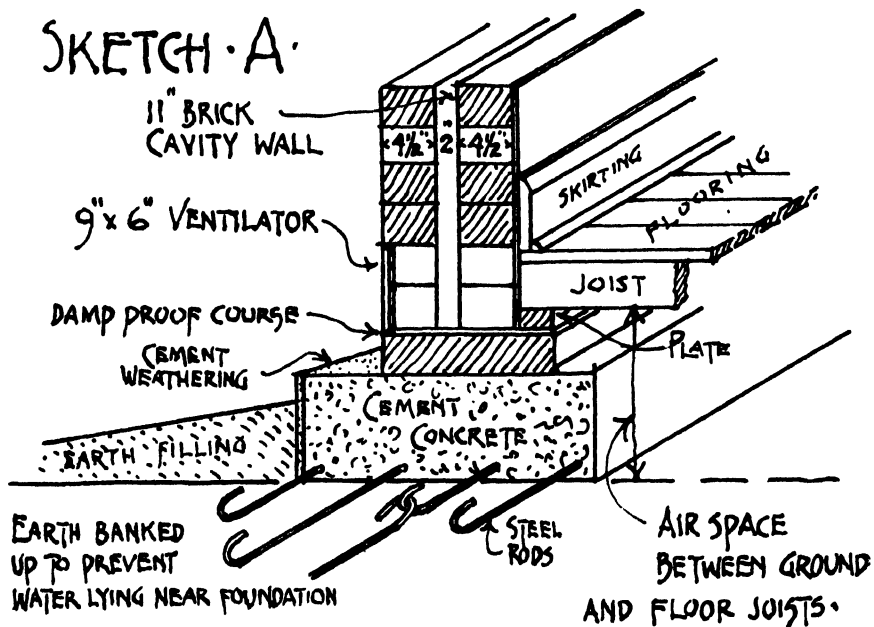
Further, if the means are available, 1½ozs. (3 tablespoonsful) of a saturated solution of Epsom salts can be injected intramuscularly or subcutaneously, half on each side of the neck, twice daily for 10 days, and then if necessary once daily for a further 10 days. These injections help to control the muscular spasms of this disease.

A very careful search should be made for any wounds through which the infection may have got in, and if such are found, all scabs are to be removed, the wounds if necessary further opened up, scraped with a knife or curette, and then packed with cotton wool plugs soaked in strong antiseptic solution or in tincture iodine, these

SOME NOTES IN GENERAL ON THE CONSTRUCTION OF BUILDINGS.

[By T. A. MACADAM, Dip. Arch. (Glas.), A.R.A.I.A., Lecturer in Architecture and Building, School of Mines, Adelaide.]

The question may be asked: What does a farmer want to know about building construction, and why should he be specially interested in it? The answer to both questions is that, as a rule, the farmer usually is the owner of the property and desires to know how to keep it in order. He is different from the average man in business, who usually rents the premises where he conducts his business and has, therefore, no interest in the property. Another reason for a farmer's special interest is the fact that farm buildings are usually situated many miles from a centre where building material and skilled labour are available. There is also the position of the farmer who is purchasing a farm, unless he knows something about the construction of buildings he may lose on the deal. A farmer beginning a new farm will save time, labour, and expense, as well as know how to make use of the materials he may find on the site if he has a knowledge of the construction of buildings. Then again there is a period of the year when the farmer is not working full



time, and he may not be able to keep all his labour employed. This period gives him an opportunity to repair his buildings, alter them, or make additions, if necessary.

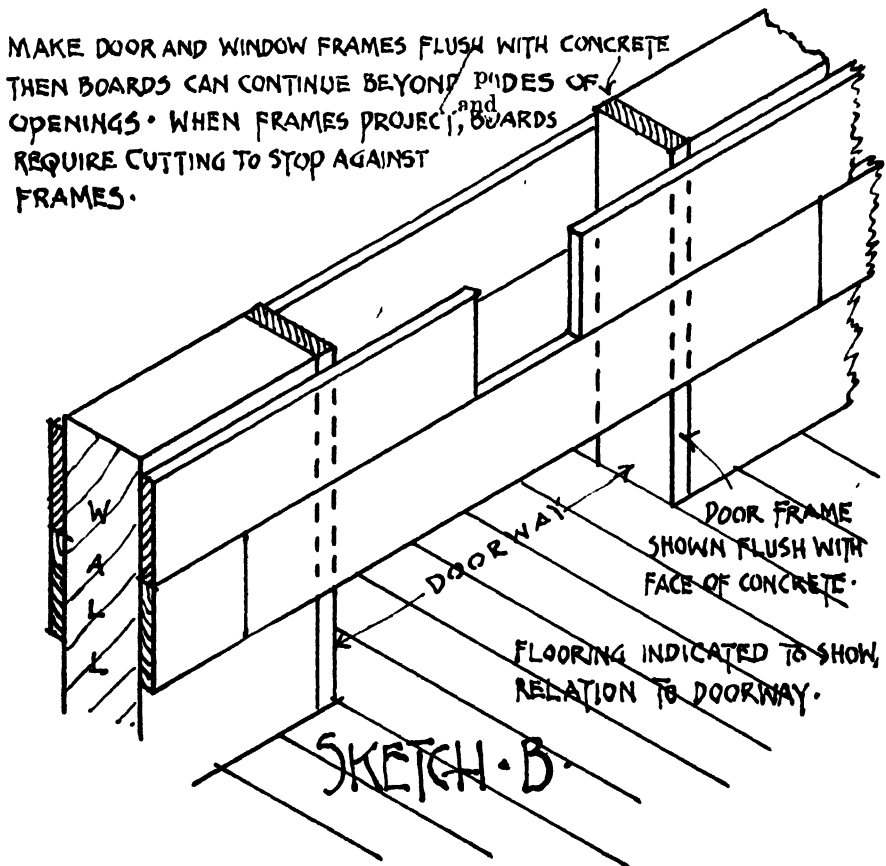
In building construction, labour, generally speaking, is a large factor in the cost. If the farmer has the labour he only requires the knowledge of construction to use that labour to the best advantage and in this way keeps the cost down.

Taking a general survey of building construction first, the more important points, such as a good foundation, ventilation, prevention of damp, &c., may be referred to, and the simplest procedure will be to take a building, such as a house, for the base of our subject.

FOUNDATIONS.

Beginning with the foundation, unless a building has a good foundation it will be a source of trouble and expense later. To be sure of a good foundation, whether it be of concrete, stone, or a stump foundation, the first point to notice is, that the ground which supports the foundation is properly drained. (See sketch A.) No water should be allowed to collect near the foundations. Next see that the soil is strong enough to support the foundation. The heavier the building the stronger the soil must be. Foundations should be level. A sloping foundation will tend to move with any vibration.

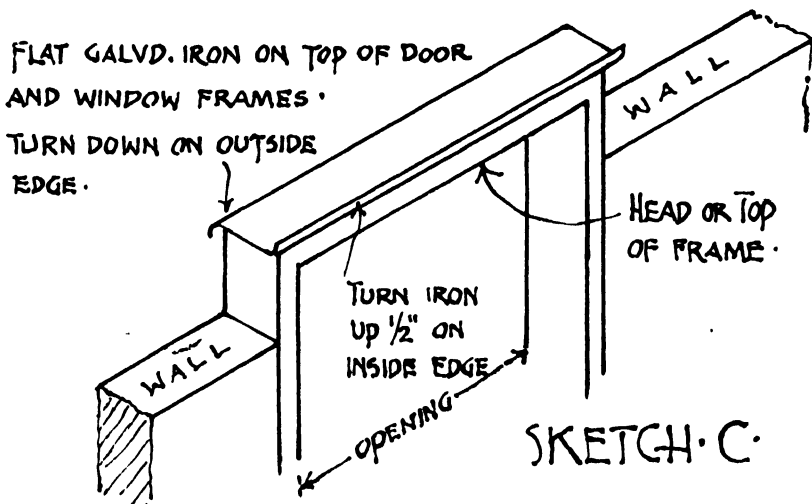
In modern building construction cement concrete is largely used for foundation. Lime concrete is used where limestone can be obtained locally. Stumps or short posts are also used, chiefly for wood or iron buildings.



Whatever materials you use see that they are fresh, clean, and, if possible, new. Do not use old cement, old lime, or faulty timber if the best results are desired.

As cement concrete is used so much for foundations as well as for other parts of buildings, a few details concerning it will not be amiss. The mixing of the materials must be done carefully if the maximum strength is to be obtained. This requires some knowledge of the materials which are being mixed. For example, the sand may be fine or coarse and the gravel may be large or small, and these would affect the mixture and the strength. (See the article on "Concrete on the Farm," by W. Trestrail, in the *Journal* for August, 1933. Also "Cement Concrete Posts for Fencing," by W. J. Spafford, published in Bulletin No. 225.)

Several points are essential in the mixing, one being the proportioning of the parts of gravel, sand, cement, or lime, another the thoroughness of the mixing of the materials, and mixing with the minimum of water. Mix the materials on a clean, hard surface and use a measure, such as a kerosene tin or wooden box, to get the proper quantities of each material. Do not mix any more than you are going to use at the time. After depositing the concrete in its position see that it is made as solid as possible by spading it or use a trowel to get an even surface. The next step is to see that the concrete is kept wet or damp for some time after it is in position, as this will tend to increase the strength of the concrete. The warmer the weather the longer the concrete should be protected. The increase in strength in the concrete will more than repay the time and labour involved in protecting it. While on the subject of cement concrete, a reference should be made to reinforced concrete. Most concrete foundations are reinforced with steel rods for the reason that the strength of the concrete is greatly increased when steel rods are used to reinforce it. Place the rods lin. from the bottom of the foundation and in



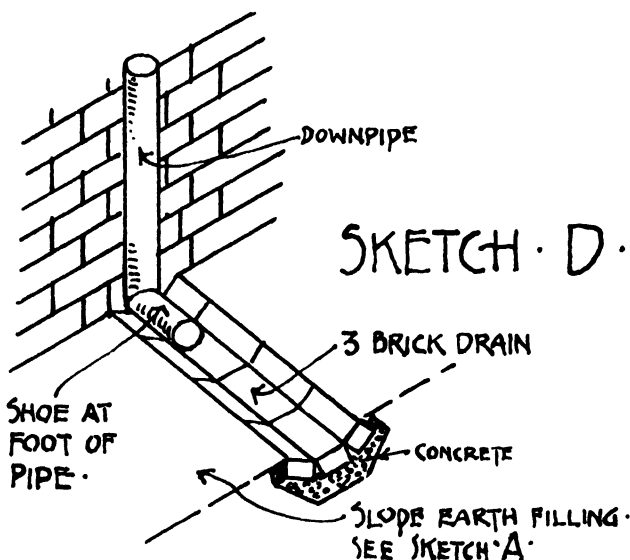
a similar position at the top of the foundation if necessary. Keep the rods straight in their length, and hook them together at junctions. (See Sketch A.) Overlap them at corners.

WALLS.

Having placed the foundations in position, the next step is to build the walls. These must be strong enough to support the roof, &c., and keep out the weather. They may be built of stone, brick, concrete, or wood and iron. Whatever the material, precautions should be taken to prevent damp from reaching the inside of the wall. Damp may rise from the ground to the inside of the wall, and to prevent this in the case of masonry walls a damp proof course of tar and sand, lin. thick, is spread over the full thickness of the wall above the outer ground level. In very wet districts two layers 12in. apart, may be used. Damp may also penetrate through the wall from the outside. To overcome this, the simplest and best way is to build a cavity wall. (See sketch A.) With brick walls it is simple, but where stone is in use it is a different proposition owing to the stones being of various sizes and shapes. If bricks were obtainable it would be better to build the outer portion in 4½in. brick and have a 2in. cavity between it and the 12in. or 14in. stone wall inside. Where stone has to be used special care must be taken when building the walls so that the joints between the stones will not become channels for the water to find its way to the inside. Stone, like brick, is porous and will be a conductor of moisture, so that every precaution has to be taken to

keep the damp out. The undersides or beds of the stones should be built level and the joints properly filled with good mortar. Lime mortar is composed of three parts of clean sharp sand and one part of run lime, well slaked. See that they are thoroughly well mixed.

The walls may be built of concrete, either by placing the concrete in position direct or by making concrete blocks and building them in position later. Considering the block method first, the blocks are made by mixing one part of cement with seven of sand, and damping only sufficiently to enable the mixture to hold together when pressed into the hand (like flour). Place the mixture in the mould and ram tightly and evenly. When block is removed from the mould keep it covered with damp bags for a week. The size of the blocks would be approximately 9in. x 6in. x 6in. The principal advantage blocks have is that they can be made in spare time and stacked for use. With a solid concrete wall certain precautions should be taken. If the walls to be built are walls exposed to wet weather a mixture must be used which will make a weatherproof concrete. This means a richer mixture than would be necessary for walls which are protected by verandahs or by walls of other buildings adjoining them. It would be advisable to use one part of cement, two of sand, and three of gravel. Place the concrete in the wall in layers 9in. to 12in.



in depth and ram it well. At door and window openings see that the wooden frames do not project beyond the line of the concrete or the boards will require to be cut at each frame. When the walls are being built, whether in brick or concrete, the frames for the windows and doors are usually built into them. They are fixed to the wall by galvanized iron straps which are built in. On the tops of all frames flat galvanized iron should be fixed to protect them from damp which may affect the wood.

ROOFING.

The walls being erected, the next step is the roofing. This is usually a simple matter, but care should be taken to see that the roof is well secured to the top of the walls where it rests. It is not sufficient to rest the roof on the walls, it should be bolted down or strapped down. In addition to being a fixing for the roof it also assists in tying the walls. Another point to observe is the roof should be braced. Bracing is necessary if the roof is to stand any exceptional wind pressure.

Various materials are used for roof coverings, such as slates, tiles, &c., but none is so good and cheap as corrugated galvanized iron. Like all other materials, it has

fixing. In very exposed situations or where the wind can get in below the iron, such as an open verandah roof, special precautions should be taken. The ordinary galvanized nail is not sufficient to keep the iron down on such roofs. Galvanized roofing screws should be used, and every other flute secured. When nailing or screwing down iron see that the head of the nail is not driven below the top of the flute, as depressed flutes allow the rain in. It will pay to use a good washer with the roofing nails or screws. When walking on a galvanized iron roof see that you walk on the part which is nailed, as the iron is supported there, and there is not the same likelihood of the flutes being dented. If a roof has to be walked on frequently, then boards should be placed on the roof for the purpose. If this is not done the nail holes gradually get widened until they are not weatherproof. When fixing the gutters in position see that they have a fall towards the rainwater tank or downpipe. If there is not sufficient fall in a gutter then there is a tendency for water to lie in the gutter until it dries out, and while drying out it is likely to rust the gutter. It will pay to examine the gutters before each winter and have them thoroughly cleaned out. In addition to preventing debris and leaves, &c., from entering the rainwater tank or downpipe, it also prevents, to a certain extent, the rusting of the tank, if it is an iron one. When placing the downpipes in position, see that they are placed so that the water from them will run away from the building and not lie near the base of it. A good plan is to put a shoe on the end of the pipe, and below the shoe put a length of concrete or brick drain, about 8ft., which will convey the water some distance from the house before it begins to soak into the soil.

VENTILATION.

While on the subject of roofs, the question of roof ventilation might be referred to. This is a matter which is very frequently neglected. Between the ceiling and the underside of the iron roof the air space enclosed should be ventilated as much as any room of a house. This can be done in several ways, and it does not matter much which way is adopted, provided it makes for good ventilation. Someone may say: Why is it necessary to ventilate the roof space? Well, if that person will go into a roof which is not ventilated on a hot day, and then go into one which is properly ventilated, the reason will be obvious. Apart from the necessity for ventilating the roof timber, it makes for a cooler building. Inlet and outlet ventilation must be provided if it is going to be effective. Various forms of ventilators are on the market for the purpose. The same attention should be given to the ventilation of the air space below the wooden floor (See sketch A.) Before a floor is laid the space which is going to be covered should be cleared of all debris, especially scraps of timber. Any timber left under a floor will only encourage white ants and other insects. Openings should be placed in all outside and inside walls below the floor to ensure a thorough current of air, the more openings the better will be the ventilation. The reasons for ventilating the space under the floor are as follows:—(1) To ventilate the timber under the floor. (2) To prevent dry rot and white ants. (3) To keep the space dry and free from damp or wet rot. (4) To keep the building cooler in hot weather and generally make it healthier to live in.

(To be continued.)

CATALOGUE OF SCIENTIFIC PERIODICALS.

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THE WANDERING GRASSHOPPER.

[A report by Mr. H. D. Adams (Agricultural Instructor) on the appearance of grasshoppers on Eyre's Peninsula has been submitted to Dr. J. Davidson, D.Sc., of the Waite Agricultural Research Institute, whose remarks on the life history of the insects and on suggested control measures are given below.]

The grasshopper which has been recently present in large numbers over certain areas of southern South Australia is a small brownish species with silvery wings. It is known as the Wandering Grasshopper (*Chortoicetes terminifera*), and occurs over wide areas in Australia, more particularly in the drier regions.

The female lays its eggs in areas of bare soil; the eggs are contained in an egg-sac which is buried in the soil by the female, with the aid of its ovipositor.

The insects occur throughout the summer months, and the eggs which are laid in the autumn take a long time to develop, owing to the low temperatures; they usually hatch from September to November, according to district and the weather during the winter months. From these eggs the young wingless "hoppers" emerge. They feed on the vegetation and eventually become winged. When winged they make somewhat indefinite migrations in swarms. The swarms may be patchy and not evenly distributed over an area. This appears to be due to the adults of a swarm laying their eggs in a restricted area. There is very little definite detailed information regarding the habits of this species in Australia. There appear to be two or three broods during the summer. These broods overlap, and this would be the explanation of a report that the young grasshoppers were hatching out in the Minnipa district.

The grasshoppers in general keep to cleared, open type of country. They do not normally extend so far south in South Australia as occurred this autumn. The present occurrence may be due to the prolonged dry weather.

If the swarms extend late into the autumn, the insects may damage young wheat crops and lucerne. The conditions which influence the survival of the eggs in the soil during the winter are not known; it is possible that the wet, cold conditions in the southern portion of this State are unfavourable for the survival of many eggs. If this is so, the hoppers may not be so numerous, when the over-wintering eggs are due to hatch in the spring. The number of grasshoppers present this autumn suggests they may occur in numbers if the eggs can withstand the winter conditions.

The numbers of the grasshoppers vary in different years; this appears to be due to weather conditions, but definite information with regard to this species is small.

The best control is obtained by destroying the "hoppers" soon after emergence from the eggs. Spreading arsenic bait in the line of their advance is the usual method. The poison bait can also be used against the winged forms, but it is more effective against the hoppers.

Observations should be made from about the end of August, to see whether hoppers are hatching out; these situations should be defined so that bait treatment may be used where desirable. Co-operation amongst the settlers in this respect would be helpful.

Some observations on this species of grasshopper and control measures were given in the *Agricultural Gazette* of New South Wales, and the following poison bait was recommended:—

Arsenite of soda, 1lb., or paris green, 3lb. to 1lb.

Molasses, 4lbs.

Bran, 24lbs.

Water, 3galls.

The arsenite of soda is dissolved in hot water. After cooling, the molasses are added and stirred until dissolved. This liquid is added to the bran and mixed to form a crumbly mash. If paris green is used the powder should be added to the dry bran; water is then added to make a crumbly mash. The bait is spread at the rate of 20lbs.



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THE IMPORTANT PASTURE PLANTS OF SOUTH AUSTRALIA, CONSIDERED AS TO THEIR INDENTIFICATION AND CHARACTERISTICS.

[By E. M. HUTTON, B.Ag.Sc., Field Officer.]

INTRODUCTION.

In general a pasture consists of a mixture of grasses, clovers, and other plants which are often termed weeds. In this paper it is intended to review pasture plants found in natural pastures as well as those which are now sown in pastures to improve their productivity. For the purpose of the paper, pasture plants will be considered in three sections, viz., the grasses, the clovers, and plants other than grasses and clovers.

A. THE GRASSES.

All grasses belong to the large grass family or *Gramineae*. Grasses are made up of fibrous roots, stem, leaves, and seed head. For the purpose of identification, leaves are important during the non-flowering or vegetative period, while the seed heads are important when the grass is approaching maturity. The roots are important in the identification of the Canary grasses.

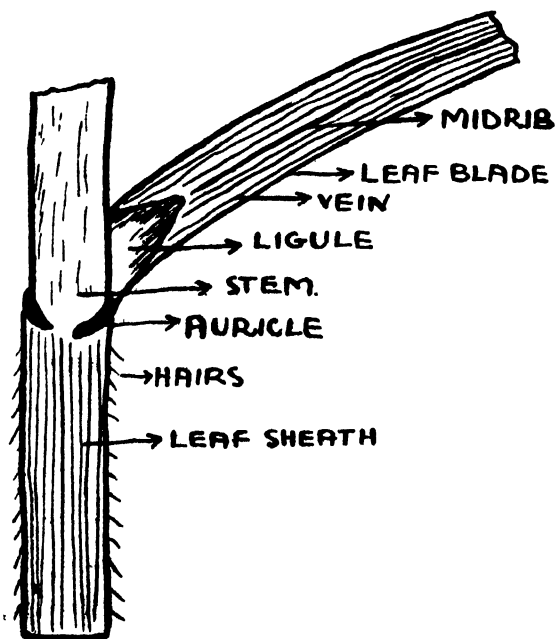


Fig. 1.—Showing parts of a Grass.

The leaves have a lower portion, the leaf sheath which sheaths or surrounds the stem, and an upper free portion, the leaf blade (see Fig. 1).

Running the length of the leaf blade is a number of parallel veins, the central one being thicker and known as the midrib. At the junction of the leaf sheath and leaf blade are found the ligule, and in some cases the auricles (see Fig. 1). The ligule is a small whitish or colourless flap which presses against the stem. Often the ligule is very minute and in some cases is represented by a semicircle of hairs. The auricles are a pair of small clasping processes which hold on to the stem.

The presence or absence of hairs on the leaves or near the ligule, and the character of the emerging leaf shoot, *i.e.*, whether spirally rolled or flattened are important points in identification. There are two main kinds of seed heads:—An open branched one or panicle, and an undivided one or spike. The parts of the seed head which bear the seeds are called spikelets (see Figs. 2 and 3).

The grass family can be divided up into a number of groups or genera, the grasses within each group resembling one another.

I.—THE RYE GRASS GROUP OR *LOLIUMS*.

These are hairless grasses with a pair of auricles. Leaves have a characteristic bright green colour. The lower surface of the leaf blade is smooth and shiny, while the upper surface is ribbed. The leaf sheaths at the base of the plant are purplish.

The seed head of the Rye grasses is in the form of a characteristic spike (see Fig. 2), each spikelet being placed edgewise to the stalk. True Perennial Rye Grass has a very slender seed head, while Drake or Darnel has a coarse seed head, each spikelet being very much swollen when mature.

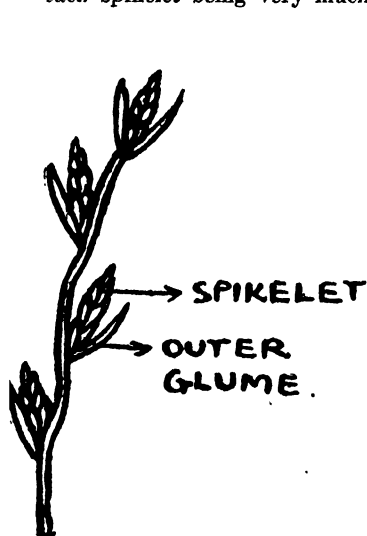


Fig. 2.—Showing Spike of a Rye Grass.

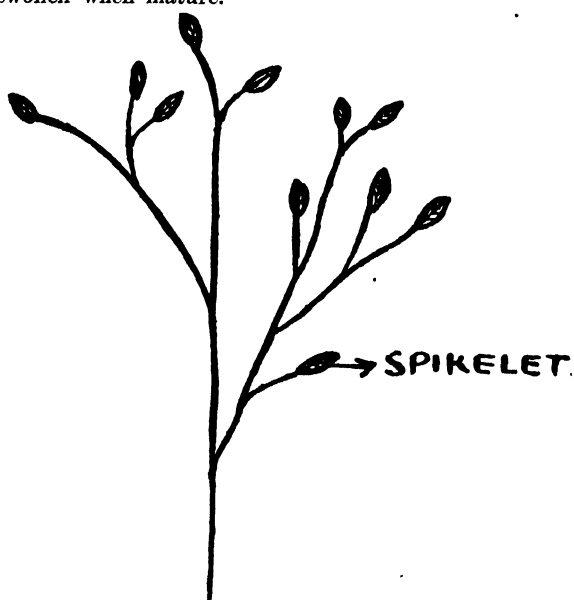


Fig. 3.—Showing Open Panicle of Weeping Love Grass.

1. TRUE PERENNIAL RYE GRASS (*Lolium perenne*).

In an established pasture Perennial Rye Grass can be recognised by its perennial tufted habit. Young plants can be recognised by the general rye grass characters, and by the fact that the emerging leaf shoot is sharply flattened (see Fig. 4). This distinguishes it from Wimmera Rye Grass in which the emerging leaf shoot is definitely rolled.

True Perennial Rye Grass is very resistant to grazing and is ideal for milk and butter production. It needs heavy soils high in nitrogen, *e.g.*, heavy dark loams and clays. In addition it needs the more temperate conditions and 20-25in. rain is probably about the minimum for persistence and productivity. Perennial Rye Grass is very persistent around gates, stables, and under trees where it withstands the trampling of stock, and benefits from the dung and urine. It shows all the advantages of a perennial, *e.g.*, rapid production feed with first autumn rain. In the year of planting it is very vigorous and has a strong

depressing effect on slower establishing grasses like *Phalaris tuberosa*. Once established it is necessary to keep up the nitrogen supply of the soil by stimulating clovers with a topdressing of superphosphate. With a heavy rainfall it may be of advantage to apply dressings of sulphate of ammonia.

2. WIMMERA RYE GRASS (*Lolium subulatum*).

The identification of this grass has already been mentioned. As its name implies, it originated in the Wimmera district of Victoria, and it is believed to be a cross between Perennial Rye Grass and Italian Rye Grass.

Wimmera Rye Grass will grow successfully in the cereal cultivation belt, and it should become important where the rainfall is less than 20in., e.g., Lower and Upper North. It forms an ideal temporary pasture for farmers—if about $\frac{1}{2}$ h. per acre of Wimmera Rye Grass is sown with the wheat in autumn at harvest time the seed formed will be scattered by the harvester. This seed will then produce an excellent temporary pasture for sheep the next year.

Wimmera Rye Grass possesses the main disadvantages of all annuals, i.e., before a bulk of feed is produced the seed must germinate and the plant must be given time to develop. It produces seed rapidly on the advent of dry conditions, and thus it should be spelled in late spring to allow of seed setting.

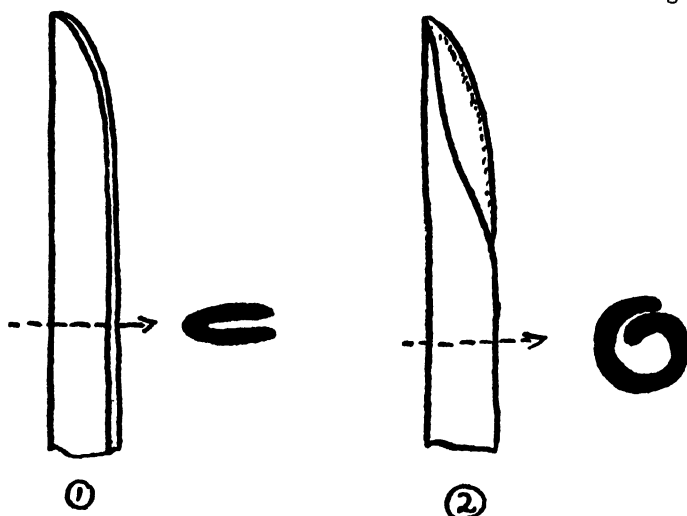


Fig. 4.—The Emerging Leaf Shoots. In (1) True Perennial Rye Grass, (2) Wimmera and Annual Rye Grasses. In each case a shoot cut across is shown.

Like Perennial Rye Grass it has a high nitrogen requirement. Thus it thrives well on a fallow, and after Subterranean Clover or Pease. Tilth and a good nitrogen level in the soil appear necessary for Wimmera Rye Grass. In the absence of cultivation, and Subterranean Clover or nitrogenous manures, it will tend to disappear gradually. Cultivation is necessary to cover the seed for germination. Thus it appears necessary to cultivate Wimmera Rye Grass pastures every two or three years, and grow Subterranean Clover in conjunction with it.

3. ITALIAN RYE GRASS (*Lolium Italicum*).

This is not important here, because it flowers very late with the result that the delicate flower structures are dried up by the summer heat and no seed is formed. It has a rolled leaf shoot and has strongly awned spikelets.

4. RIGID RYE GRASS (*Lolium rigidum*).

This is a common weed which is the shortest of all the rye grasses. It has characteristically curved leaves. It produces very little seed, and has a low food

5. DRAKE OR DARNEL (*Lolium temulentum*).

This is a tall growing weed, which is often poisonous to stock because of the presence of a fungus. It can be recognised by the mature spikelets being greatly swollen.

II.—THE CANARY GRASS GROUP OR PHALARIS GRASSES.

Like the *Loliums*, these are hairless. They possess no auricles and the emerging leaf shoot is rolled as in the annual rye grasses. They have a very large ligule, and if the young shoots are cut near the base, the sap will be found to be purple.

The *Phalaris* grasses have a characteristic seed head, the flower scales of which are oval and marked with white and yellowish-green stripes (see Fig. 5).

1. TOOWOOMBA CANARY GRASS (*Phalaris tuberosa*, ALSO KNOWN AS *Phalaris bulbosa*, *Phalaris stenoptera*, AND *Phalaris stenophylla*).

With young plants having the general characters of the *Phalaris* group, *Phalaris tuberosa* is indicated if the young root tips are almost colourless and the stem base is pink. In the case of the non-persisting annual *Phalaris minor* or wild Canary grass, the young root tips are a bright pink. If one is doubtful of the seed bought, a germination test by placing seeds on moist blotting paper in a warm place should be carried out: Colourless root tips show *Phalaris tuberosa*, yellow root tips show *Phalaris canariensis*, bright pink root tips show *Phalaris minor*.

When the young *Phalaris tuberosa* plants stool, the additional stems arise below the soil and then grow through the soil at an angle before reaching the surface, and this makes it very resistant to grazing. Established plants show up as

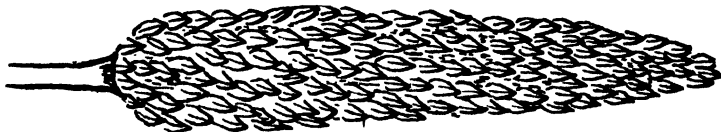


Fig. 5.—Showing seed head of *Phalaris tuberosa*, which is 6-8 times as long as broad.

vigorous perennial tufts which tend to increase in circumference. The leaves are broad, light green, and succulent.

Phalaris tuberosa is especially prized, because it produces greenfeed with the first autumn rains, and is able to resist the hot dry summer because of its underground swollen stems and long roots, which penetrate deeply into the moist subsoil and keep the plant alive.

It has been grown successfully in rainfalls varying from 17-36in., and is admirably suited for grazing cattle. It appears to do better on the heavier soils, but should persist on light soils with a heavy subsoil.

In the first year, *Phalaris tuberosa* does not tiller very actively, during which time it must be carefully handled to prevent eating out of this relatively slow establishing grass. In the second autumn the grass is highly vigorous and becomes firmly established. It might be interesting to note here that recently I observed some *Phalaris tuberosa* plants which have persisted through the severe summer droughts of the last few years on Mr. H. K. Moore's property at Jamestown.

2. THE WILD CANARY GRASSES (*Phalaris minor* AND *Phalaris canariensis*).

These grasses grow under the same conditions as are favourable to wheat. *Phalaris minor* is the common one found, while *Phalaris canariensis* is never found wild and is cultivated for canary seed.

They are easily distinguished from *Phalaris tuberosa* by their annual habit, and the colour of their young root tips.

Although they are excellent fodder plants producing soft succulent feed, they disappear under grazing and have the disadvantages inherent in all annual grasses.

(To be continued.)

PASSION FRUIT GROWING.

[By GEO. QUINN, Chief Horticultural Instructor,]

The principal points in securing good results in the cultivation of this plant may be summed up as follows:—

It is desirable to have a good, rich, free-working, well-drained soil located in a place not subject to very heavy frost during the winter months, as these plants are very readily injured by severe frosts.

The kind of Passion Fruit usually grown is the ordinary *Passiflora edulis*, which comes practically true from seeds.

The general method of raising passion vines is to take the seeds out of good types of fruits and sow them straight away—before they have had time to dry out—in boxes or sheltered beds made up of good, free, sandy soil which can be kept well watered. The seeds are covered to a depth of about $\frac{1}{2}$ in. with loose soil made up of sand and rotted manure, which is pressed fairly firmly on to the seeds. The fruits selected about June may be kept until August in a cool place, when the seeds are extracted and sown.

The seedlings, when sufficiently advanced—that is, when they are 4 in. or 5 in. high, should be transplanted either into boxes or pots in the first case, placing them about 4 in. apart, so that they may be lifted with a ball of earth when ready to go out into the orchard. The young plants should be trained to a single stem. They are planted in the field in rows very much like grape vines are, the rows being 9 ft. or 10 ft. apart to allow for implements to cultivate the soil, and the plants are set out from each other in the rows about 6 ft. to 8 ft. They are trained somewhat fan-shaped on a trellis resembling a 5-wired fence, but above the height of an ordinary agricultural fence. Plants may be bought from nurserymen at about 6d. each, and set out of the pots without receiving any check.

The best time to set out these plants is in the early spring when most of the frosts are over, but they should be watered in when planting, and kept watered about once a fortnight for the first three months—if it is only a matter of giving them a bucketful of water. The tillage necessary approximates to that usually given grape vines; whilst the pruning consists of cutting out exhausted shoots as they accumulate, thus keeping up a supply of laterals on which the fruits are carried.

As to the profitable character of growing them, that would depend very much on the time when the fruit becomes available for marketing, but they have the advantage over most fruits, that they are not readily injured by ordinary transport procedures. It never appears to be very cheap, and no particular effort has been made to push the sale of it or to induce greater quantities being used. It is doubtful if it would be a wise procedure for anyone to take up the growing of passion fruit only, on a large scale, until, at any rate, one becomes accustomed to the requirements of the market and the methods of handling the crop and the plants.

BORERS IN STONE FRUIT TREES.

[By GEO. QUINN, Chief Horticultural Instructor.]

The principal borer attacking stone fruit tree stems and limbs is the larva or caterpillar of a moth figured in French's "Destructive Insects of Victoria," Part I., page 112, under the name *Maroga gigantella*. (It is more often now called *Cryptophasa unipunctata*.) The moth has a wing spread of about 2½ in., the front wings being creamy white in colour with a single dark dot—hence the name "unipunctata"—in the middle of each wing. The hind wings are of a plain gray colour. The fully grown caterpillar found in the tunnelled wood is about 1½ in. long by nearly a quarter of an inch thick. The head is black and the next two or three

segments dark-brown; the rest of the body of a pale creamy-yellow colour. It is a native insect, and the larvae are often found in Banksia or native honeysuckle trees.

The moths deposit their eggs in crotches or forks where limbs join the trunk or on the trunk itself, and particularly like places where gum may have exuded owing to some damage or twist. When the small caterpillars hatch, they gradually tunnel under the bark and raise masses of sawdust-looking frass. They continue boring in these softer parts until fairly well grown, and then they strike into the hard wood of the limb or stem. There is not, to my knowledge, any effective way of preventing the moths depositing on the trees—though winter oil sprayings may do so—but the young caterpillars soon reveal their presence by the evidence of the newly pushed out sawdustlike borings. If when the stone fruit trees—including almonds—are bare of leaves, it needs no very close scrutiny to detect these evidences of boring having commenced.

At this early stage a strong knife or scraping tool will quickly remove the shallowly located borers, and a coating of Stockholm tar or old paint will cover the wound from the wet or drying air. At these early stages only very minute semi-transparent grey-looking little caterpillars are found. If not dealt with in the early stages, the caterpillars—as previously remarked—tunnel into the wood and may take either an upward or downward or devious course.

The best procedure when borer hunting is to scrape away sawdust, gum, &c., until the mouth of the tunnel is revealed. Push a flexible wire in as a probe and note whether the end is wet or slimy when withdrawn—indicating the pest is well punctured. If the tunnel is very irregularly bored, the wire will probably fail to prick the culprit. It then becomes necessary to suffocate the borer, and the best reagent is Carbon Bisulphide put on to a little cotton waste or wadding, and thrust into the tunnel, which is immediately plugged airtight with clay or a close-fitting wooden plug. I am told that the fumes of ordinary petrol evaporating from cotton

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or wool waste used in a similar manner will also kill the borers, but have not tested it. The fumes of burning sulphur would be effective if they could be injected into the tunnel before closing it against their escape.

These pests are not difficult to control, but careful attention during each winter is desirable where the pest has been found much in evidence. The South Australian raised varieties of almonds are most prone to "gunming" and this encourages the egg-laying upon such sorts.

ENSILAGE COMPETITION—HILLS DISTRICT.

The following are the results of the Ensilage Competition conducted by the S.A. Committee of Australian Dairy Council and judged by Mr. R. Hill (Agricultural Instructor):—

Competitor.	Address.	Position.	Suitability of Plants. 15	Success- lency. 20	Palata- bility. 15	Nutritive Value. 35	Percent- age of Waste. 15	Total. 100
A. E. Francis (No. 1.)	Bugle Ranges	1	13	19	14	30	14	90
F. P. Smith ..	Blackwood	2	14	19	14	28	14.5	89.5
A. E. Francis (No. 2.)	Bugle Ranges	2	13	16.5	14	32	14	89.5
B. Stephenson (No. 1.)	Mt. Barker Springs	4	13	18	14	31	13	89
H. A. Woolley	Mt. Barker Junc.	4	14	16	14	32	13	89
Mrs. A. A. Liebelt	Little- hampton	6	14	14.5	14	31	13	86.5
B. Stephenson (No. 2.)	Mt. Barker Springs	7	13	17.5	13	29	12	84.5
R. J. Clements	Northfield	8	12	17	15	25	15	84
A. Sparrow (No. 1.)	Sandy Creek	8	14	16	14	26	14	84
D. F. Sheppard	Prospect Hill	10	13	16.5	14	28	12	83.5
A. Sparrow (No. 2.)	Sandy Creek	11	12.5	14.5	13	28	14	82
J. M. Irwin...	Mt. Barker	11	13	15.5	13	28	12.5	82
T. Smee	Charleston	11	14	12	13	30	13	82
J. H. Dawkins	Gawler River	14	12	14	13	29	12	80
R. J. Baker ..	Two Wells	15	14	7	13	32	13.5	79.5
A. V. Lehmann	Callington	15	12	16.5	13	27	11	79.5
T. B. Brooks .	Clarendon	17	14	11	13	26	13	77
C. Smart	Clarendon	18	12	15.5	11	25	10	73.5
H. F. Ouston	Oakbank	19	13	6	13	28	13	73
J. O. Anderson	Bolivar ...	20	12	4	12	33	12	73

In a detailed report on the entries Mr. Hill stated that the winning stack, exhibited by Mr. A. E. Francis, of Bugle Ranges, was 12ft. x 12ft. at the base, reduced to 9ft. square at the top. The crop was cut very early, as soon as the Silver grass commenced to show heads, and the stack was covered with earth 1ft. in depth. The mixture consisted of Subterranean clover, a big percentage of Silver grass, some soft Brome grass, sterile Brome grass, wild oats, and some Perennial Rye grass. The result was excellent ensilage with very little wastage. The labour used to cut and weight the stack (which contained approximately 25 tons) and 47 hours for a man and a youth, using a sweep and grab; and a further four hours were occupied in erecting the grab and in other preparations.

TURRETFIELD SEED WHEAT.

HARVEST REPORT—SEASON 1933-34.

[By R. C. SCOTT, R.D.A., Supervisor of Experimental Work, and F. E. WADDY, Farm Manager.]

The Turretfield Farm lies in the hundred of Barossa and adjoins the township of Rosedale. In situation it is placed about 35 miles north of Adelaide or 10 miles in a north-easterly direction from Gawler. The total area is 1,604 acres, but that available for cropping is considerably less since the North Para River and Salt Creek run through the property, taking up approximately 100 acres of land. In addition, about 250 acres comprises rough, hilly country which is only suited to grazing, whilst when that occupied by plantations, buildings, &c., is taken into consideration only about 1,250 acres are available for the planting of crops.

On the whole the soil is of a red loam type with some patches of calcareous land, whilst the flats adjoining the river are more or less silty in nature. A serious



Turretfield Seed Wheat Farm Homestead.

disadvantage so far as the soils of Turretfield are concerned is the prevalence of red clay patches which tend to run together and set hard after rain.

From the years 1920 to 1932 the farm was conducted on a commercial basis, and all farming costs recorded.

However, at the conclusion of that period the Government of the day approved of the proposal that the work should be confined to the production of pure seed wheat for disposal to farmers. As this decision was not arrived at until late in the season only preparatory work could be carried out in that year. However, during the past 12 months a definite system of plant selection has been commenced which, when the full rotation has been completed, will render available supplies of pure strains of seed wheat.

THE SEASON.

The weather conditions experienced during the past year have been most unusual. Not only was the rainfall irregularly distributed, but the extremes of temperature, particularly those recorded in late Spring and early Summer, were such as to affect seriously the setting and proper maturing of the wheat grain.

Particulars of the rainfall at Turretfield are shown in the following table:—

Rainfall at Turretfield.

	1932.	1933.	Means, 1908-1933.
	Ins.	Ins.	Ins.
January	0.45	1.44	0.56
February	0.99	0.13	0.73
March	0.92	0.57	0.76
April	2.60	0.92	0.82
May	1.14	3.04	2.40
June	4.00	0.59	2.19
July	2.27	1.55	2.06
August	2.44	2.67	2.12
September	1.71	3.29	2.32
October	2.29	0.72	1.68
November	0.34	0.36	0.96
December	0.89	1.05	0.96
Total	20.04	16.33	17.56

"Useful" Rainfall.

	1932.	1933.	Means, 1908-1933.
	Ins.	Ins.	Ins.
Seeding rains (April-May)	3.74	3.96	3.22
Winter rains (June-July)	6.27	2.14	4.25
Spring rains (August-October)	6.44	6.68	6.12
Early Summer rains (November)	0.34	0.36	0.96
Total	16.79	13.14	14.55

The mean fall over the past 26 years is 17.56in., of which 14.55in. has fallen during the growing period of the wheat crops.

For 1933, 16.33 in. were recorded, of which 13.44in. may be regarded as "Useful." Consequently the registration was approximately 1½in. below the mean, but the chief feature of the season so far as rainfall is concerned was the manner in which this amount was distributed.

Good rains fell in May (304 points), but the month of June and the early part of July were unusually dry and cold.

For August and September 267 points and 329 points were registered respectively, with the result that all crops made vigorous, healthy growth. However, in October and November the falls were scanty, thus limiting the development of plants, but the most serious feature was the extremes of temperatures recorded in the former month.

On October 19th and 22nd hot winds raged, and on the latter date a shade temperature of 98° F. was reached, whilst four days later a particularly severe frost was experienced, which cut the vines in the district and blighted the ears of wheat crops which were in a certain stage of development. Until these conditions were experienced the harvest prospects were exceedingly bright, and whilst many crops made a good recovery after the cooler weather experienced in the following weeks, it is estimated that the ultimate wheat yield is 8bush. to 9bush. per acre less than that which would have been gathered if normal ripening weather had occurred.

HAY HARVEST.

The great bulk of the hay area comprised headlands and the divisions cut between varieties. In all, 190 tons were stacked, including 34 tons secured from stubble land planted with oats for grazing purposes.

The individual yields obtained are tabulated below:—

Field.	Variety.	Acreage.	Total Yield.		Acre Yield.		
			T.	C.	T.	C.	L.
No. 7—Sword	16.3	51	0	3	2	65
No. 3—Sword and Caliph	15.5	45	0	2	18	72
No. 15—Nabawa	5.82	13	10	2	6	44
No. 6—Sultan	6.36	14	10	2	5	67
No. 3A—Waratah	4.08	8	10	2	1	75
No. 1—Ranee	2.93	5	10	1	17	61
No. 5—Federation and Gallipoli	12.1	18	0	1	9	84
		63.09	156	0	2	12	70

In addition to the above figures 34 tons of oaten hay were cut from 42.12 acres of stubble land in Field No. 9, which was planted for the purpose of providing grazing for livestock. After having been regularly fed off until late in the season it was eventually allowed to develop for hay, and ultimately returned 16cwts. 16lbs. of good quality material per acre. However, as this was essentially a chance crop it is not included in the mean hay yield for the farm. The average yield of 2 tons 12cwts. 70lbs. is very satisfactory, particularly when it is remembered that the great bulk of this was cut from the headlands and divisions which rarely yield as well as the main crop.

The best return tabulated is that from 16.3 acres of Sword in Field No. 7, namely, 3 tons 2cwts. 65lbs. per acre. This comprised the whole of the field and the crop, which originated from purchased seed, was cut for hay because it was not sufficiently true to type for our purposes.

However, probably an even higher yield was secured from 6 acres of Sword planted on a rich flat in No. 3, which had not been cropped for a number of years. This was not weighed separately, but as the crop was dense and almost 6ft. in height it must have yielded at least 3½ tons of hay per acre.

Sword can therefore be recommended as a wheat capable of producing heavy yields of good quality hay, but at the same time no comparison with the other varieties named in the table is possible since none of these were cut from regular blocks.

WHEAT HARVEST.

The whole of the wheat crops were seeded in good time on well-prepared fallow ground, and planted at the rate of 75lbs. of grain together with 150lbs. of super-phosphate per acre.

In all, 348 acres were devoted to wheat, and the yields obtained are shown in the following table:—

Field.	Variety.	Acreage.	Total Yield.		Acre Yield.	
			Bush.	Lbs.	Bush.	Lbs.
No. 3—Sword	29.85	966	32	32	23
No. 3—Sword	4.22	120	6	28	28
No. 3—Caliph	20.23	536	24	26	31
No. 6—Sultan	30.30	759	48	25	5
No. 15—Nabawa	69.61	1,527	36	21	57
No. 1—Ranee	24.24	522	10	21	2
No. 5—Gallipoli	57.14	892	16	15	37
No. 3A—Waratah	32.50	425	30	13	6
No. 5—Federation	51.25	527	38	10	18
No. 3—Selection Plots	28.70	889	3	—	—
		348.04	7,167	3	20	36

No comparisons between the yields from the different varieties are possible since the fields were planted at varying times whilst the soil conditions are not similar throughout all paddocks.

However, in this connection comparisons can be drawn when the averages from the seed plots are being considered.

The mean yield from 348 acres is 20bush. 36lbs., which is quite satisfactory, but not as high as originally anticipated.

The frost severely affected some varieties, and it is estimated that the loss from this cause approximated 5bush. per acre in the case of Sword, 6bush. with Caliph, 8bush. with Ranee, Gallipoli, and Sultan; 10bush. with Nabawa, and 15bush. with Waratah.

The best yield was harvested from an area of almost 30 acres of Sword planted in Field No. 3. This amounted to 32bush. 23lbs. per acre, and was followed by a return of 28bush. 28lbs. from another block of the same variety.

The poorest averages were secured from Gallipoli, Waratah, and Federation. That from Waratah was due almost entirely to the action of frost since the growth made was very satisfactory, whilst those from Gallipoli and Federation were brought about by eel-worm attack in patches of Field No. 5.

Seed Plots, 1933-34.

Variety.	Acreage.	Total Yield.		Acre Yield.	
		Bush.	Lbs.	Bush.	Lbs.
Waratah	2.26	79	5	35	0
Ford	2.06	70	15	34	6
Sword	4.17	139	30	33	27
Gallipoli	4.22	130	23	30	54
Ghurka	2.78	85	43	30	50
Ranee 4H	4.83	142	27	29	30
Nabawa	2.42	69	22	28	44
Sultan	1.04	29	53	28	44
Federation	4.92	140	25	28	32

The nine wheats listed above constitute the varieties which will be handled at Turretfield with the object of creating a limited supply of pedigreed seed wheat. In the course of time some will no doubt be replaced with more suitable types that happen to be evolved. However, it is not proposed to include any number of varieties in this work, but to concentrate on about eight or nine of the most important.

The system adopted for the selection and building up of supplies which will be available for sale to farmers consists of four stages, namely:—

1. *Stud Plots*: In which the grain from hand-selected ears is planted in spaced rows. From these plants the most valuable strains will be isolated and typical ears from the best plants gathered for the continuation of the stud plot in the following year.

2. *Selection Plots*: In which the grain harvested from the stud plots after the stud ears have been picked will be seeded.

3. *Seed Plots*: In which the grain harvested from the Selection Plots is seeded.

4. *Commercial Seed Plots*: In which the grain harvested from the Seed Plots will be planted and will supply the seed wheat to be offered for sale.

From the foregoing it will be noted that four years must elapse before the plan of selection will be in full operation and, therefore, as the work has only been in progress for two seasons the wheats quoted in the previous table have not been built up from stud ears but were developed from plants seeded in spaced rows in 1933, and then carefully worked over to remove any impurities or undesirable types. Examination of the table shows that Waratah, Ford, and Sword have given the maximum yields, whilst Nabawa, Sultan, and Federation are practically equal for bottom position.

In this connection it might be added that all of these plots were seeded side by side, and consequently so far as this season is concerned the yields obtained are comparative one with the other.

In all cases the grain harvested was of good quality and the crops free from disease, although different varieties were more or less injured by frost.

Only two wheats, namely, Ghurka and Ranee 4H, are not well known to farmers.

Ghurka was bred by the Victorian Department of Agriculture, being a cross between Indian H x Federation and Currawa. It is a hardy, short strawed, heavy yielding variety which should suit the red lands of South Australia.

Ranee 4H is a selection from Ranee (Indian F x Federation) made by the Victorian Department in which the other types present in the original Ranee have been eliminated and an improvement effected.

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AGRICULTURAL EXPERIMENTS IN SOUTH AUSTRALIA.

[By R. C. SCOTT, R.D.A., Supervisor of Experimental Work.]

EXPERIMENTS IN THE SOUTH-EASTERN DISTRICTS.

Under the arrangement in which private farmers work in co-operation with the Department, agricultural experiments are progress at Keith, Kongorong, and Millicent.

In addition, wheat variety tests were commenced at Wolseley, but as the experimenter was unable to continue the work over the full period, there are no results of value to report upon.

The character of the experiments include wheat and pasture variety trials on different types of land at Keith, manurial tests with sown and natural pastures at Kongorong, and trials with imported wheat varieties at Millicent.



Harvesting Wheat Experimental Plots at Keith.

EXPERIMENTS AT KEITH.

The Keith district is situated about 150 miles from Adelaide and is served by the Adelaide-Melbourne railway. It lies on the fringe of what is usually described as the Ninety-Mile Desert country, and the land varies considerably in quality. That in the vicinity of the township is quite good agricultural country, capable of yielding heavy cereal crops and producing a luxuriant growth of pasture, whilst on the outer or plain country the soil is sandy and, generally speaking, of low fertility.

* The former area consists chiefly of sandy loam soil overlying a limestone rubble and limestone rock subsoil, whilst in those patches where the sand tends to predominate the land is liable to drift.

In the latter area the sand is coarser in texture and varies in depth from a few inches to over 2ft. It rests on a layer of tough clay which in its turn overlies fairly solid limestone rock.

In both of these types of soils agricultural experiments are in progress.

Rainfall at Keith.

	1928. Ins.	1929. Ins.	1930. Ins.	1931. Ins.	1932. Ins.	1933. Ins.	Means.	
							1928-33. Ins.	1907-33. Ins.
January	0.50	1.49	0.00	0.72	0.00	0.85	0.59	0.40
February	2.28	0.40	0.87	0.13	1.95	0.02	0.94	0.98
March	1.14	0.17	0.24	0.96	1.98	0.55	0.84	0.79
April	0.81	1.10	1.42	1.18	1.93	1.47	1.32	1.10
May	2.83	1.87	1.39	1.99	0.91	4.22	2.20	2.31
June	3.30	2.31	0.29	2.83	4.20	0.68	2.27	2.32
July	2.02	2.19	3.51	2.85	2.63	1.07	2.38	2.15
August	0.67	1.65	2.65	2.67	2.13	2.57	2.06	2.11
September	2.00	1.68	2.67	1.97	1.48	2.53	2.06	2.22
October	2.96	1.36	2.18	0.33	1.82	0.50	1.53	1.47
November	0.39	1.09	1.26	0.43	0.63	1.74	0.92	1.12
December	0.41	2.02	1.49	0.91	0.60	0.47	0.98	0.99
Total	19.31	17.33	17.97	16.97	20.26	16.67	18.09	17.96

Useful Rainfall at Keith.

	1928.	1929.	1930.	1931.	1932.	1933.	1928-33.	1907-33.
	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
Rains—								
Seeding (April-May)	3.64	2.97	2.81	3.17	2.84	5.69	3.52	3.41
Winter (June-July)	5.32	4.50	3.80	5.68	6.83	1.75	4.65	4.47
Spring (August-October) .	5.63	4.69	7.50	4.97	5.43	5.60	5.65	5.80
Early Summer (November)	0.39	1.09	1.26	0.43	0.63	1.74	0.92	1.12
Total	14.98	13.25	15.37	14.25	15.73	14.78	14.74	14.80

The average annual rainfall at Keith is almost 18ins., whilst the "Useful" fall totals 14.80ins. Therefore, so far as the rainfall alone is concerned, and not taking the nature of the soil into consideration, the district is well treated for the growing of annual crops. However, examination of the tables will show that only a little more than 3ins. is recorded during the four months extending from December to March inclusive. Consequently, the less hardy perennial pastures have difficulty in carrying through the summer, whilst in an average season the seed-producing capacity of late-ripening annual plants is affected.

During the past six years the average falls have approached the means of the 1907-33 period, but in each season special conditions have been recorded. In 1929, 1931, 1932, and 1933 late Spring and early Summer rains were scanty, with the result that normal maturity of the crops was affected, whilst in addition, conditions favourable to the development of Red Rust were experienced in 1932.

Other extremes recorded were dry cold months in August 1928, June 1930, and June 1933, during which all plants received a severe set-back.

EXPERIMENTS ON THE PROPERTY OF MR. W. E. GILL.

Wheat variety experiments have been conducted on the property of Mr. Gill, which is situated in the better class land of the Keith district. The results secured are shown in the following table:—

Wheat Varieties, Keith.

Variety.	1928.	1929.	1930.	1931.	1932.	1933.	Means.	
							1930-33.	1928-32.
	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.	B. L.
Bena	30 20	29 13	9 2	19 33	15 26	—	—	20 43
Sultan	24 31	26 36	8 58	22 22	11 43	—	—	18 52
Dan	20 19	27 27	8 43	14 38	12 42	—	—	16 46
Federation .	17 53	28 44	7 56	19 2	9 27	26 1	15 37	16 37
Major	21 1	26 9	8 14	17 24	9 11	—	—	16 24
Gallipoli ...	—	—	13 11	24 22	13 1	27 4	19 25	—
Ford	—	—	—	—	—	22 13	—	—
Sword	—	—	—	—	—	21 58	—	—
Waratah ..	—	—	—	—	—	20 54	—	—
Nabawa ..	—	—	—	—	—	20 23	—	—

Reviewing the yields from the varieties seeded over the five-year period 1928-1932 it will be noted that *Bena* has given the highest average, with a mean return of 20bush. 43lbs. per acre. *Sultan* occupies second position with 18bush. 52lbs., whilst there is very little difference between the remaining three, each being about 2bush. less than *Sultan*. *Gallipoli* has been included in the experiment since 1930, and during the four seasons has headed the averages on three occasions, whilst the mean yield from this variety over the full period is 19bush. 25lbs.

On account of the damage caused by Red Rust in the 1932 crops it was decided to introduce a number of new wheats, and the yields secured from these varieties are set out above.

Viewing the results as a whole it would appear that *Gallipoli*, *Bena*, and *Sultan* are the most suitable varieties for planting on the better class land in the Keith district.

However, provided that the varieties are planted on good fallow land, rather higher average yields than those tabulated can be anticipated, since in two years out of the six, namely 1930 and 1932, Take-all and Red Rust respectively played havoc with the crops.

EXPERIMENTS ON THE PROPERTY OF MR. L. H. DENSLEY.

Pasture experiments have been conducted by Mr. Densley on land of much the same quality as that on which the Wheat varieties have been planted. The class of experiment consisted simply of Pasture variety trials, each plot being about one-tenth of an acre in area and the whole collection set out in the same field so that all fodders received similar conditions of grazing. The full area was manured annually at the rate of 1½cwts. of Superphosphate per acre. The varieties seeded and remarks concerning the growth made are as follows:—

Perennial Rye Grass:

This Grass made good growth in the early years after planting, but later on died out rapidly. The plot was seeded with ordinary commercial Rye grass, as at that time certified seed was not obtainable. Experience has since shown that the latter is much superior regarding length of life and other desirable qualities, and there is little doubt that had certified seed been available this would have developed into a very satisfactory pasture.

Wimmera Rye Grass:

This has proved the best of the grasses. Each season it has made a good body of feed, but in recent years the foliage has exhibited a light green colour and made rather less growth than anticipated. This is probably due to lack of association with a clover which would assist in supplying the nitrogen requirements.

Cocksfoot:

A number of plants of cocksfoot have persisted notwithstanding the dry summer conditions, but on the whole, this grass does not appear to be of much value for the district.

Phalaris tuberosa:

The seed purchased in 1929 as *Phalaris tuberosa* proved to be *Phalaris minor*. A good crop of the latter resulted, but being an annual which does not possess persistent seeding habits, it died out in the course of two years.

The plot was then cultivated and seeded with *Phalaris tuberosa*, but experience with this fodder has indicated that good tillage is essential for a satisfactory stand, and consequently only a few plants managed to survive the competition with weeds.

As a result, no information regarding the value of *Phalaris tuberosa* is available.

Chewing's Fescue:

The seed germinated well, but the plants did not make headway and practically disappeared after the first summer.

Kentucky Blue:

The development of this variety was very similar to that of Chewing's Fescue, and in the third season it had died out completely.

Sheep's Burnet:

The plants persisted well and individually made fair growth, but the body of feed was never great.

Creeping Bent:

Has yielded a limited amount of short grazing, but does not appear to have much value for these conditions.

Chicory:

This variety has shown considerable promise, persisting throughout the dry summers, and yielding an appreciable amount of palatable fodder.

Evening Primrose:

One of the strongest growing plants seeded in the experiment. Because of its deep rooting habits it was able to firmly establish itself in the deep sands. At the same time it has provided good pasturage and proved one of the best varieties for the lighter soil conditions.

Lupins:

In the first year a poor germination of lupins was obtained, but the plants steadily thickened up until in the last season the crop was both tall and dense. However, under the Keith climatic conditions the grain does not appear to be readily palatable to livestock, whilst the plants themselves are not eaten at all. This is the reason why the stand has improved in recent years.

From the point of view of improving soil fertility or checking the drifting of sandy land, the planting of lupins may be recommended, but in this area they do not appear to have much value as a fodder crop for livestock.

Danthonia pilosa (Wallaby grass):

This grass has taken a long time to develop, and although producing little feed in earlier years, has steadily improved and now provides useful grazing.

Ehrharta longiflora (Annual Veldt grass):

Seed of this grass was gathered from plants growing on sandy land near the sea coast, west of Adelaide. Attention was drawn to the variety, which is an annual, because of the strong growth made early in the season and its free seeding habits.

At Keith it has successfully re-seeded itself each year and gives promise of becoming a useful pasture plant for the poorer land.

King Island Melilot:

On the sandy type soil the Melilot has not persisted and the plants died out rapidly.

Bokhara Melilot:

This variety has made fair development and at times has yielded good grazing, but latterly the plants have thinned out.

Lucerne:

Has proved far and away the best fodder in these plots. In the years in which satisfactory summer rains were experienced a crop sufficiently well grown to allow for mowing was obtained, whilst throughout the full period very good grazing has been secured.

Black Medic:

This pasture has not proved of value and at the end of the second season had almost disappeared.

White Clover:

The growth made by White Clover was poor and the plants failed to carry through the summer.

Strawberry Clover:

The soil and climatic conditions were not suitable for this clover and consequently the young plants did not persist.

Clustered Clover:

Appears naturally in the district and consequently the addition of seed, together with regular and adequate dressings of superphosphate, resulted in the development of a thick and strong-growing stand. Clustered Clover was easily the best of the clovers.

Subterranean Clover:

The Subterranean Clover seeded in this plot was of the Mount Barker strain. As the annual rainfall is less than 18ins., it was not surprising to find that except under unusually favourable late spring and early summer conditions, this type was unable to set its grain satisfactorily, and consequently could not provide sufficient seed for the following year.

As a result this strain is not suitable, and the earlier maturing type, grain of which is now obtainable, should be much more valuable in this area.

From the foregoing, it can be concluded that lucerne is the best fodder for planting under conditions similar to those in which the experiments were conducted, whilst other fairly satisfactory pastures are Wimmera Rye Grass, Clustered Clover, and Evening Primrose. In addition it would appear that if the best strain of Perennial Rye Grass and Subterranean Clover was secured, both of these fodders could be included amongst the valuable varieties.

EXPERIMENTS CONDUCTED ON THE PROPERTY OF MESSRS.
T. A. & A. S. DICKSON.

The land on which experiments are being conducted by Messrs. Dickson is quite different to that on which the other experimenters at Keith are working.

It has recently been reclaimed from its virgin state, under which it carried yacca, together with occasional patches of stunted mallee. The soil is a low fertility sand, but overlies a yellowish clay of fair quality.

The experiments comprise tests to determine whether cereals can be planted as a first crop and also pasture variety trials to indicate those most suitable for such land.

CEREAL EXPERIMENTS.

In the first two seasons oats were planted on land which had been ploughed for the first time in the previous August and on which the yaccas remaining after ploughing had been hand grubbed.

The oat varieties included Algerian, Lachlan, Kherson, Early Burt, Fulghum, Palestine, and Imbros Island. They were seeded early in the season, together with 180lbs. of Superphosphate per acre, with the object of providing sheep grazing and subsequent harvesting if the later development would permit.

The grazing secured amounted to half a sheep per acre per annum, but the grain crop was almost a total failure. The varieties Kherson, Early Burt, and Palestine gave the best yields of fodder, but failed to make further headway, whilst on the other hand Algerian and Imbros Island gave practically no grazing, but produced a small quantity of grain. These results were not satisfactory, and accordingly wheat varieties were substituted in seasons 1931 and 1932. Owing to the dry conditions experienced in October in the former year, only 33 points being recorded, the wheat crop failed altogether and no harvest figures were secured.

However, in the next season the following yields were obtained:—

Nabawa	12bush. 18lbs. per acre.
Ford	10bush. 9lbs. per acre.
Gluyas	8bush. 48lbs. per acre.
Felix	5bush. 38lbs. per acre.
Faun	4bush. 54lbs. per acre.
Federation	3bush. 51lbs. per acre.

From the experience gained during these seasons it would appear that cereal-growing on such land is attended with considerable risk, and unless intended as a preparation for pasture crops is not to be recommended. However, if wheat is to be planted the varieties Nabawa and Ford have proved the most satisfactory.

PASTURE EXPERIMENTS.

There is little doubt that this land is unsuited to regular cereal cropping, but, on the other hand, there is every possibility that, assisted by the average rainfall recorded, it could be built up to fair grazing country.

With this object in view the land would first of all be ploughed to destroy the natural growth and possibly a cereal crop planted, so that further tillage could be given prior to sowing with pastures.

In an attempt to ascertain the most suitable fodders a collection of varieties was planted on land which had carried one cereal crop.

The results obtained over the past four seasons have been as follows:—

Perennial Rye Grass:

The plants made good growth at first, but in subsequent years died out rapidly, and at the end of the third year very few remained.

Wimmera Rye Grass:

This is one of the best plots. The plants have seeded freely and made strong growth, but regularly show evidence of Nitrogen deficiency. Last season a strip was dressed with Sulphate of Ammonia and a marked benefit was noted, particularly in the healthy appearance of the plants. Under ordinary pasture management this requirement could probably be made good by planting in conjunction with a Clover, when the legume would assist in supplying the nitrogen requirements of the grass.

Cocksfoot:

Failed to survive the conditions and at the present time has practically disappeared.

Phalaris tuberosa:

The plants have persisted fairly well and stooled out considerably. However, not very much feed has been produced, a fact which is probably due to the lack of fertility. At the same time it is the best of the perennial grasses, and as soil conditions improve so should *Phalaris tuberosa* become more valuable.

Danthonia pilosa:

The Wallaby grass in this plot only provides fair grazing. It was very short in the first season, but has improved with age.

Yorkshire Fog:

Not enough rain is received for Yorkshire Fog and most plants have succumbed.

Gheuing's Fescue:

A fair mat of this grass has persisted, although the growth is very short.

Waipu Brown Top:

This variety has done quite well and the ground is coated with fairly short grass. It appears to be much more palatable to stock than the other grasses of similar type included in the experiment.

Creeping Bent:

Has developed about equally with Brown Top, but is not eaten as readily by livestock.

Kentucky Blue:

Only a relatively thin stand of this grass has persisted.

Couch grass:

Germinated satisfactorily and has obtained a good hold. This plot has yielded a fair amount of short grazing, particularly in those seasons in which good summer rains have been recorded.

Chicory:

Has given one of the best pastures, both with regard to quantity and palatability of the fodder. All livestock appear to be particularly fond of it. At one time kangaroos entered the plots and dug for the roots, ultimately leaving the ground in a stirred condition as if pigs had been confined on the patch. Its deep taproot permits it to withstand severe weather conditions, and Chicory appears to be a very useful plant.

Evening Primrose:

The Primrose has made good development, and in the same way as the Chicory has penetrated to the clay, thus firmly establishing itself against summer drought. Good feed has been produced, and consequently Primrose can be regarded as one of the best varieties for these conditions.

Sheeps Burnet:

Individual plants have made good growth and persisted well, but viewed as a whole the plot has not yielded much feed.

Lupins:

The variety planted was New Zealand Narrow Leaf. As soil improvers they have done well, but do not appear to have appreciable value as a food for live stock. The plants have spread over the adjoining plots, and at times have made dense growth approximately 3ft. in height. So far as is known Lupins have not been utilised for ensilage in South Australia, but it is reported that in parts of Europe they are frequently availed of for this purpose and so converted into a palatable foodstuff. In view of the fact that Lupins are useful soil renovators and consequently of use for the lighter lands their value for silage purposes is worthy of investigation.

Bokhara Melilot:

This plant does not appear to be very long-lived, but at one period showed to advantage.

At the present time many plants have died out and the area is not as attractive as previously. However, it appears to be a useful variety and has yielded a satisfactory amount of grazing.

King Island Melilot:

The Melilotus was practically a failure, and despite a strong germination the plants did not thrive.

Lucerne:

In addition to the Lucerne planted in this plot Mr. Dickson has also seeded a small area on similar country. The results obtained are very encouraging, the plants having developed into strong, healthy crowns and yielding very useful grazing.

There is little doubt that ultimately Lucerne will be extensively sown in this class of country.

Clustered Clover:

The seed purchased under this name contained only a small percentage of Clustered Clover, and mainly comprised Drooping Clover. The former has done well, and is one of the best in the series, but the latter is not particularly valuable.

Subterranean Clover (Mount Barker strain):

The strain has persisted fairly well, although the thickness of the stand has varied from season to season according to the character of the preceding Spring weather. It has proved a very good fodder, but as adverse Spring conditions may lead to a poor setting of grain and consequently a thin crop in the following year, the earlier ripening strains are to be preferred.

Subterranean Clover (Early strain):

The seed used in this plot originated from an early ripening plant forwarded from Western Australia and built up in the pasture plots at the Adelaide Show Grounds. In maturity and characteristics it is very similar to that now on the market as the Dwalganup strain.

Its early maturing habits permit it to set grain by the middle of August, with the result that danger of poor seeding due to adverse Spring weather is practically avoided. In growth characteristics the Early strain is more "stemmy" and

smaller-leaved than the later maturing type, and therefore would never be preferred unless the climatic conditions rendered the seeding of this strain advisable.

In the plots at Keith it has always seeded freely and a good dense mat of fodder maintained.

Reviewing the Variety experiments, the best plots have been Wimmera Rye Grass, Waipu Brown Top, Chicory, Evening Primrose, Lupins (from growth point of view only), Bokhara Clover, Lucerne, Clustered Clover, and Early Strain Subterranean Clover.

The grasses generally made growth indicative of nitrogen starvation, and when a strip across all plots was dressed with Sulphate of Ammonia the response was very marked. However, it is doubtful whether such application would be economic comparatively with the planting of mixture containing both grasses and clovers.

These Variety plots served to indicate the grasses and clovers which were most valuable for the locality, and from the information thus gained two pasture mixtures were planned for seeding on two-acre plots in 1933.

The mixtures planted were:—

Plot 1:

5lbs. Wimmera Rye grass per acre.

5lbs. Early strain Subterranean Clover per acre.

Plot 2:

3lbs. Clustered Clover per acre.

3lbs. Bokhara Clover per acre.

2lbs. Evening Primrose per acre.

2lbs. Chicory per acre.

Both plots were seeded on land which had carried one cereal crop and were fertilised at the rate of 2cwts. of Superphosphate per acre. The germination was satisfactory, although the Subterranean Clover was not as thick as anticipated.

As these plots have only been established for one year, little comment is possible, but from the results obtained it would appear that the mixture planted in Plot 1 will prove very suitable and yield more grazing than that in Plot 2.

EXPERIMENTS AT MILLMOENT.

The work at this centre consists of tests with imported wheat varieties which were sown in comparison with those regularly planted in the wetter and more fertile soils of the South-East. In the past the efforts of Australian wheat breeders have been largely directed towards the production of types better suited to the drier areas.

In such areas the normal growing period is relatively short, and it follows that whilst the later ripening types which have been evolved in Australia are better suited to our cooler districts, there may be higher yielding varieties available from those countries in which cool wet-growing conditions are regularly experienced.

Consequently the Departments of Agriculture in Tasmania and New Zealand were asked to supply particulars relative to their more important varieties.

Tasmania reported that the most widely grown wheat was Braemar Velvet, constituting about 32 per cent. of the area planted, whilst about 24 per cent. was seeded with Federation.

In New Zealand the chief varieties were Solid Straw Tuscan, Hunters and Velvet Chaff, all of which had a growth period of almost eight months.

Accordingly, the above three, together with Braemar Velvet, were imported and tested on the properties of Messrs. Sapiatzer and Fenson Bros. in the years 1931 and 1932 respectively.

Unfortunately, the small amount of Braemar Velvet secured was so much reduced by attack from pests that it had to be sent to the Kybybolite Experimental Farm

for multiplication purposes, but the mean yields from the remainder, together with that from Major, are shown below:—

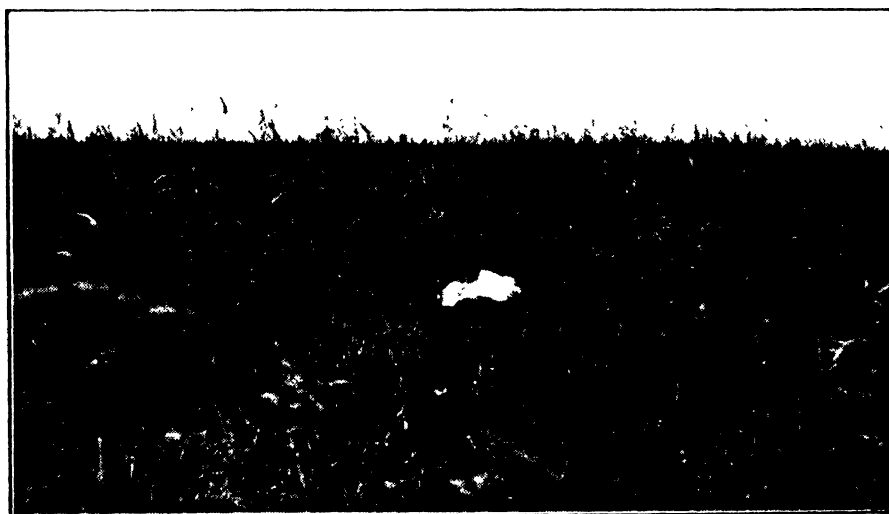
Variety.	Mean Yield 1931-32.	
	Bush.	Lbs.
Major	27	52
Hunters	16	39
Velvet Chaff	13	31
Solid Straw Tuscan	10	21

From the above figures it will be noted that Major gave very much higher returns than any of the imported wheats.

The difficulty with the latter was their liability to rust and the long period that elapsed between full bloom and maturity. Despite early planting, they failed to ripen their grain satisfactorily and did not show much promise in these tests.

EXPERIMENTS AT KONGORONG.

The experiments at Kongorong are connected with the manuring of sown and natural pastures. They were commenced in 1924 on the property of Messrs. Morrison Bros., but four years later this partnership was dissolved, and for the



Pasture Experiments at Kongorong: 2cwts. Superphosphate Plot, immediately before cutting for Meadow Hay.

past five seasons the experiments planned for Plots 1 to 4 have been conducted by Mr. W. Crowe, and those occurring on Plots 5 to 9 by Mr. E. E. Morrison.

The Kongorong district lies about 20 miles to the south-west of Mount Gambier and the land on which the plots are placed is typical of the locality.

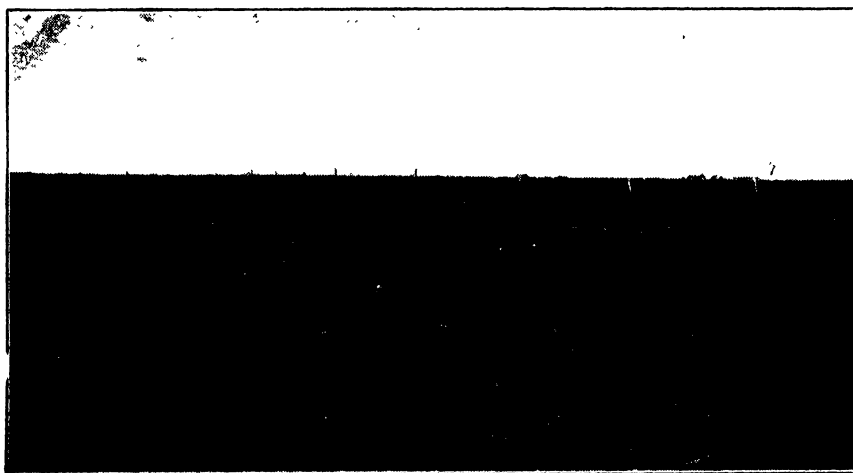
The area surrounding Kongorong comprises rather bleak open country on which, prior to the adoption of top-dressing, feed made very slow growth during the winter months.

The soil is relatively shallow and is of light loam type, which in its turn overlies fairly solid limestone rock. The rainfall approaches that recorded at Mount Gambier, and in the table following the monthly precipitation, together with the means for Kongorong and Mount Gambier are set out.

Kongorong Rainfall.

	1925.	1926.	1927.	1928.	1929.	1930.	1931.	1932.	1933.	Means. 1925-1933.	Means. Mt. Gambier. 1862-1933.
	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
January	0.87	0.19	0.76	1.57	1.56	0.18	1.49	0.25	0.16	0.78	1.32
February	2.79	0.75	1.69	1.72	0.05	2.20	0.57	3.13	0.20	1.46	1.09
March	0.10	0.28	1.10	0.55	0.30	0.38	1.40	3.85	1.27	1.03	1.43
April	2.28	2.86	0.64	2.41	2.24	1.62	1.38	4.09	1.83	2.16	2.33
May	5.47	4.55	3.72	2.21	2.95	1.36	3.73	0.84	3.54	3.15	3.45
June	2.33	2.49	2.88	3.95	5.08	1.05	3.54	5.02	2.85	3.19	4.03
July	3.67	3.44	3.92	2.65	3.58	3.41	3.11	3.97	1.82	3.29	4.11
August	2.19	3.78	4.35	1.41	2.13	4.80	2.89	4.46	2.60	3.18	8.91
September	4.13	1.92	0.89	3.00	2.97	2.92	1.74	1.84	3.17	2.51	3.07
October	0.93	3.01	0.16	4.28	1.64	2.28	0.90	2.78	1.55	1.95	2.46
November	1.29	0.89	1.23	0.59	0.85	1.88	1.11	0.96	2.61	1.27	1.72
December	0.38	1.61	2.30	0.36	2.01	1.25	0.19	1.58	0.78	1.15	1.63
Total...	26.43	25.77	23.14	24.70	25.86	23.33	22.05	32.72	22.38	25.11	30.55

The above rainfall returns indicate that since these plots were established drier years have been experienced than is usually the case in this district. For the nine seasons the annual fall has been 25.11 inches, whilst the mean for 72 years is 30.55 inches.



Pasture Experiment at Kongorong. No Manure Plot, not grazed.

The value of the rainfall is largely dependent upon its distribution, and in this locality it is a disadvantage to receive heavy downpours during the winter months, particularly if dry weather should be experienced in late Spring. What may be regarded as a relatively good season occurred in 1930, when mild winter conditions were followed by good rains extending into early summer. In this year feed was abundant and heavy grazing returns were secured from those plots receiving full manurial dressings.

PLAN OF EXPERIMENT.

The plan of experiment consists of 9 plots each 5 acres in area. Seven carry natural pasture and are top-dressed annually with various fertilisers, whilst two were sown with pasture grasses in 1924. In the latter the acre mixtures comprised:—

<i>Plot 1:</i>	10lbs. Wimmera Rye Grass.	<i>Plot 2:</i>	1lb. Sheeps Burnet.
	2lbs. Subterranean Clover.		2lbs. Wimmera Rye Grass.
<i>Plot 2:</i>	3lbs. White Clover.		2lbs. Creeping Bent.
	1lb. Alsike Clover.		2lbs. Cocksfoot.
	2lbs. Black Medic.		2lbs. Yorkshire Fog.

The grazing result from each plot was practically equal, but in later years many of the varieties planted in Plot 2 died out and were replaced with Subterranean Clover, seed of which had been carried in from adjoining fields by animals.

In this collection of fodders Subterranean Clover was the outstanding variety, none of the others approaching it in body of foodstuff produced. Wimmera Rye Grass has also done fairly well, but under these conditions and the use of certified seed Perennial Rye Grass would probably be more satisfactory.

The best of the remainder were White Clover, Alsike Clover, Sheeps Burnet, and Cocksfoot, and all of these are worthy of inclusion in any pasture mixture. Others which showed up fairly well but are not particularly useful fodder plants were Creeping Bent and Yorkshire Fog.

In 1931 various changes in the Manurial dressings were made and the grazing returns from each plot prior to these changes, namely, the period 1925-30, are shown in the next table:—

Pasture Plots, Kongorong, 1925-30.

Plot.	Pasture.	Manure per Acre.	Sheep per Acre per Annum.						
			1925	1926	1927	1928	1929	1930	Mean.
1. ...	Wimmera Rye Grass Subterranean Clover	1cwt. Raw Rock Phosphate	0.97	1.45	1.75	2.34	2.59	2.64	1.96
2. ...	Sown Fodders	1cwt. 45% Super	1.32	1.75	1.35	2.52	1.92	2.82	1.95
3. ...	Natural Pasture ...	1cwt. 45% Super	0.92	1.42	1.73	2.83	2.29	3.79	2.16
4. ...	Natural Pasture ...	1cwt. Raw Rock Phosphate	0.66	1.20	1.19	2.46	1.56	1.73	1.47
5. ...	Natural Pasture ...	1 ton Lime (1924) 1cwt. 45% Super (annually) 10cwt. Raw Rock Phosphate (1924)	1.61	1.58	1.93	1.93	2.33	2.51	1.98
6. ...	Natural Pasture ...	1cwt. 45% Super (1924)	1.33	1.58	1.60	1.99	1.81	1.40	1.62
7. ...	Natural Pasture ...	No Manure	0.54	0.39	0.41	0.61	0.88	0.35	0.53
8. ...	Natural Pasture ...	1cwt. 33% Bone Manure	0.64	1.02	1.30	1.65	1.88	1.15	1.27
9. ...	Natural Pasture ...	1cwt. Raw Rock Phosphate	0.74	0.97	1.74	1.69	1.49	1.18	1.30
		1cwt. Sulphate of Potash							

In these experiments ground raw rock phosphate (82 per cent. acid soluble phosphate) has been utilised on a number of plots with the object of determining its value for pasture top-dressing comparatively with superphosphate.

So far as the ground imported rock is concerned the price relatively to superphosphate is too great to warrant consideration, but there is a number of low-grade phosphatic deposits in South Australia which if finely ground and available at a sufficiently cheap rate would possibly be useful for top-dressing in the higher rainfall areas.

In the foregoing table the yields obtained from the varying manurial dressings have been shown on a sheep per acre basis notwithstanding the fact that at times different classes of livestock have been grazed upon the experimental area.

In comparing the sown pastures (Plots 1 and 2) it will be noted that the yield from each is practically equal, namely, 1.96 and 1.95 sheep per acre respectively. This result has been obtained despite the fact that the former plot has received an annual dressing of 1cwt. of raw rock phosphate and the latter a similar quantity of 45 grade superphosphate. However, in this case no conclusion regarding the value of these two fertilisers can be drawn, since the improved pasture following the Wimmera Rye Grass, Subterranean Clover seeding, comparatively with the other mixture planted, has served to counterbalance the benefit gained by the use of the more readily soluble phosphatic manure. Dealing with the advantage of sown fodders comparatively with natural pasture, attention is drawn to the fact that in Plot 4 the natural pasture topdressed with 1cwt. of rock phosphate per acre has yielded grazing for 1.47 sheep, whilst the sown pasture in Plot 1, which received a similar manurial dressing, has given a mean grazing for 1.96 sheep per acre per annum over the six-year period.

From these figures it can be concluded that in the Kongorong district the sowing of a pasture mixture will lead to an increased grazing capacity of at least half a sheep per acre per annum, with the probability that when superphosphate is utilised the advantage in favour of sown pasture comparatively with natural

pasture would be still further increased. Examining the yields from the natural pasture plots, the outstanding feature is the low grazing return secured from the area (Plot 7) which has not received any manurial dressing. The grazing in this case only amounts to 0.53 sheep per acre per annum, and even this figure is higher than would be the case if sheep were maintained continuously on an unmanured area, since with 5 acre plots the flock is simply turned in from time to time according to the pasturage offering. On the other hand, Plot 3, which receives 1cwt. of 45 grade Superphosphate per acre, has maintained 2.16 sheep per acre, or, in other words, has yielded four times as much grazing as the unmanured area. Consequently, it can be concluded that adequately top-dressed land in the Kongorong district will carry four times as many sheep or cattle as it could prior to top-dressing, and moreover would maintain such animals in better health.

In connection with annual applications of raw rock phosphate, a 1cwt. dressing (Plot 4) has produced sufficient pasture for 1.47 sheep—a reduction of 0.69 sheep per acre comparatively with that obtained from 1cwt. applications of 45 grade Superphosphate.

Assuming that the value of the grazing of one sheep equals 12s. 6d. per annum and the cost of superphosphate and raw rock phosphate is 5s. and 4s. per cwt. respectively, the additional outlay of 1s. per acre for superphosphate comparatively with that required for raw rock phosphate has lead to an increased return of 8s. 8d., or a net profit of 7s. 8d. per acre.

Therefore, it would appear that before raw rock phosphate can be suggested as an economic fertiliser for pastures it must be available at rates very much below those at which it is offered to-day.

Little can be said regarding the remaining manurial dressings, as the results do not show to advantage when compared with those obtained from annual dressings of superphosphate.

In these soils lime is apparently not required, whilst a heavy application of raw rock phosphate every 10 years is not as effective as lighter annual dressings. Further, the use of either bone manure or sulphate of potash has not proved economic under these conditions.

In 1931 an alteration in the manuring of Plots 5, 7, and 9 was effected, and the results since that year are set out below:—

Pasture Plots, Kongorong, 1931-32.

Plot.	Pasture.	Manure per Acre.	Sheep per Acre. per Annum.		
			1931.	1932	Means.
1	Sown fodder	1cwt. Raw Rock Phosphate .	2.11	1.88	2.00
2	Sown fodder	1cwt. 45% Super.....	2.68	1.44	2.06
3	Natural pasture ...	1cwt. 45% Super.....	2.72	2.40	2.56
4	Natural pasture ...	1cwt. Raw Rock Phosphate .	2.28	1.79	2.04
5	Natural pasture ...	2cwts. 45% Super	2.65	2.86	2.76
6	Natural pasture ...	10cwts. Raw Rock (1924) ..	1.54	2.14	1.84
		1cwt. 45% Super (1924)....			
7	Natural pasture ...	No manure	0.56	0.64	0.60
8	Natural pasture ...	1cwt. 45% Super.....	1.44	2.38	1.91
		½cwt. Sulphate Ammonia .			
9	Natural pasture ..	1cwt. Raw Rock Phosphate	1.51	2.50	2.02
		½cwt. Sulphate Ammonia ..			

The results are available for only two years, but the most important feature has been the improvement in the grazing capacity of Plot 5 since 2cwts. of Superphosphate per acre have been applied. This plot has given a mean grazing return of 2.76 sheep per acre over the two seasons and jumped to the head of the averages, whereas for the six-year period 1925-30, during which time it received 1cwt. of superphosphate annually, the yield was only 1.98 sheep per acre.

The addition of Sulphate of Ammonia to Plots 8 and 9 has also had considerable influence and much improved grazing has been secured from each.

In conclusion of this report dealing with the Kongorong plots it is desired to place on record our appreciation of the work of the experimenters, Messrs. Morrison and Crowe, in keeping careful records of the stock depastured on the plots and in the interest they have shown in the work being conducted.

STATE OF SOUTH AUSTRALIA.

FINAL RESULTS OF CEREAL AND HAY HARVEST, 1933-34.

[By W. L. JOHNSTON, Government Statist.]

WHEAT, 1933-34—35,373,466bush.; average per acre 9.26bush.

WHEAT, 1932-33—42,429,614bush.; average per acre 10.43bush.

There are still a few minor Wheat Districts where the completion of the collection has been delayed and a number of odd returns from farmers in other districts outstanding, but, rather than further delay the final results, a safe estimate has been made for all these, and hence the totals now submitted may be accepted as final.

1. GROWERS AND ACREAGE SOWN.

Wheat Growers.—There were 14,992 (15,438) Growers of Wheat for all purposes for the Season 1933-34, and of this number 13,970 (14,467) reaped areas for grain. Approximately 1,708 (1,754) reaped areas of under 50 acres. Share farmers counted once only.

Acreage.—The grand total acreage sown to Wheat, Barley, and Oats for all purposes was 4,949,349 (5,039,942) acres, a decrease on the previous year of 90,593 acres.

Wheat.—4,074,417 (4,274,096) acres. Grain 3,821,795 (4,066,782) acres, Hay 246,999 (205,372), Fed Off, &c., 5,623 (1,942).

Barley.—320,527 (322,958) acres. Grain 307,423 (314,286), Hay 2,729 (2,125), and Fed Off 10,375 (6,547).

Oats.—554,405 (442,888). Grain 265,074 (174,244), Hay 247,879 (243,015), Fed Off, etc., 41,452 (25,629).

2. PRODUCTION AND AVERAGES PER ACRE.

Wheat.—35,373,466 (42,429,614) bushels, decrease 7,056,148 bushels, averaging 9.26 (10.43) bushels per acre.

Barley.—5,254,280 (6,070,161) bushels; decrease 815,881 bushels, averaging 17.09 (19.31) bushels per acre.

Oats.—2,087,772 (1,788,712) bushels; increase 299,060 bushels, averaging 7.88 (10.27) bushels per acre.

Hay (Wheaten, Oaten, and Barley).—524,191 (547,060) tons; decrease 22,869 tons, averaging 1.05 (1.21) tons per acre. Distributed as follows:—Wheaten 290,009 (278,875), Oaten 231,607 (265,845), Barley 2,575 (2,340) tons.

3. BENEFITS FROM FALLOWING.

In good seasons the difference in yields per acre of crops sown on fallow and crops on unfallowed land is less than in less favoured seasons, as will be seen from the following return:—

Grown On	Yield Per Acre.				
	1933-34.	1932-33.	1931-32.	1930-31.	1929-30.
	Bush.	Bush.	Bush.	Bush.	Bush.
Fallow	11.60	12.86	14.81	11.05	9.07
Not fallowed	4.78	6.86	7.57	5.48	2.84
Total	9.26	10.43	11.81	8.34	6.40
Rainfall—	Inches.	Inches.	Inches.	Inches.	Inches.
April-Nov.	11.66	14.70	13.27	11.31	9.57

Of last season's Wheat crop 2,508,581 (2,420,674) acres sown on fallow yielded 29,092,873 (31,129,859) bushels, averaging 11.60 (12.86) bushels per acre, and 1,313,214 (1,646,108) acres sown on unfallowed land yielded 6,280,593 (11,299,755) bushels, averaging only 4.78 (6.86) bushels per acre thus making the State average 9.26 (10.43) bushels per acre.

4. SEASONAL CONDITIONS.

Rainfall.—The mean monthly rainfall over the Agricultural Areas of the State is specially computed and recorded in comparison with the averages for the past 29 years. The following are the particulars in inches of the rainfall from April to November for the chief divisions of the State:—

RAINFALL (APRIL-NOV.) AND WHEAT YIELDS PER ACRE.

Year.	Whole State.	Central.	Lower North.	Upper North.	South-East.	West-ern.	Murray Mallee.
	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
Rainfall—							
1933	11.66	14.62	11.32	8.05	15.45	11.71	8.47
1932	14.70	18.39	14.86	9.86	19.68	14.22	11.74
Average 5 years	12.10	15.44	11.42	7.82	18.20	11.27	9.52
Average 29 years	12.73	16.15	12.38	9.03	19.39	11.18	10.53
	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.	Bush.
Wheat Yield—							
1933	9.26	13.85	14.79	6.61	16.14	6.21	5.42
1932	10.43	13.73	15.27	10.77	11.54	6.96	7.68
Average 5 years	9.31	13.69	13.83	7.64	15.03	6.29	6.53

5. THE MARKETING OF THE CROP.

The carry-forward was 1,750,240bush., and with the 1933-34 crop a total of 37,123,706bush. were available. 4,000,000bush. are required for seed and probably 3,500,000bush. for home consumption, including feed for stock and a three months' supply carry forward before the next crop is matured; less this 7½ millions the balance available for export was 29,600,000.

To date of this Bulletin, it is estimated that 10,750,000 has been exported, leaving a balance available for shipping of 19 millions.

It is interesting to record the countries buying the Wheat and Flour, and also Barley, which is now a very useful item of export.

FIVE MONTHS OVERSEA EXPORTS (DECEMBER, 1933, TO APRIL, 1934).

Chief Countries.	Wheat.	Flour.	Barley.
	Bush.	Tons.	Bush.
United Kingdom	5,802,580	12,427	1,145,470
China	—	—	—
Japan	1,133,863	3,244	253,422
Africa	2,217	1,509	—
Egypt	60,953	5,023	—
Belgium	18,513	—	118,868
Netherlands and North East Indies	60	1,457	—
Peru	273,740	—	—
Russia	—	—	—
New Zealand	—	—	144,180
Other (including "For Orders")	964,585	4,092	—
Total 5 months, 1933-34	8,256,511	27,752	1,661,940
Total 5 months, 1932-33	18,993,810	30,522	1,875,968

Values of Above.—Wheat £1,041,957 (£2,628,063), Flour £144,374 (£190,293), Barley £186,999 (£220,745).

6. AREA INTENDED TO BE CROPPED, 1934-1935.

Particulars have been received from farmers in all Hundreds of the State as to the areas intended to be sown for the 1934-1935 season. These indicate that the Wheat Areas for all purposes will be decreased by approximately 15 per cent. and the Barley and Oaten areas increased, especially the latter.

At a later date information will be obtained as to the actual sowings.

WHEAT, 1933-34—Acres 3,821,795; yield 35,373,466bush.; average 9.26bush.

WHEAT, 1932-33—Acres 4,066,782; yield 42,429,616bush.; average 10.43bush.

ACREAGE CROPPED.

Divisions.	Total Wheat, Barley, Oats.	Grain.			Hay (W.B.O.).	Fed off Areas (W.B.O.).
		Wheat.	Barley.	Oats.		
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Central	979,611	573,748	223,396	29,168	144,374	8,925
Lower North	1,034,848	857,848	46,948	13,467	102,225	14,360
Upper North	388,918	363,117	715	2,051	21,620	1,415
South-Eastern	110,267	44,175	12,045	20,269	31,399	2,379
Western	1,320,944	1,110,241	12,819	104,688	76,166	17,030
Murray Mallee	1,114,761	872,666	11,500	95,431	121,823	13,341
Total, 1933-34 ..	4,949,349	3,821,795	307,423	265,074	497,607	57,450
Total, 1932-33 ..	5,039,942	4,066,782	314,286	174,244	450,512	34,118
Increase or decrease ..	-90,593	-244,987	-6,863	90,830	47,095	23,332

2. PRODUCTION OF GRAIN AND HAY.

Divisions.	Grain.						Hay (W.B.O.).
	Wheat.		Barley.		Oats.		
	Bush.	Av.	Bush.	Av.	Bush.	Av.	Tons.
Central	7,943,937	13.85	3,944,979	17.66	392,031	13.44	201,688
Lower North	12,689,577	14.79	782,361	16.66	218,511	16.23	120,681
Upper North	2,399,603	6.61	7,149	10.00	23,874	11.64	21,168
South-Eastern....	712,988	16.14	281,098	23.34	341,090	16.83	39,284
Western	6,899,363	6.21	151,519	11.82	615,970	5.88	52,956
Murray Mallee ...	4,727,998	5.42	87,176	7.58	496,296	5.20	88,414
Total, 1933-34	35,373,466	9.26	5,254,280	17.09	2,087,772	7.88	524,191
Total, 1932-33	42,429,614	10.43	6,070,161	19.31	1,788,712	10.27	547,060
Increase or Decrease	-7,056,148	-1.17	-815,881	-2.22	299,060	-2.39	-22,869

3. FIVE YEARS' COMPARISON.

Year.	Wheat.			Rainfall Agric. April- Nov.	Value of Oversea Exports.	
	Area.	Yield.	Average Per Acre.		Wheat and Flour.	Barley.
	Acres.	Bush.	Bush.	Inches.	£	£
1928-29	3,445,563	26,826,094	7.79	9.39	3,911,088	211,099
1929-30	3,645,764	23,345,093	6.40	9.57	3,866,967	77,660
1930-31	4,180,513	34,871,526	8.34	11.31	3,037,811	342,732
1931-32	4,071,370	48,093,102	11.81	13.27	5,901,673	413,034
1932-33	4,066,782	42,429,614	10.43	14.70	5,225,173	319,877
Mean	3,881,998	35,113,086	9.05	11.65	4,388,542	272,880
1933-34	3,821,795	35,373,466	9.26	11.66	2,390,419 10 months	277,675 10 months

ACTIVITIES AT ROSEWORTHY AGRICULTURAL COLLEGE, 1933-34.

PART I.—A GENERAL REVIEW.

[By ALLAN R. CALLAGHAN, D.Phil., B.Sc. (Oxon.), B.Sc.Agr. (Syd.),
Principal Roseworthy Agricultural College.]

INTRODUCTORY.

For several years past College harvest reports have been published annually. These have dealt almost exclusively with results of cropped land, plus certain experimental work on cereal varieties and cereal culture. These records are of particular interest and value. For the year under review, however, a rather more ambitious and comprehensive report is intended, mainly with the object of meeting the needs of the time, and also to make the data which are available of greater general accessibility and interest.

The unprecedented plight of Australian wheat farming has called for a detailed examination of the whole structure of agriculture. The most urgent need of the moment is to reduce costs. Eschewing politics, the agriculturist by surveying the problem in a broad way, realises that costs may best be lowered by the acceptance and practice by the farmer of the most efficient of the existing methods of production, and also by the partial substitution of primary commodity lines less costly to produce.

The metamorphosis characterising the development of agriculture in new lands has proceeded step by step in South Australia, as well as in the wheat lands of Australia as a whole. Speaking in terms of agricultural principles, the pioneer stages of development have passed as far as most districts are concerned. The phase of temporary agriculture, which is both necessary and permissible during the early stages of agricultural development, must give way to a more diversified system. The value of the land is in its productivity, decline in productivity means decline in value, consequently, continuous cropping, or regular cropping in rotation with fallow ultimately reduces the intrinsic value of the land. Continuous cropping—and fallowing falls into the category of cropping, for it is a period when serious calls are made upon the organic matter of the soil for the production of Nitrogen—actually entails a continuous drain upon the resources of the land without any attempts being made at replacement. This type of farming is being followed even in many of the older settled areas of our wheat lands where it is most damaging. I refer particularly to leasehold land which is being farmed to meet the immediate needs of the lessee with no thought of the future value of the land.

The adoption of a system whereby livestock enter into, and become inseparable from, the agriculture of the farm is essential, if the best principles are to be followed. What is more, at the present time, such a system is imperative if the business of farming is to be made profitable and permanent. Such a scheme of affairs does not by any means involve the discontinuance of wheat growing, but it does involve the adoption of wider and more adequate rotations. Under it, every opportunity is given the land to recover; by carrying sheep and other livestock valuable ingredients are returned to the land through their droppings, and organic matter is returned to the soil during the period when the paddocks are resting from cropping and fallow, through the agency of decaying plant tissue.

Apart altogether from increasing the direct returns from their farms under such a system of management, farmers have at their disposal the means of increasing their efficiency as wheat growers, for better yields may confidently be expected.

The Roseworthy Agricultural College farm has been, and is being, farmed along the lines recognised as a permanent system of agriculture, a system which maintains livestock operations as an integral and very essential feature of the cropping and rotational aspects of farming. For this reason a full report of the most outstanding features of the agricultural year must necessarily include reference to, and be co-ordinated with, all lines of activity which are directed towards the livestock carrying capacity of the property.

Additional to this general review there are certain specialised services rendered by the College, such as cereal variety trials, other experimental work and plant breeding, which will receive individual notice under separate reports. Subsequently it is intended to issue all reports as one bulletin.

COLLEGE FARM ACTIVITIES.

The activities of the College farm are very different from any ordinary farm of similar area, and although its management embodies the practice of a balanced system of agriculture, the diversity of its work entails specialised procedure. With a stud of Jersey cattle, a stud of Southdown sheep, stud pigs of various breeds, as well as stud Clydesdale horses, not to mention the various phases of experimental work, the activities combine sidelines of work, seldom if ever undertaken on a wheat and sheep farm.

One of the results of this specialisation in livestock is the retention of much larger quantities of conserved fodder and grain on the place than would be necessary were sheep and fat lamb raising the only consideration outside wheat growing. This must be carefully borne in mind when summing up the position, for much hay and grain, which would ordinarily bring direct returns, is utilised on the farm, thereby inflating the comparative carrying capacity of the property.

By reason of the large number of students in training on the College farm, the assessment of economic values, especially those connected with costs, is an item manifestly difficult. There is a superfluity of labour of variable skill and intermittent energy, the working value of which is well nigh impossible to assess. This is another consideration which complicates the presentation of reports on farm operations from the view-point of agricultural economics.

This review is chiefly concerned with the farming of the College farm for the year covered from the 1st April, 1933, to the 31st March, 1934, and one of the main objects is to bring before the notice of farmers the results which have followed the practice of certain broad agricultural principles.

Without placing undue emphasis upon the diverse and specialised nature of the work conducted at the College, there are several features, vital to the correct interpretation of the farming system in operation, which must be brought into sharp relief. Firstly, there is the rotational system with areas cropped, areas fallowed and areas rested, together with the harvest returns for the year; secondly, the actual carrying capacity of the farm; and thirdly, the returns from sheep with a translation as near as practicable of the possible sheep-carrying capacity. These aspects form part of the general theme of this report, but I do not purpose restricting myself to them: they are itemised merely as focal points for analysis of the data given herein.

GENERAL ASPECTS OF THE YEAR'S OPERATION.

Areas.—The area held by the College covers 2,300 acres, and excluding land occupied by buildings, vines, and orchard, plantations and scrub land, the area of agricultural or arable land embraces approximately 2,000 acres. For the period under review this was occupied as shown below, and illustrated on the accompanying map.

Treatment of College Farm Areas for Period 1/4/33-31/3/34.

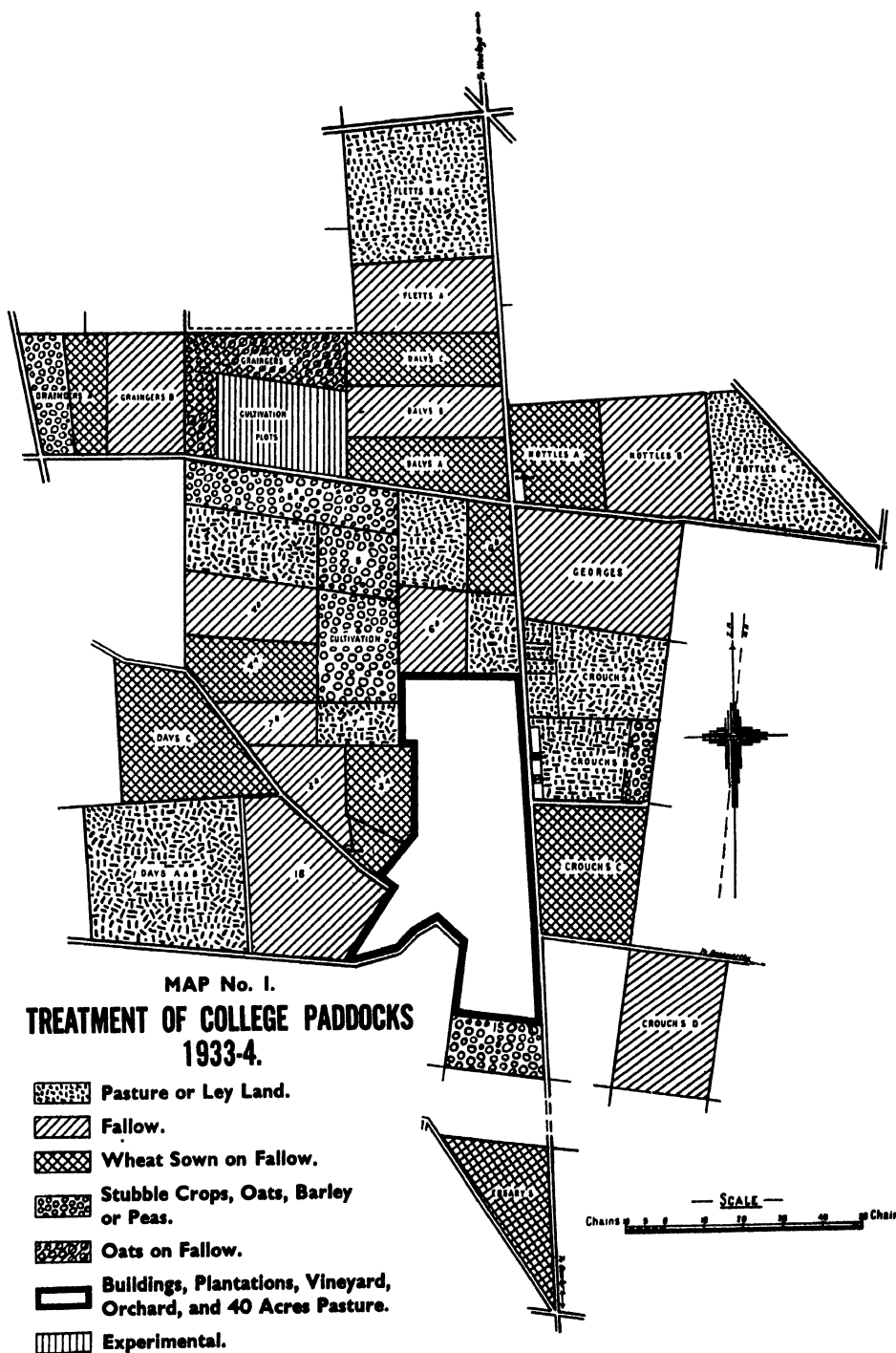
Area fallowed in preparation for 1934 seeding	545 acres
Area rested as pasture (ley land)	595 acres
Area cropped (a) Wheat sown on fallow	532 acres
(b) Oats (122 acres), barley (37 acres), peas (38 acres), ensilage (70 acres) sown on stubble	267 acres
Total Arable area	1,939 acres
Other areas available for grazing	40 acres
Total	1,979 acres

The second map shows the proposed treatments for this year. It will be seen that the normal rotation practised is wheat-pasture-fallow. Variations in the rotations are made in cases where stubble land is cropped, and in some cases the rotation has been wheat-stubble crop (oats, barley, or peas)-pasture-fallow; in one paddock the intention is wheat-peas-oats-pasture (for two to three years)-fallow. This latter arrangement is designed to rest a paddock for a longer period than normally, and periodically every large paddock on the farm will receive a longer pasture term than the one year of the normal rotation. The oats sown following the peas will be sown as a cover crop to a light seeding of Wimmera Rye Grass and Lucerne.

These figures given above indicate that approximately 635 acres were available throughout the year for the grazing of animals, whereas the 800 acres under crop were out of commission for grazing for the greater part of the year and 550 were available only for fallow grazing. The mean number of livestock carried for the period under review was maintained, except for stall and other hand feeding, on these areas. All feed fed to livestock is produce of the College Farm, the only purchases for the year being small quantities of bran for show stock and medicinal purposes. In addition to the arable land mentioned above, small paddocks around the College buildings, amounting in all to about 40 acres, were available to grazing animals, two acres of lucerne were irrigated during the summer and soiled for milch cows and mares with foals, one acre of lucerne was irrigated and used in the poultry run.

Livestock.—The mean numbers of livestock held from the 1st April, 1933, to the 31st March, 1934, are given, together with data relative to their nature and feeding.

The mean number of sheep was 939, and in addition agistment was given 460 wethers for five weeks during the spring. Hand feeding of pregnant ewes and Southdown stud sheep was carried out during February and March of this year, chaff, ensilage, oats, and peas being used in the rations, otherwise the whole of the flocks were maintained by grazing on arable land. During the year 335 fat lambs were marketed and 838 sheep and 104 lambs shorn, yielding 9,355lbs. of wool. The sheep consist of a Southdown stud, Merino and half-bred ewes for fat lamb production, hoggetts, miscellaneous rams for experimental purposes, and ration sheep.



Cattle.—Throughout the year an average of 32 cows in full milk was maintained; this, with an average of 67 dry cattle, including calves, brings the total number of cattle carried for the year to 99. The milking herd is fed daily, and by far the greatest bulk of the feed is ensilage, with oats as the concentrate, but chaff, green lucerne, and some wheat were also fed at different periods of the year. All other cattle during the summer months were fed ensilage in the field; young calves are fed whole milk. The main herd is of Jersey stud cattle, a few half-bred Lincoln Reds remaining in the dry cattle.

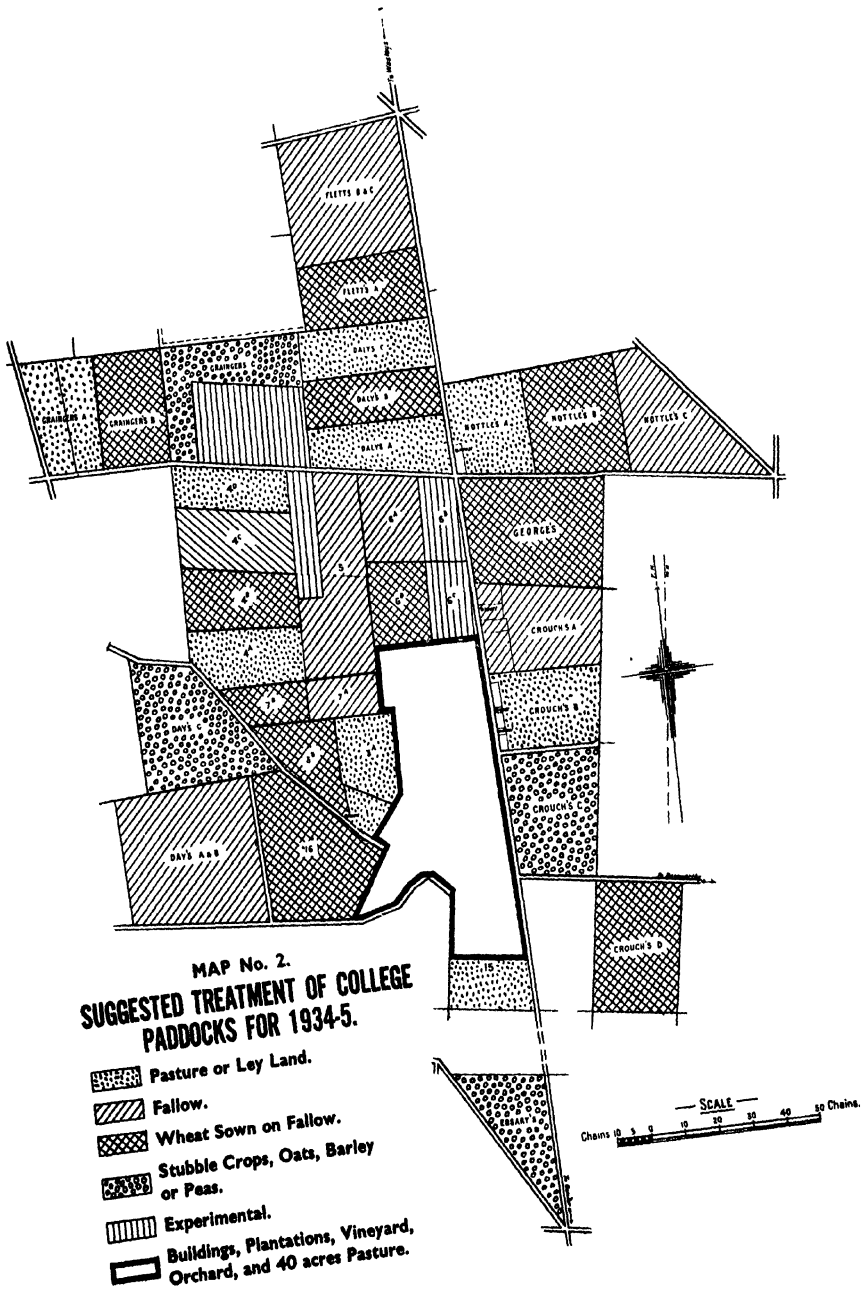
Horses.—The mean number of horses for the year was 78; this includes 58 working horses, a Clydesdale stallion, foals, yearlings, and two-year-olds. The feed is chiefly hay and chaff, with oats as a concentrate during periods of maximum work. Lucerne is fed during the summer to mares suckling foals, otherwise no other footstuffs enter into the regular rations.

Pigs.—With 201 pigs in the swine herd for the year, there is a consumption of large quantities of grain which would otherwise be sold. Skim-milk, wheat, barley, and peas are the foods entering into regular rations, while for experimental purposes green lucerne and meat-meal have been fed. The latter, of course, is not produced on the place and must be purchased. The pigs consist of stud Berkshire, Large White and Tamworths, with various half-bred sows, from which are bred porkers and baconers for the market. The average number of breeding sows maintained for the year was 35.

Poultry.—There were 1,239 birds carried for the year, consisting chiefly of fowls of various breeds, a few ducks, and some turkeys. The poultry are fed chiefly crushed grain, together with green fodder, and for the latter purposes approximately an acre of lucerne irrigated over the summer months.

Considering the pigs and poultry as two means whereby grain produced on the property is marketed, there remain the cattle, horses, and sheep, all of which are dependent upon grazing and fodder produced on the farm. On the average sheep and wheat farm the number of horses required is less and cows and dry cattle need hardly be considered at all. On the basis of comparison these may be regarded as surplus livestock, and they represent a grazing value of approximately 719 sheep. To this there is to be made an allowance for 460 sheep given agistment for five weeks; this in terms of sheep per year amounts to 45. By the adjustments suggested it is possible to arrive at a conservative approximation of the true sheep-carrying capacity of the property last year. The mean number carried was 939, and adding 764 on account of adjustments, brings the total to 1,703 sheep. This represents a carrying capacity of 0.86 sheep per acre, including all cropped areas, and after allowing for sufficient horses to carry out all farm operations.

Harvest Returns.—Having in mind the livestock carried on the farm the harvest returns for last year are the more striking; they indicate, above everything else, that a bountiful season was enjoyed, and taken advantage of. This latter is important, for good seasons are not likely to continue uninterrupted, and if there is one thing I am anxious to draw specific attention to in this report, it is to the fact that a large quantity of fodder was conserved, and that a large proportion of it was conserved from self-sown areas, included in areas set out at the beginning as pasture or ley land. This demonstrates that in spite of the large numbers of stock carried, the season was sufficiently bountiful for one paddock at least to be closed, and its natural growth conserved as ensilage



and hay. It means that in the event of a poor year the advantages of the good year may be more fully utilised, and it acts as an insurance to the carrying capacity of the property. It shows, in other words, that the property was not by any means stocked to its maximum last year, and that the figures stated are fair average of the mean carrying capacity of the farm in all seasons.

The following are the harvest figures for the year:—

HARVEST RETURNS, 1933.

	Total Acreage.	Total Yield.	Average Yield Per Acre.			Mean Yield for 28 Seasons.		
		Bushels.	Bushels.	Lbs.		Bushels.	Lbs.	
Wheat	389	9,675	24	51		17	7	
Oats	83	2,480	29	35		23	21	
Barley	38	826	21	42		24	38	
Peas	38	607	15	50		—	—	
		Tons.	Tons.	Cwts.	Lbs.	Tons.	Cwts.	Lbs.
Hay (crop)	195	430	2	4	19	1	18	85
Hay (self-sown)	40	50	1	5	0	—	—	—
Ensilage (crop)	70	490	7	0	0	—	—	—
Ensilage (self-sown) ...	80	240	3	0	0	—	—	—
Straw (baled)	70	100	1	8	64	—	—	—

The harvest returns, particularly grain yields, were considerably lowered as a result of severe finishing conditions experienced during October, nevertheless the yields compare more than favourably with mean yields. The area harvested for wheat was the largest ever taken off at the College in one year, and only on two occasions previously has the average yield of 24bush. 51lbs. been exceeded, once in 1909 by 14lbs. and again in 1920 by 1bush. In other words the average yield this year was only 1bush. off the record and it was 7bush. above the average. This is the more significant when it is recalled that in the two years 1909 and 1920, the rainfall recorded was well above average, being 24.05in. and 19.30in. respectively, whereas, in the year just closed the rainfall of 16.85in. was below the average, which for the past 51 years is 17.52in.

Summating these figures to crystallise them, it is found that from the total of 930 acres harvested 13,588bush of grain, 480 tons of hay, 100 tons of straw, and 730 tons of ensilage were harvested. Superimposing the data given concerning the livestock carried, and making very liberal allowances for the conditions under which they are kept at College, the results are at least arresting.

Balance of Production and Consumption.—The following table is compiled to indicate the reserves on hand, and also to show the quantity of produce available for sale.

Feed.	Fed to Livestock, 1933-34.	Harvested, 1933-34.	Carried over from 1932-33.	Carry over for Sale and Reserves from 1933-34.
	Bushels.	Bushels.	Bushels.	Bushels.
Wheat	3,840	9,675	2,924	8,759
Oats	2,051	2,480	1,148	1,577
Barley	1,130	826	720	416
Peas	315	607	297	589
	Tons.	Tons.	Tons.	Tons.
Chaff and Hay ...	547	480	618	551
Ensilage	445	730	255	540

On the basis of last year's production and making due allowance for seed wheat for this year's seeding, a little more than 5,000 bush. of wheat are available for sale. Practically all the other produce is fed to animals and marketed in this way or else it is held in reserve for feeding purposes.

Fat Lamb Production.—One of the most remunerative of College activities is that of fat lamb production, and as this enters into the possible scope of a wheat and sheep farm a few figures bearing on the work at College last year should be of interest. Last year experimental work with the Border-Leicester-Merino flock reduced the percentage of lambs and the total numbers, but from the point of view of returns a substantial improvement was noted.

PARTICULARS OF LAMBING, 1933.

Breeding of Ewes.	No. of Ewes Mated.	Deaths before Lambing.	No. of Ewes Lambing.	Rams Mated.	Lambs Marked.	Lambing Percentage.	Remarks.
Merino	99	2	97	Border-Leicester	94	97	Neither group interfered with by experimental treatment—Average, 102% Twin Lamb Disease Investigation.
Merino	25	1	97	South-down	104	107	
Dorset-Merino	73						
Corriedale and English Leic.-Merino	40	4	36	South-down	21	58	Ewes kept enclosed in a small yard on chaff feed. Many dead lambs taken away from these ewes.
Merino	60	9	111	South-down	102	92	Drought feeding Experiment 9 ewes died with (T.L.D.) before lambing and 8 lambs died before marking.
Dorset-Merino	60						
Border-Leicester-Merino	25	1	24	Dorset .	24	100	These ewes were mated in separate flocks of 25 (to one ram) which accounts for the low percentage in some cases.
	25	—	25	Suffolk ..	17	68	
	25	—	25	Ryeland .	8	32	
	25	—	25	Shropshire	10	40	
	25	1	24	South-down	18	75	
Total . . .	482	18	464		398	86%	

A report on the feeding trials has already been issued and details of the fat lamb breeding experiment will be recorded when the results from this year's matings are available.

The total number of fat lambs marketed last year was 335 and the average net return was 16s. 3d. per head. Of this total 156 were marketed at the Abattoirs with an average net return of 15s. 4d. per head, whereas 142 lambs exported direct returned 17s. 10d. per head net. In addition to this, by private sale of reject and other lambs 37 were disposed of to return 13s. 8½d. per head net.

Five consignments of lambs were entered in Export Competitions. The first consignment by Southdown out of Dorset Horn-Merino half-bred ewes was successful in winning the Cooper Cup for the best entry of lambs exported from South Australia in 1933.

SUMMARY.

1. The Roseworthy College Farm has been, and is farmed with the object of maintaining soil condition and the productivity of the land.

2. A more diversified system of agriculture is developing in the agricultural areas, and livestock is entering more largely into the management of most farms.

3. Out of total arable area of approximately 1,950 acres, 550 acres were fallowed, 600 acres were rested as pasture or ley land, and 800 acres were under crop.

4. During the year the livestock carried consisted of 939 sheep, 99 head of cattle, including 32 cows in milk, 78 horses, 201 pigs, and 1,239 head of poultry. No feed other than small quantities of bran and meat meal was purchased, and the livestock were maintained on the property by grazing and feeding of fodder produced on the place. Excluding horses necessary for farming operations, the pigs and the poultry, the equivalent sheep carrying capacity of all areas including fallow and crop amounted to 0.86 sheep per acre.

5. From cropped areas and the produce of one self sown paddock, 13,588 bush. of grain, 480 tons of hay, 100 tons of straw, and 730 tons of ensilage were harvested.

6. During the year 335 fat lambs were sold locally or exported at the average net return of 16s. 3d. per head. The average net return for lambs sold through the Abattoirs was 15s. 4d., for those exported direct the average price was 17s. 10d.

BOTFLIES.

Replying to the Secretary of the Elbow Hill Agricultural Bureau, who asked for the best treatment for botfly grub in horses, Mr. R. H. F. Macindoe, B.V.Sc., M.R.C.V.S. (Deputy Chief Veterinary Officer) says although the majority of horse-owners hold the opinion that the botfly grub found in the stomach is injurious to the animal's health, this view is contrary to fact. While it is admitted that occasionally an animal may die through an impaction of the stomach due to the interference with movement of food from the stomach into the intestines, such cases are exceptional, and the grub does little harm when one realises how prevalent the insects are, for practically all horses harbour them.

To get rid of them is by no means easy, and treatment is, generally speaking, unsatisfactory, as the grubs are very resistant to the effects of most drugs.

If medicinal treatment is attempted, the best drug for the purpose is carbon bi-sulphide, which is a liquid, and administered in gelatin capsules, each containing 2-3 drams. The routine treatment is as follows:—Keep the horse without food for 12-20 hours, then give 1 capsule; after an hour, give a second capsule; and after another hour give a third capsule.

As carbon bi-sulphide is strongly irritant, very great care should be taken in the administration, to see that the cap of the capsule does not come off, or that the horse does not crush them in the mouth.

Although this treatment is the best, it is not recommended for general use by the horseowner himself, owing to the danger of injury which may occur to the membrane if the capsules should break.

Another treatment is tincture of iodine $\frac{1}{2}$ oz., administered in a capsule 4-5 mornings in succession, and about two hours before feeding, the last dose to be followed by a drench of raw linseed oil, 1 pint; oil of turpentine, 4 tablespoonsful. The best time to treat horses varies in different localities, but usually the best time would be between March and May.

THE SELECTION AND TREATMENT OF FRUIT TREES AND VINES IN THE HOME GARDEN.

(Wireless Address by R. FOWLER, Manager Blackwood Experiment Orchard.)

The foundation of a successful fruit garden lies in the careful preparation of the soil before planting. In a test set out for the purpose at the Experimental Orchard at Blackwood it has been proved that it pays to subsoil the ground before planting, so that in the preparation of a garden I would say, if possible have the soil broken up to a depth of 12in. to 18in. either with horse implements, or else trench or deep dig it by hand. If this is not possible over the whole area a strip say 6ft. to 8ft. wide where the trees will stand might be done, and failing this, then a hole approximately 4ft. x 4ft. should be made.

In all of these operations the subsoil should be broken up well, but not brought to the surface. When digging the holes the surface soil should be removed, say, to the depth of 9in., the subsoil well loosened to the depth of another 9in., but not removed, and if manure of any sort is to be used, it should be well mixed up with the subsoil. By breaking ground up as suggested, it enables the root system of the tree to penetrate freely to a depth that will not be subsequently rapidly affected by heat or cold. It is not advisable to dig large deep holes, particularly into stiff clay subsoils, as the tendency then is for the water to drain into the hole, and trees cannot thrive except in well-drained situations.

When planting, the tree should not be placed at a greater depth than it stood in the nursery, as indicated by the soil mark on the bark. It should be firmed in well, starting from the outside of the hole and working in to the centre, and when finishing, the earth should be heaped up to the tree trunk to a height of 1in. to 2in. above the ground level to allow for subsequent sinkage.

It is not advisable to have the surface immediately surrounding the tree lower than the ground level, as this acts as a basin for collecting surface water, and will cause the loose soil to become sodden, a condition very detrimental to the young tree.

Before planting, injured or damaged roots should be trimmed with the secateurs, and when planting, the roots should be carefully spread out, so that the tree will be well braced from all sides, and not liable to be blown over.

Generally the best time to plant deciduous fruit trees in this climate is during early winter after a good soaking rain. The soil will still be warm and the roots will send out fresh fibrous roots to replace those torn off and injured, even while the top portion of the tree is quite dormant.

A series of tests carried out in the Experimental Orchard have proved that trees planted in May make quite a considerable amount of root growth during the winter months where the soil conditions are favourable.

If manure is to be applied, and it is generally a good plan to give the tree a little assistance in this manner, it should be well mixed with the subsoil before the tree is planted, in the case of farm or stable manure or bonedust. If sulphate of ammonia is used, it should be well mixed with the surface soil. The amount of manure to be used might vary with the quality of the soil, but as a basis to work upon I would suggest for farmyard manure 4 to 5 good shovelful of well-fitted manure, for bonedust 1lb., or roughly 2 to 3 double handful, and for sulphate of ammonia 3ozs. to 4ozs. Each tree should be tied to a stake, driven down before planting, to protect the tree from injury during tillage operations the first couple of years. If conditions are dry at the time of planting, an irrigation should follow, and during planting operations the roots of the trees should not be unduly exposed to the sun.

The distance apart will, to a large extent, depend on the size of the home garden and the number and variety of the trees to be planted, but as a general rule 16ft. to 18ft. apart is close enough, though under most orchard conditions

trees are planted 20ft. apart. They should be kept at least 8ft. or 10ft. away from the surrounding fence, and where this is of palings or iron, it affords good shelter without removing moisture or plant food. A shelter of some kind is necessary, and failing the regular fence, a hedge of some sort—Carob, Tagosaste, or Kaffir Apple is suggested.

In selecting the young trees from the nursery, it is well to avoid very large trees, which are probably two or three seasons old, and to select those of one season's growth from the bud, carrying well-ripened, short-jointed wood, with plump, well-defined buds.

Soon after planting, but not before, the young trees should be pruned, cutting out the centre, if the tree is already headed, to give an open framework, leaving four or five leaders in the case of peach and apricot trees, cutting generally to an outside bud, so that the subsequent growth will tend to keep the tree open. The reason for not pruning before planting is that the terminal buds may be injured in the process of planting, and in addition, a better idea can be formed of the placing of the limbs and selection of terminal buds.

In deciding which varieties to plant, the commercial grower has to be guided by the future markets for his produce, whether it is to be sold locally fresh, canned, or dried, or exported to overseas markets. No such considerations affect the home garden. Here it is a question of good fruit for eating and preserving, and in some cases drying, and a continuity of supplies, that is, varieties so arranged that as one finishes another will be coming on, and not a glut at one period and no fruit at another.

In the following lists of varieties I have endeavoured to arrange them so that there will be little overlapping:—

Apricots.—Oullin's Early, Moorpark, Late Riverside.

Peaches.—Wright's Early, Wiggins, Peregrine, Louis Grognet, Finlayson's Seedling, Prizetaker. Canning—Elberta for freestone or Golden Queen for clingstone.

Nectarines.—Dr. Chisholm, Goldmine, New Boy, W. C. Fripp.

Plums.—Angelina Burdett, Early Orleans, Grand Duke, Greengage, Jefferson, Prune d'Agen. Canning—Coe's Golden Drop, Jefferson, and Greengage.

Plums—Japanese.—Formosa, Burbank, Climax, Santa Rosa, Rubio, and Wickson.

Almonds.—Hatch's Nonpareil (subject to gumming), Ne Plus Ultra, Jose's B1, Peerless, Chellaston.

The above lists contain probably many more varieties than could possibly be planted in the home garden, and from these I would select the following twelve:—

Apricots (2)—Oullin's Early, Moorpark.

Peaches (3)—Wright's Early, Louis Grognet, Elberta.

Nectarines (2)—Dr. Chisholm, Goldmine.

Japanese Plum (2)—Climax, Wickson, or Santa Rosa.

European Plum (2)—Angelina Burdett, Jefferson.

Orange (1)—Washington Navel.

Lemon (1)—Lisbon.

If more space is available, I would plant a Persimmon (Kurokumo or Jubilee) and a Loquat (Sewell's Enormity). The Almonds would be planted probably along the back fence, and any of the varieties mentioned could be selected.

The laying out of the garden gives room for individual taste, and no set plan can, therefore, be advocated, but I think it is a good plan to group your trees to the best advantage in the ground available, and plant vines so that they can

be grown with the fences acting as a trellis. In this position they are out of the way, and do not interfere much with the general lay out. Trees and vines should not be interplanted.

Having now dealt with the preparation of the soil, and the selection of the trees, we come to the subsequent treatment.

Remember that the first few years are the most important to young trees. If at this stage they are neglected and allowed to become stunted, they have very little chance afterwards of making successful trees, and it is mostly on good cultivation that their future successful growth depends.

It is not enough to prepare the ground, dig a hole, put the trees in, and then leave it for the rest of the season. The planted portion of the garden should be thoroughly tilled during the summer months, the hoe and the fork should be kept going, so that the young tree will get a decent chance, and it will repay for the time and attention given to it.

For the first few years vegetables, particularly root crops, can be grown between the trees, and to some extent later on, if the ground is well treated with manure, but trees and vegetables, as a rule, do not thrive well together.

My remarks so far have applied to deciduous trees—those which lose their leaves in winter—but different treatment in some particulars is necessary for citrus trees, orange and lemon. The time for planting these trees is in the early Spring, about September or October, just when they show signs of returning growth. If planted now, there is a danger of the young growth, which these trees frequently throw out after being transplanted, being cut by frosts.

They need pruning rather severely after being transplanted, if the root system has been mutilated or dried up. It is well to see that the roots of young citrus trees are not exposed to the air at all before planting, and nurserymen, as a rule, send out these trees with a ball of earth attached wrapped round with a piece of hessian or bagging. This need not be removed when planting, as it will soon rot in the soil. Citrus trees need protection from wind, and it is well to provide this in some way. A thin covering of straw wrapped loosely round each stem is a protection from the sun if the pruning has unduly exposed the bark, and will be found an advantage. Citrus trees, being evergreens, will require more water than deciduous trees, and careful attention must be given

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to this, but that does not mean that they should be overwatered. The soil should be kept moist, but well drained, and not allowed to become water-soaked or sodden.

PESTS AND DISEASES.

The most troublesome fungus pests likely to be found will be the *Curl Leaf* of the peach and *Shothole* of the Apricot, Almond, and Japanese Plum.

No doubt *Curl Leaf* is familiar to all peach growers, and its characteristic appearance on the trees well known. It is not as destructive in the drier parts of the State as it is in the moister districts, but it should be guarded against. It is caused by a fungus known as an internal fungus, that is, the mycelium of the disease penetrates into the leaves, and once inside cannot be reached by any spray mixture. The spores, or what might be termed "seeds" of the disease, pass the winter somewhere on the tree, mostly about the buds, and commence their active growth just when the tree itself commences to burst into bloom. It is at this time that spraying for this disease should be done at what is called the "pink" stage of the bud. If delayed until the leaf buds are well developed, the disease will have found entrance into the leaves, and it cannot then be checked, so that it is quite useless to spray peach and nectarines trees after the disease once appears on them. Generally, the effect then is that the diseased leaves will eventually curl up and fall off, and if the attack has not been severe, little injury may result, but sometimes trees are so badly attacked that most of the first leaves fall off, and before the second leaves come the fruit also has fallen off. Very often the fruit itself is attacked by the disease. The remedy is to spray at the right time, that is, the "pink" stage of the blossom buds, with Bordeaux or Burgundy Mixture.

Shothole of the apricot and almond is also a fungus disease causing considerable damage at times. The name is derived from the characteristic round holes which appear in the leaves, much resembling small holes that might have been caused by shot from a gun. The holes are the result of injury caused by the disease affecting that portion of the leaf.

The treatment is the same as that for *Curl Leaf* of the Peach, and should be done at the same time, and with the same mixture, but the application is sometimes repeated with a certain amount of benefit if the disease appears badly on the trees at a later period, but generally, one application in the Spring is enough, especially if an autumn spray has been applied. It is of benefit to spray during May with Burgundy or Bordeaux Mixtures to destroy the winter spores.

European Plums may also be affected with *Prune Rust*, another fungus disease, but the attack generally comes so late in the season that little harm results.

Insect pests are likely to be *Black* and *Green Aphis* of the Peach and Japanese Plum and *Red Spider*, particularly on the Almond, and *Curculio Beetles*. The best remedy known for aphides is Nicotine Sulphate or Black Leaf 40. This can be procured in small quantities, and though expensive, a little goes a long way. It is used at a strength of 1 pint to 100 gallons of water, with the addition of 4lbs. of soft soap. Directions will be found on the container. As all the Aphis family increase at an enormous rate, it will be found necessary to spray every few days for a short time, until the pest is well under control. Generally aphides disappear when the very hot weather commences. A winter spray with a Red Oil emulsion or Tar Distillate also helps in the control of these pests, and with Red Spider as well. Red Oil or Tar Distillate cannot be used in the summer. They are strictly dormant period sprays.

For *Red Spider*, Lime Sulphur Spray in the summer is very effective, but should not be used stronger than 1 part solution in 70 parts of water.

Curculio Beetles are very difficult to control, but sometimes 1lb. of Arsenate of Lead to 8galls. of water proves effective. Other methods are trapping, bandaging with wool, etc.

LAKE ALBERT AND JERVOIS HERD TESTING ASSOCIATION (formerly Lake Albert).

RESULTS OF BUTTERFAT TESTS FOR APRIL, 1934.

Herd No.	Average No. of Cows in Herd	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during April.	Per Cow during April.	Per Cow December to April.	Per Herd during April.	Per Cow during April.	Per Cow December to April.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
6/B ..	18-43	9-03	3,790	205-64	1,878-60	227-51	12-34	96-86	6-00
6/C ..	21-43	15-27	6,622½	309-03	2,525-79	289-26	13-50	108-32	4-37
6/H ..	23-83	6-60	3,752	157-45	1,682-37	194-07	8-14	87-09	5-17
6/Y ..	15	13	4,350	290-00	2,425-14	199-88	13-33	106-82	4-59
6/I ..	23	22-67	14,230	618-69	3,730-52	637-82	27-73	161-03	4-48
6/LL ..	23-43	16-60	8,793½	375-31	2,679-53	348-43	14-87	103-08	3-96
6/Oo ..	19-97	16-97	10,856½	543-64	3,430-38	506-19	25-35	160-06	4-66
6/PP ..	14-33	9-27	5,355	373-68	2,840-72	270-08	18-85	142-68	5-04
6/RR ..	20-53	24-27	17,767	601-66	4,064-12	803-15	27-20	169-29	4-52
6/Tt ..	19-77	17-47	11,758	594-74	3,566-83	535-93	27-11	159-51	4-56
6/Xx ..	23-80	20-30	8,942½	375-73	3,360-87	422-88	17-77	149-14	4-73
6/Zz ..	26-30	22-17	12,866	489-20	3,026-33	643-41	24-46	145-16	5-00
6/BBB	24-73	20-47	13,333½	539-16	3,240-02	629-79	25-47	145-37	4-72
6/CCO	21	16-83	8,632	411-05	2,669-72	367-00	17-48	117-21	4-25
6/DDD	20	17-47	10,040½	502-03	3,405-64	432-34	21-62	144-08	4-31
6/EEE	26-80	21-40	17,423½	650-13	3,605-20	755-89	28-20	150-88	4-34
6/FFF	22-90	19-47	13,274½	579-67	3,766-21	580-82	25-36	159-45	4-37
6/GGG	25	22	16,065	642-60	4,060-09	595-78	23-84	156-68	3-71
6/HHH	17	15-10	7,677	451-59	2,964-78	391-20	23-01	141-15	5-10
6/III	23	22-37	14,276	620-69	3,970-30	651-92	28-34	165-30	4-57
6/JJJ	25	21	12,600	504-00	2,871-75	636-08	25-44	139-94	5-05
6/KKK	30	30-83	20,779	532-79	3,733-06	819-53	21-01	146-43	3-94
6/LLL	21	17-03	9,124½	431-50	2,580-68	466-13	22-20	119-80	5-11
Means	22-79	18-21	10,969-93	481-27	3,195-34	495-87	21-76	139-49	4-52

SOUTHERN DISTRICTS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR APRIL, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during April.	Per Cow during April.	Per Cow March to April.	Per Herd during April.	Per Cow during April.	Per Cow March to April.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
9/A ..	25-93	23-47	11,841	450-65	918-19	658-50	25-40	48-83	5-56
9/B ..	15-13	13-63	5,127½	338-89	770-95	242-89	16-05	36-86	4-74
9/C ..	12	7-10	2,427	202-25	490-33	114-21	9-52	23-03	4-71
9/D ..	27	25-23	12,256	453-93	934-06	641-98	23-78	47-41	5-24
9/E ..	13	13	5,505	423-46	942-11	247-77	19-06	40-70	4-50
9/F ..	16	8-77	3,129	195-56	394-34	131-11	8-19	16-34	4-19
9/G ..	32-83	29-33	13,171	401-19	827-92	716-18	21-81	43-03	5-44
9/H ..	18-50	11-60	7,024	379-67	620-12	319-92	17-29	28-18	4-55
9/I ..	36	17	7,275	202-08	341-72	306-93	8-53	14-09	4-22
9/J ..	52-40	37-43	15,265	291-32	527-26	696-51	13-29	23-67	4-56
9/K ..	22	20-10	5,597	254-41	530-59	285-21	12-96	26-17	5-10
9/L ..	24-67	13-80	6,324½	256-36	453-32	230-13	9-33	16-88	3-64
9/M ..	17	1	135	7-94	24-35	6-90	—	1-17	5-11
9/N ..	30-97	27-93	11,440	369-39	658-37	415-74	13-42	25-30	3-63
9/O ..	21	14-90	4,701	223-86	547-88	233-83	11-13	25-09	4-97
9/P ..	55-67	30-47	15,350½	275-74	387-24	711-93	12-79	18-46	4-64
9/Q ..	15	15	5,130	342-00	—	252-73	16-85	—	4-93
9/R ..	9	6-47	1,586	176-22	—	92-27	10-24	—	5-82
Means	24-67	17-57	7,404-69	300-12	574-64	350-26	14-20	26-83	4-73

NARRUNG HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR APRIL, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during April.	Per Cow during April.	Per Cow October to April.	Per Herd during April.	Per Cow during April.	Per Cow October to April.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
1/C ..	32-63	24-33	13,171½	403-64	3,318-04	644-18	19-73	188-61	4-89
1/D ..	34-17	19-77	8,272½	242-10	2,969-66	476-78	13-95	181-92	5-76
1/E ..	36	23-33	9,580	266-11	2,867-18	532-87	14-80	151-40	5-56
1/P ..	36	30-13	19,384½	538-46	4,436-54	1,006-18	27-95	211-17	5-19
1/R ..	60-80	38-97	10,614	174-57	2,430-08	497-56	8-18	103-21	4-69
1/S ..	13-73	12-97	6,400½	466-17	3,430-26	304-80	22-17	166-59	4-76
1/EM ..	17	10-43	2,194½	120-09	3,740-99	125-97	7-41	184-62	5-74
1/GG ..	17	12-77	4,878	286-94	2,574-48	250-93	14-76	125-86	5-14
1/KK ..	19-53	15-53	9,094	465-64	3,738-64	452-02	23-14	174-96	4-97
1/NN ..	18-73	11-30	5,418½	280-20	3,090-13	258-17	13-78	151-38	4-76
1/QQ ..	15	8-10	3,447	229-80	2,578-82	191-72	12-78	130-33	5-56
1/RR ..	22-70	21-67	6,719	296-34	2,106-23	377-41	16-64	113-31	5-63
1/SS ..	17	7-10	2,620½	154-15	2,533-58	152-43	8-97	125-10	5-82
1/TT ..	12	10-90	6,324	527-00	4,319-44	322-32	26-86	213-56	5-10
1/VV ..	15	6-30	4,658	310-56	2,418-13	193-78	12-92	110-16	4-18
1/VVW ..	23	17-67	8,388½	364-72	2,667-84	391-21	17-01	123-78	4-66
1/XX ..	20	9-18	4,204	210-20	2,934-43	196-26	9-81	143-88	4-67
1/YY ..	14	8-47	4,001	286-78	2,617-03	214-57	15-33	130-26	5-36
					Nov.-April			Nov.-April	
1/ZZ ..	29-83	25-73	8,645½	289-78	2,974-95	367-57	12-31	112-66	4-26
1/AAA ..	19	9-50	3,090	162-63	2,337-14	161-24	8-49	117-74	5-22
1/BBB ..	16	12-43	3,278½	204-91	2,023-39	181-93	11-37	102-50	5-55
					Jan.-April			Jan.-April	
1/CCC ..	13	4-60	1,136½	87-42	502-07	58-64	4-51	27-28	5-16
Means	22-82	15-51	6,614-57	289-81	2,976-79	334-46	14-65	143-82	5-06

THE HILLS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR APRIL, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during April.	Per Cow during April.	Per Cow July to April.	Per Herd during April.	Per Cow during April.	Per Cow July to April.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
7/E ..	30	24-01	12,250	408-33	4,868-74	483-62	16-12	191-04	3-95
7/H ..	7	6	2,595	370-71	5,350-01	121-49	17-36	251-41	4-68
7/L ..	35-57	29-73	11,687	327-16	5,063-27	526-01	14-79	233-48	4-52
7/P ..	29-17	16-80	8,716	298-80	5,681-26	446-75	15-28	268-53	5-11
7/T ..	16	8-50	3,825½	207-84	3,825-72	146-43	9-15	167-12	4-40
7/Y ..	28	18-33	5,515½	196-98	4,543-34	236-47	8-45	197-93	4-29
7/AA ..	12	8-20	3,445½	287-12	4,455-10	170-41	14-20	195-14	4-95
7/KK ..	23	17	8,145	354-13	3,766-52	367-73	15-99	278-85	4-51
7/MM ..	39-20	22-33	8,639½	220-39	5,613-31	337-70	8-61	212-91	3-91
7/PP ..	19-80	16-80	7,347	371-06	5,451-67	373-90	18-88	273-59	5-09
7/TT ..	17-53	16-03	8,451½	482-12	5,814-38	349-73	19-95	240-93	4-14
7/UU ..	20-87	11-57	4,532	222-48	3,918-72	203-42	9-99	178-59	4-49
7/VV ..	19-83	17-80	7,735	390-07	6,676-55	345-51	17-42	301-95	4-47
7/XX ..	19-97	17-17	9,721	486-78	6,372-45	542-70	27-18	335-41	5-58
7/YY ..	25	19-50	6,277	251-08	3,182-52	295-08	11-80	140-79	4-70
7/BBB ..	70-30	57-90	24,941	354-78	4,937-26	1,162-85	16-54	223-24	4-66
7/CCC ..	24	19-83	6,330	263-75	4,955-52	279-31	11-64	221-37	4-41
7/DDD ..	12-40	12-20	5,754	464-03	5,247-82	292-67	23-60	247-71	5-09
7/EEE ..	11-53	6-93	3,931	340-93	4,413-71	198-76	17-24	215-57	5-06
					Oct.-April			Oct.-April	
7/FFF ..	19	16	7,728½	406-76	3,136-59	370-44	19-50	140-64	4-79
					Nov.-April			Nov.-April	
7/GGG ..	17	6	1,665	97-94	1,846-11	70-39	4-14	87-18	4-23
Means	23-65	17-53	7,556-29	319-49	5,061-83	348-59	14-74	224-73	4-61

IMPORTANT WEEDS OF SOUTH AUSTRALIA.

[By G. H. CLARKE, B.Sc., Botanist at the Roseworthy Agricultural College.]

No. 6.—STINKWORT.

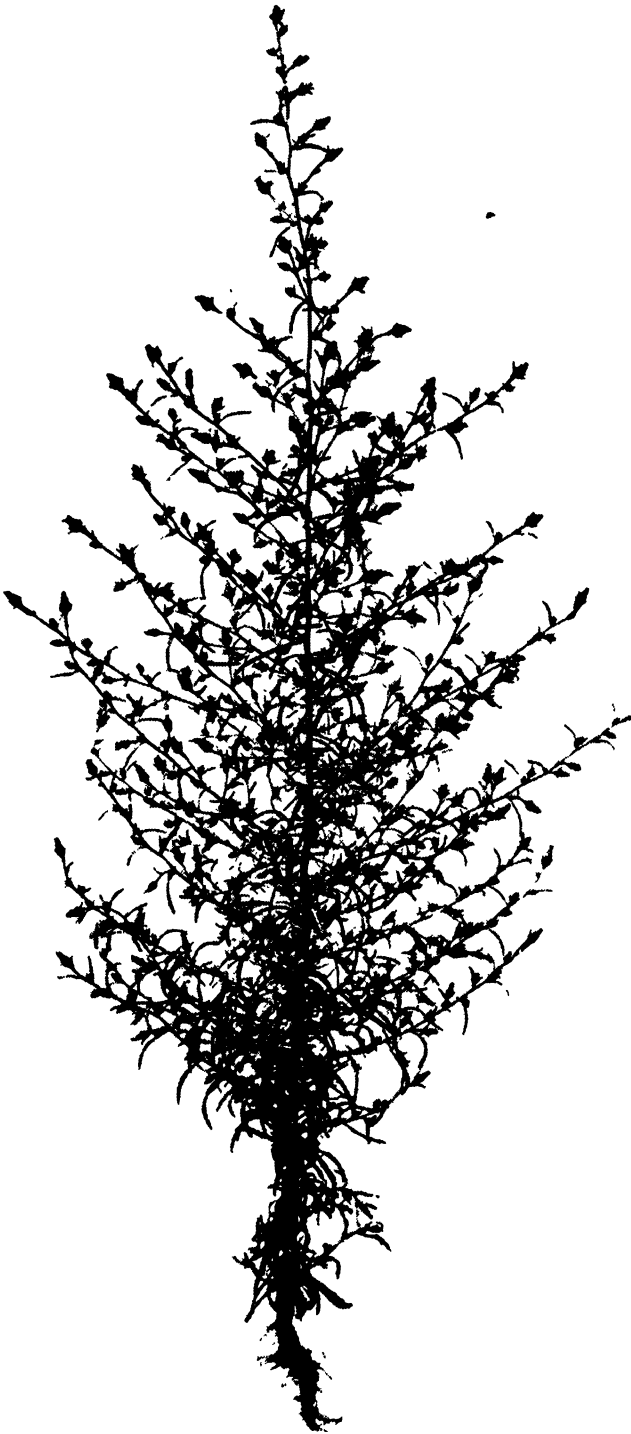
Inula graveolens, Desf.

Stinkwort is said to have first made its appearance in Australia some seventy years ago in the Onkaparinga district of this State, and though efforts were made by many farmers to keep it within bounds during the early years following its introduction, it gradually spread, and has since become firmly established throughout all the agricultural areas of the State. To-day it is probably the most widely spread weed in South Australia, besides occupying large areas in Western Australia and Victoria, and somewhat smaller areas in New South Wales. Reaching its greatest development during the late summer and autumn months, Stinkwort covers hundreds of acres with a vivid green growth, which contrasts sharply with the prevailing straw-like colour of stubble and grassland, and with the chocolate-brown tints of fallowed ground. Seen from the distance it creates an illusion of luxuriant pasture on land often quite barren of any other kind of green herbage. The plant is so firmly established here that it would be futile to place it upon the list of proclaimed noxious weeds, but this does not mean that, by proper management of the land, an intelligent farmer cannot do much towards keeping his property free of this particular weed.

Stinkwort owes its popular name to the presence of a resinous oil with a strong and characteristic odour. This oil is an external secretion formed by innumerable small glandular hairs present on all parts of the plant's surface. Under a microscope these hairs appear as blunt finger-like papillae which arise from the epidermis or covering layer of cells. Owing to this secretion the surface of the plant is very sticky so that particles of dust, &c., readily adhere to it, which accounts, in part, for the dirty green colour of many specimens. The wool of sheep pastured on Stinkwort country is greatly discoloured, but its quality is not impaired, the colour being easily restored in the scouring process. Milk and butter are tainted if dairy cows are permitted to eat the weed, and the flavour of mutton may be affected if sheep are fed upon it.

In outline the plants are roughly conical, and are somewhat suggestive of miniature cypress pine trees. They have an erect, much-branched habit, the lateral branches arising from a stout central stem and branching again and again so as to form a diffuse system. All the stems bear slender leaves and very numerous small ovoid heads of yellow florets surrounded by greenish-coloured bracts. When mature these heads appear as fluffy balls due to the development of a tuft of hairs on each of the contained "seeds" or fruitlets. The weed shows a decided preference for cultivated land, but is often abundant along the roads, especially where the plough is regularly used to clear the roadsides of noxious weeds. A particularly dense growth of Stinkwort is often seen on land cultivated only at infrequent intervals; such land may be completely covered with a forest-like growth of crowded plants.

Botanical Name and Classification.—*Inula* was the Latin name for Elecampane (*Inula Helenium*, L.), which was formerly used in medicine, and is said to be still used to some extent in veterinary practice. The species name *graveolens* means "strong-smelling." Like the thistles and Bathurst Burr the *Inulas* are members of the *Compositae*, but they belong to a distinct tribe of that large and important family. This tribe (*Inuleae*) includes, among others, many species of so-called "everlasting" flowers. The genus *Inula* comprises about 100 species belonging



Stinkwort, showing general habit (see coloured plate opposite).



STINKWORT (*Inula graveolens* Desf.)

A.—"Seed" with pappus. B.—Upper leaf, entire and nearly linear. C.—Lower leaf, oblong-lanceolate and sub-dentate. D.—Flower-head, passing into fruit. E.—Staminal tube opened out showing tailed anthers. F.—Female ligulate floret. G.—Bisexual tubular floret. H.—Single head showing bracts and florets.

to Europe, Asia, and Africa, the best-known species being *I. Helenium* or Elecampane, of which a decoction of the root was formerly used as an aromatic tonic. The *Inulas* are mostly herbs with alternate leaves. The flower-heads may be solitary or numerous, and contain florets of two kinds enclosed within an involucre composed of numerous bracts arranged in several rows. These bracts are usually green in *Inula*, but in certain other genera of the same tribe they are brightly coloured and simulate petals, except for their tougher consistency and resistance to drying, the whole flower-head, in such cases, giving rise to the structure popularly termed an "everlasting" flower. Within the involucre the florets are arranged in two series. There is an outer series of "ray" florets in which the corolla is strap-shaped or "ligulate," and from which stamens are missing, and an inner series of "disc" florets in which the corolla is tubular and stamens are present. The anther of each stamen is prolonged at the base into two long appendages or "tails." The fruitlets are small and cylindrical, and are surmounted each by a pappus of fine silky hairs.

Description of Inula graveolens.—A sticky herbaceous annual with a strong odour, glandular-hairy all over, 1-2 ft. high; stem erect, much branched, with erect spreading leafy branches; lower leaves oblong-lanceolate and subdentate, the upper ones linear and entire. Heads small, very numerous, subsessile, in a long loose pyramidal panicle; involucre bracts in several rows, linear lanceolate, the outer ones green, the inner ones with scarious margins; florets yellow, the outer ones ligulate and female, slightly exceeding the involucre, the inner ones tubular and bisexual; anthers tailed; achenes hairy, narrowed into a neck at the summit, then expanded and supporting the pappus of numerous barbed capillary bristles. Period of flowering: March-April.

Properties.—Few weeds have given rise to as much discussion and difference of opinion among farmers and stockowners as has been the case with Stinkwort. To some it is a useful fodder plant, present in great abundance at a time when other green feed is scarce, while others regard it as a weed, objectionable in many ways but not seriously harmful, either to stock or to the productivity of the land on which it grows; others, again, are of the opinion that Stinkwort is poisonous to stock, at least during its flowering and fruiting stages. While there is no doubt that the State would be much better off without the plant than with it, it is not as serious a pest as has often been supposed, despite the very dense growth it makes on certain areas during the summer months.

Firstly, as regards its effects on stock, at no stage does the plant appear to be actually poisonous in the sense that some other plants are. It does not contain any poisonous alkaloid or other toxic principle capable of causing death when introduced, in relatively small amounts, into the body of an animal. During the young stages stock will and do eat it without harmful effects, and feeding tests, both here and in other States, have failed to prove that the plant is poisonous even when mature. In these tests sheep have been fed with the fresh plants, or drenched with extracts, both types of experiment invariably yielding negative results. On the other hand it is well known that mortalities have occurred among sheep pastured on Stinkwort country, and without having had excess to other green feed, especially during March and April, when the plant is in flower, and when other green fodder is scarce. The intake of large amounts of Stinkwort, especially when wet with rain or dew, may lead to a condition of bloat, but the same is liable to occur with other fodders, even with lucerne, and is in no way peculiar to Stinkwort. But the weed may be dangerous in another way; the full-grown plants contain a large amount of woody fibre which, if eaten in quantity by hungry or travelling stock, may cause digestive troubles due to mechanical irritation of the stomach and intestines. Moreover, the mature plants bear fruiting heads in countless numbers, each composed of a large number of fruitlets armed with barbed hairs. Sheep, feeding upon Stinkwort at this stage, cannot avoid taking in large amounts of such indiges-

tible material, which is liable to produce irritation and inflammation of the digestive tract, and so render the system subject to attack by bacteria present in the intestines, and facilitate the absorption of their toxins. Braxylike disease, which is caused by a specific bacterium and is at times responsible for deaths among stock, often affects sheep on Stinkwort pastures, and the opinion has been expressed by veterinary officers that this plant may be a predisposing factor in braxylike disease. This does not prove, however, that Stinkwort is poisonous; it merely shows that, by causing acute intestinal disturbance, it may render animals liable to attack by disease-producing bacteria.

The spoiling of milk and butter as a result of the ingestion of Stinkwort by dairy cows has already been mentioned. The resinous secretion has an irritant action on the skin to which some persons are peculiarly susceptible. Cases of dermatitis have been known to occur among those engaged in hand-pulling the weed, an operation which should not be undertaken without using gloves. The role of this secretion in the physiology of the plant is not quite clear. Formed externally, and becoming concentrated by evaporation of its more volatile constituents, it may possibly play a part in checking transpiration losses, and in reducing the effects of prolonged and intense irradiation. Or it may serve to protect the plants against parasitic infection; that the oil may have some influence upon bacterial activity is suggested by the slow decay of the plants in the soil, and by the possible role of Stinkwort in braxy-like disease.

From the wheatgrower's point of view Stinkwort is not as troublesome as weeds which develop later in the year. It is a summer weed, and has practically finished its growth at seeding time, and the seeds, though present in great numbers in the soil, do not germinate until after the harvest has been taken off. Being a rather deep-rooted annual it is of some value in opening up and aerating the soil, particularly in lands with a heavy clay subsoil. On the other hand it dries out the soil, and, by its slow decay, creates difficulties in working the ground.

Eradication.—Notwithstanding the wide distribution of Stinkwort, it is a striking fact that certain areas are comparatively free from it, even in districts where the weed is especially bad. While it does not spread much on uncultivated land, neither is it troublesome on land that is regularly cultivated, manured, and cropped. It makes its greatest growth on land which is infrequently cultivated, seldom manured, and cropped only at irregular intervals, all of which shows that, by proper farming methods, much can be done to keep wheat land free of this as of other weeds. There may, however, be another factor at work. Stinkwort seems to thrive best on land to which phosphatic manures are seldom applied, and which, presumably, are deficient in phosphates. At the present time the Roseworthy College farm lands are singularly free of Stinkwort, though, according to the statements of former students, the weed was plentiful at one time and, in fact, is still plentiful in the district. It has been suggested that the changed state of affairs is to be attributed to the regular use of superphosphate, which may thus prove to be a valuable and economical means of control, inasmuch as, the manure being paid for by improved yields, the cost of eradication would be comparatively small.

Since the weed is readily eaten by stock during the young stages, the stubble should be heavily grazed by sheep immediately after harvest. By this means a dense growth of the Stinkwort is very largely prevented. If possible the plants should not be allowed to form seed, and should be ploughed up before they come into flower. Small patches of the weed should be hand-pulled and burnt.

THE BAKING QUALITY OF AUSTRALIAN WHEATS.

No. 2.—THE QUESTION OF QUALITY AND THE PELSSENKE TEST.

[By A. R. HICKINBOTHAM, B.Sc., Dip. Ed., A.A.C.I., Chemist,
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[The following article is the second of a series which was commenced by Dr. Callaghan in the May issue.]

INTRODUCTION.

With few exceptions, the wheat grown in South Australia is consumed as bread and, therefore, the value of any sample or variety of wheat depends primarily on the kind of bread that can be made from it. In addition to this fundamental requirement, a variety of wheat should possess other features to satisfy the special demands of each person who handles it. The grower likes to produce a nice, plump, even sample, but he must obtain a high yield per acre; the miller wants grain of easy milling qualities that will give him a high percentage of flour; while the baker requires the flour to handle well in the bakehouse, and give him a large number of loaves from each sack.

Because so many interests are concerned, each with special demands, it has proved to be an extraordinarily difficult thing to obtain a clear and concise definition of the term "strength," but in seeking such a definition it is necessary to recognise that the consumer, after all, has the last say, and the baker, the miller, and the farmer must ultimately judge their products from the consumer's point of view. A variety of wheat may, however, have desirable qualities from several points of view. Those varieties which are recognised as being of really high quality, or "strong," generally satisfy all demands except, unfortunately, that of the grower; under local conditions the definitely high quality wheats at present available do not yield well. On the other hand, low strength wheats yield well

Roseworthy Agricultural College.

Annual Winter School for Farmers, 1934.

The Annual Winter School for Farmers will be held at Roseworthy Agricultural College from the morning of the 8th August to the morning of the 17th August.

A comprehensive course of lectures and demonstrations is being arranged. The Minister will open the School on the 8th August, and Mr. McCann, the S.A. Trade Commissioner in London, who is at present visiting South Australia will lecture the School. Others lecturing the School include the Director and members of the Waite Institute Staff, Officers of the Department of Agriculture and the Principal and Staff of the College.

Arrangements with outside lecturers are not yet complete.

Conditions for enrolment have been circularised to all branches of the Agricultural Bureau; non-members of the Bureau will be supplied with these on application.

ALLAN R. CALLAGHAN, Principal.

and may mill well, but they generally fail to satisfy the handling requirements of the baker; they always produce an unsatisfactory loaf lacking in shape, bulk, and appearance, and in attractiveness to the consumer. Flour of very low strength is necessary for making biscuits and certain types of cakes, and sometimes wheat is grown specially for this trade. Such samples are obtained where a very long ripening period is experienced, and are well suited by conditions in Tasmania, but the climate of most of our wheatgrowing areas is obviously unsuitable for them.

Australian wheats have always had the reputation of being of relatively low strength. When flour was first milled here, wheat was imported from America and blended with locally grown samples for the purpose of improving the strength of the flour, but it was found that the practice met no special demand, and it was soon discontinued. The earliest plant breeders also recognised this weakness, and sought to produce new varieties that would yield a strong flour, but their experience soon indicated that it was extremely difficult to combine high yielding capacity and really good quality or strength in one variety. In the pioneering stages high yield per acre and drought resistance were of fundamental importance and so, for many years, strength received little attention. From time to time efforts were made to revive interest in this question without success, but lately it has been brought prominently before the public because of adverse criticism by overseas buyers who maintain that there has been a drift in quality in recent years. Without doubt, this position has arisen partly because of changed conditions in the handling of flour in bakeries where machinery has largely displaced hand work, but it is also said to be partly due to a falling off in the quality of our bulk wheat through the introduction of new varieties of lower strength than those they have displaced. This latter contention appears to be justified in only a few cases, but in a period of over-production particularly, any falling away in quality must influence the demand and the price received for our wheat. On the other hand, an increase in strength would widen its range of usefulness, and be reflected in a greater demand and, ultimately, in better prices.

COMPOSITION OF GRAIN AND FLOUR.

A wheat grain consists of three main parts: the germ or embryo, the starchy centre or endosperm, and the covering or skin. In the process of flour making, the germ is removed because it contains oil which would go rancid and spoil the flour, while the skin yields bran and pollard. The centre portion or starchy endosperm is ground into flour, this product forming about 70 per cent. of the grain. If the grain is small, or thick skinned, the proportion of skin or bran is higher, and less flour is obtained from each bushel, so that a large, plump grain is desired.

Flour contains three important constituents, namely, starch, protein material, and sugar. Starch constitutes about 90 per cent. of the flour, and confers on it most of its food value but, though it forms the bulk of the loaf it is of small importance in baking. The protein material consists of nitrogenous substances, and gives rise to gluten in the dough; it is present in the grain as a network of threads throughout the starchy centre of the grain, and forms about 10 per cent. of the flour. The sugar, which forms approximately 1 to 2 per cent. of the grain, serves as food for the yeast which converts it into alcohol and carbon dioxide gas, and it is the formation of this gas that makes the dough rise. Australian flours are generally low in sugar but, if there is a deficiency in the flour, it can be added in making the dough, so that the actual quantity in the grain or flour is not of great importance.

GLUTEN.

The important constituent in bread making is the gluten, and each variety of wheat tends to have a characteristic amount of gluten of a good or bad quality. A large amount of good gluten allows the dough to absorb more water, and there-

fore makes more loaves from each bag of flour. It enables the loaf to stand up well, and hold more of the gas formed by the yeast, so that the loaf is larger and looks better, and it confers on the bread a more silky texture and resilient crumb. Further, it causes the dough to work easily, making it tough, elastic and non-sticky, and it permits the baker to mishandle the dough to some extent without appreciably spoiling the loaf, a point of considerable importance in bakeries where machinery is extensively used.

Gluten may be separated from wheat by chewing; it is obtained as a substance like chewing gum which is essentially *wet gluten*. If placed in a warm place such a plastic piece of wet gluten would dry out forming a horny piece of *dry gluten* weighing about one-third of the weight of the wet gluten. The great amount of water that gluten may absorb, without becoming sticky in many cases, is an important characteristic of this substance, and it varies to some extent in gluten from different varieties.

QUALITY AND STRENGTH.

Bakers and millers use the term *quality*, but more usually *strength*, to denote certain characteristics in flour, but it is by no means easy to define strength concisely. The word is used to distinguish contrasting types of flour. One sample will take a lot of water forming a tough, elastic, resilient dough which is easy to handle and bakes into a large, bold, upstanding loaf having a fine, even, silky texture. At the other extreme, another sample of flour will absorb appreciably less water giving a soft runny dough that is difficult to work, and that bakes into small loaves of uneven texture, the comparatively dense bread being broken by large, irregular cavities. The former is obviously the more desirable, and flour giving that type of loaf is called *strong*, and the wheat from which it is made is a *strong* or *high quality* wheat.

The definition usually adopted by cereal chemists is:—*That a strong wheat is one which yields flour capable of making large, well-piled loaves.* In this definition the word "pile" has a special significance, being applied, not to the shape of the loaf, but to the texture of the loaf when pulled apart—it should be of a smooth, even, silky texture recalling the pile of velvet. The definition has been subjected to some criticism for it implies that the size of the loaf is the main indication of strength and, since size can be measured accurately and other factors are often difficult to evaluate, there has been a tendency to over-emphasise its importance for this purpose, and to neglect textural and working qualities which a strong flour should also possess.

THE MEASUREMENT OF QUALITY.

The only conclusive test of quality is a good loaf and, as a rule, the baking test is used to determine the quality of the flour of any variety of wheat. In this test the wheat is milled, the dough made and the loaves baked under standardised conditions, and the quality of the flour is determined by loaf measurements and, generally, the allotment of points for each of the important characteristics of the loaf and perhaps, also, of the dough. In many procedures the best result is sought in every case, so that the composition or treatment of the dough may be varied to attempt to correct the weaknesses thought to be present; further, the assessment of the value of the loaves is generally left to some extent to the personal judgment of the baker. Consequently, the experience and skill of the baker play an important part in the reliability of the baking test. The method requires special apparatus and materials, and is costly unless large quantities of flour are to be tested. Useful results can be obtained from a little more than half a pound of grain, but the most satisfactory results are generally obtained when larger amounts of flour are available.

While the baking test is the standard test, its many disadvantages have led to numerous attempts to find some simpler substitute for it. A great deal of attention has been bestowed on gluten studies since this constituent has by far the most important bearing on quality. The chemical determination of the gluten (protein) content, calculated from the nitrogen present, has been widely used and, while of definite value, it is not satisfactory as a reliable test of baking quality because it does not assess gluten quality (and also because other factors enter into the problem of strength). Again, it was thought that the percentage of gluten that could be washed out from the flour, or the ratio of wet to dry gluten, might be of service as these vary appreciably, but the results have been disappointing in many cases. Extensive studies of the actual constituents of the gluten, and of the effect of other substances upon it, have proved of limited value, and no perfectly reliable chemical test for discovering the quality of the gluten, or the strength of a sample of grain or flour, has yet been discovered.

Many simple physical tests were also applied, such as moisture absorption, extensibility of the dough, viscosity of flour suspensions, expansion of the dough during fermentation and tests of gassing power, and studies were made of the effect of subsidiary factors such as changes of sugar content and acidity, without discovering any simple test that could be relied on to indicate strength. It is only by combining the information gained from a number of tests that a satisfactory estimate of strength can be made.

The plant breeder wishes to know something of the strength of new cross-breeds as soon as possible, when only a few heads are available. The baking test cannot be used because it requires so much grain, while most laboratory methods take time and are costly. In the absence of a convenient test he has relied on such information as he could get from the appearance of the grain, its hardness when judged by biting it, and the separation of the gluten by chewing. These tests are not reliable, though they do permit of broad distinctions being made.

THE PELSSENKE TEST.

In recent years a new test for both strength and gluten quality has been developed independently in Germany and U.S.A. which appears to be the simple and comparatively reliable test that has been needed; it is generally known as the Pelschenke or Wholemeal Fermentation Test. It differs from practically all previous tests in that wholemeal is used instead of flour, and since wholemeal can be made with an ordinary coffee grinder type of mill, it requires a minimum of special apparatus. It is a rapid test and requires less than half an ounce of grain. The test, as used here, may be described as follows:—

A half ounce of grain is ground in a small coffee mill and passed through a 1 mm. round hole sieve. With a good mill only a little flaky bran is retained by the sieve and this is discarded; if it is re-ground and added to the meal it does not measurably affect the test.

A 5gram sample is weighed into a porcelain dish and 2.7 cc. of a well agitated 10 per cent. suspension of "Nycander" yeast is added from a graduated pipette. The mixture is stirred with a glass rod until most of it adheres to the rod when the dough is taken in the fingers and the last traces picked up from the dish by rubbing it with the dough.

The dough is kneaded in the fingers for approximately 20 seconds, varying according to the nature of the meal, to form a stiff, firm, even dough. If it tends to crack, a little water is added by dipping the finger into water which is then worked into the dough. It is then rolled between the palms to form a smooth ball without creases or cracks and dropped into a beaker containing water at 31° C. Tall 150 cc. beakers half full of good rain water are used. The water in the beakers is maintained at 31° C. by placing them in a suitable water oven or, in hot weather, in a large water bath.

The kneading requires the greatest care and differences in technique at this point may give rise to appreciable variability in the results obtained. It is essential to secure the same dough consistency in every case, and the time of kneading is adjusted accordingly.

Each sample is tested in duplicate and the tests are repeated if the results do not agree well. The duplicate is tested after an interval and is treated independently in every way except for the grinding. The yeast, if stored in a refrigerator in lump form, will retain full activity for several days but only fresh yeast, not more than two days old, is used. If the quantity of yeast suspension is adjusted, samples of less or more than 5 grams may be used and almost identical results obtained. If only a small amount of sample is available, it is better to do two 2.5gm. samples than one 5gm. sample.

The photographs show the behaviour of the dough balls. At first they sink, but after approximately 15 minutes they rise to the top of the water, due to the expansion caused by the carbon dioxide formed by the yeast. After a further interval ranging from a few minutes to several hours the balls begin to break up and fall to the bottom. This generally happens quite suddenly so that two balls of the same dough, after floating for perhaps a couple of hours, may fall apart within a few minutes of each other. The time from the mixing of the dough to the final disintegration of the balls, measured in minutes, is called the test number in the following tables which give the values obtained for a number of representative varieties taken, in most cases, from the crops of the last two seasons. The great variation in time shown by different varieties, and the tendency to uniformity in the same variety grown in different seasons and under different conditions, is rather striking.

TABLE I.—*Test Numbers of Representative Varieties.*

Variety.	Test No.		Variety.	Test No.	
	1932.	1933.		1932.	1933.
Aussie	117	—	Gluford	50	—
Baringa	26	30	Gluyas Early	32	35
Begum	39	39	Gluyas Late	37	49
Bencubbin	45	39	Gullen	—	61
Bobin	—	31	Hard Federation	153	111, 127
Bunyip	49	53	King's White	35	42, 33, 38
Cadia	138	175	Kington	39	37
Caird	77	35	Maharajah	58	40
Caliph	45	29	Major	—	35
Canberra	40	55, 61, 41	Merredin	—	146
Captain	50	43	Minister	273	141
Carrabin	255	116, 127	Minflor	44	36
Collection	41	47	Minflos	—	168, 200, 168
Comeback	266	203	Nabawa	33	49
Crostan	65	48	Nawab	28	32
Currawa	40	39	Nolba	124	102
Dan	32	31	President	36	44
Daphne	33	—	Ranee 4H	70	72, 55
Dawn	42	75	Regal	41	39
Dundee	58	123, 91	Riverina	—	106
Early Bird	—	43	Sirdar	35	28
Faun	82	56	Sultan	56	35, 47
Fay	94	67	Sutton	38	37
Federation	—	29	Sword	33	60, 58
Felix	52	54, 48	Walker's Wonder	47	54
Florence	86	57	Waratah	41	35, 33, 32, 33
Ford	60	81, 62	Yandilla King	—	35
Gallipoli	27	25	Yilma	50	32
Gloss	58	92	Zealand Blue	112	141

NOTES ON TABLE I.

Samples.—The test numbers given in this table were obtained from grain grown on the College Farm or in the Experimental Plots, and they may be considered as typical for these varieties under local conditions. The results have been proved to differ

amongst strains of the same variety. The extent to which they are influenced according to district, or by conditions under which the sample was grown is not yet known, but is thought to be considerable in some cases at least. With a view to examining these effects approximately 250 samples have been collected from most of the wheat growing areas of the State (through the courtesy of officers of the department and numerous farmers) and these will be tested in the near future.

Short Row v. Long Row and Commercial Crop.—In short rows the seed is planted 4in. apart with 16in. between rows, while in the long rows the seeds are 1in. apart with 5ft. between rows. Samples of grain of any variety from either long rows or commercial crops give similar test figures, but these differ materially from the result obtained from samples collected from short rows; the latter are generally from 20 to 30 per cent. higher, the difference being due, probably, to increased nitrogen assimilation and faster finish. Examples of this are seen in the 1933 tests of Dundee, Minfos, and Rancee.

Ford.—The sample testing 81 is a special strain selected here. It shows variations in type as well as quality.

Sword.—The higher figures obtained for the 1933 crop are probably due to a difference in strain.

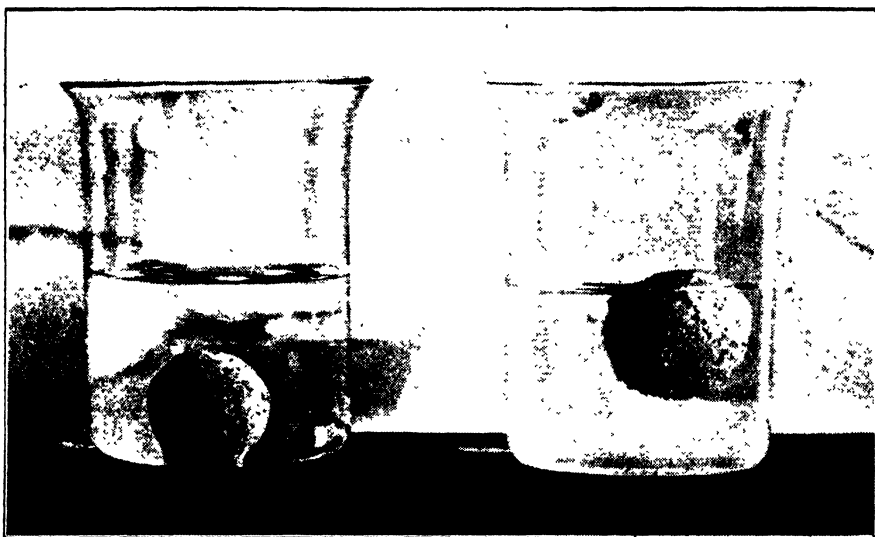


Fig. 1.—Showing behaviour of wholemeal balls when first placed in the water and after an interval of 15 minutes.

Florence.—Tests between 110 and 40 have been obtained from this variety. It appears to be particularly subject to variation.

Seasonal Variation.—From an examination of the results at present available for the same variety in different seasons, it appears that some varieties are more susceptible than others to seasonal, and probably environmental, conditions.

ESTIMATION OF PROTEIN QUALITY.

A figure which represents the quality of the gluten, which Pelshenke called Specific Protein Quality, may be obtained from the test number by dividing it by the percentage of protein found by chemical analysis. This procedure is based on the argument that the value of the gluten, or its strength as shown by the test number varies independently with both its quantity and quality, that is—

$$\text{Strength} = \text{Quantity} \times \text{Quality},$$

$$\text{and therefore, } \frac{\text{Strength (test number)}}{\text{Quantity (protein content)}} = \text{Quality}.$$

The strength (test number), protein content, and consequent quality of gluten for a few varieties are given in Table II.:—

TABLE II.—*Test No., Protein Content, and Specific Protein Quality of Selected Varieties.*

Variety.	Test No.	Protein (N x 5.7).	Specific Protein Quality.
Comeback	203	8.0	25.4
Dan	32	7.6	4.2
Florence	86	11.6	7.4
Ford	60	10.3	5.8
Gallipoli	25	7.8	3.2
Gluyas Late	37	5.9	6.3
King's White	35	7.5	4.7
Minister	141	12.0	11.7
Nabawa	33	7.5	4.4
Nawab	28	6.8	4.1
Ranee	70	8.2	8.5
Sultan	56	9.5	5.9

COMPARISON WITH OTHER PUBLISHED RESULTS.

To illustrate the results obtained by other workers on Continental and American varieties of wheat, and to provide a basis for comparison, the following data have been abstracted from the original papers (1), (2). In all cases where two results are quoted for any class of wheat, they are the highest and lowest given by the authors. Further results obtained from Australian wheats—many from the same varieties as tested here—may be found in the January, 1934, issue of *The Agricultural Gazette of New South Wales*.

TABLE III.—*Data of Pelshenke (Table VIIA.—Foreign Commercial Varieties).*

Class of Wheat.	Country of Origin.	Test No.	Protein Content.	Specific Protein Quality.
Northern Duluth (1929)	U.S.A.	282	12.82	22
Northern Spring (N.Y.)	U.S.A.	168	13.98	12
Manitoba I.	Canada	171	14.94	11.5
Manitoba I.	Canada	154	14.96	10.3
Manitoba II.	Canada	237	11.56	20.5
Manitoba II.	Canada	142	14.27	10
Hard Winter I.	U.S.A.	105	10.55	10
Hard Winter I.	U.S.A.	36	9.85	3.6
Hard Winter II.	U.S.A.	80	12.25	6.5
Hard Winter II.	U.S.A.	25	11.56	2.2
Boril Buenos Aries	Argentina	63	14.40	4.4
Boril Buenos Aries	Argentina	36	13.77	2.6
Rosafe	Argentina	39	13.39	2.9
Banat Theiss	Europe	41	13.51	3.0
Banat Theiss	Europe	23	13.89	1.6
Austral	Australia	38	10.99	3.5
Austral	Australia	30	13.26	2.3

TABLE IV.—*Data of Pelshenke (Standard Varieties from Several Tables).*

Variety.	1928. Test No.	1929. Test No.
German Winter Wheat, Standard Variety (Table 8.)	39.2	—
Austrian, Hungarian, Bohemian Variety (Table 9.)	35.9	—
Swedish, Dutch, English Variety (Table 10.)	41.0	—
Winter Wheat, France, Mediterranean Variety (Table 11.)	38.5	41.4
North American Winter Wheat Variety (Table 12.)	40.5	38.2
Russian, Rumanian, Finnish Variety (Table 13.)	41.2	—

TABLE V.—*Data of Cutler and Worzella (from Table IV.—Wholemeal Time Test Applied to Varieties of Wheats Representing Different Classes).*

Class.	Highest Test Given.			Lowest Test Given.		
	Variety.	Source.	Time.	Variety.	Source.	Time.
Hard Spring	Marquis....	N. Dakota .	391	Supreme ..	N. Dakota .	248
Hard Red Winter	Tenmarq ..	Kansas	364	Kanred ...	Kansas	126
Low-protein Hard	Askof.....	Wisconsin .	192	Kanred ...	Iowa	104
Soft Red Winter	Mich. Amber	Indiana ...	168	Gladden ...	Indiana ...	66
White Varieties .	Baart.....	Washington	144	Quality ...	Minnesota .	55

MINOR FACTORS AFFECTING THE TEST.

The test may be influenced to a very important extent by the yeast employed. Even when using one carefully selected product occasional variations arise from causes beyond control, and it is therefore desirable to use a standard variety as a check in every batch of samples tested. Because of variations in the yeasts used the test times recorded by different operators are not always comparable.

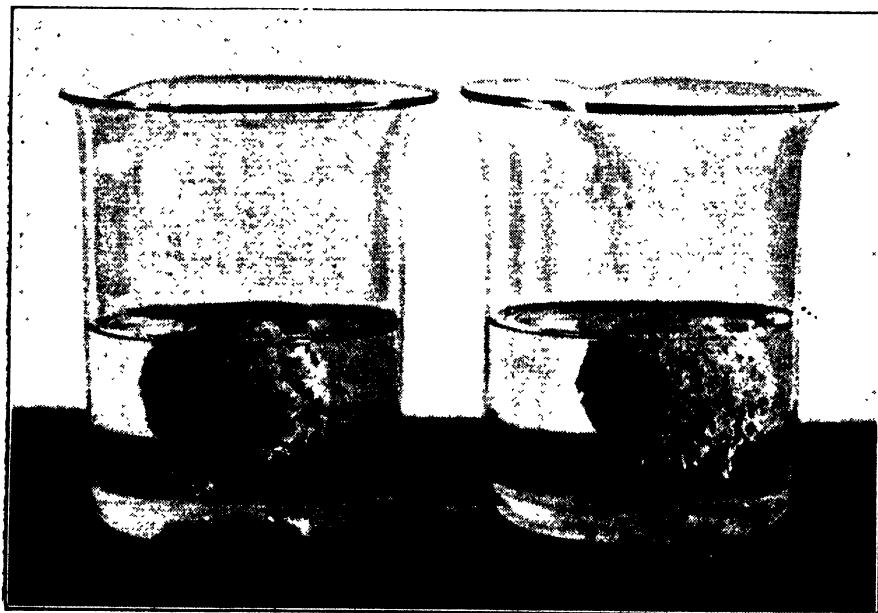


Fig. 2.—Showing the breaking of balls of a soft or weak variety. The balls have retained a spherical shape.

It has been found that storage of a sample meal generally results in an appreciable increase in the test number; for example, a sample of Ford which tested 60 when freshly ground, gave a test of more than 100 after being stored for a month. The extent of the increase appears to vary amongst varieties; it appears to parallel the increase in strength that occurs in flour during storage, and is probably a matter of oxidation.

Samples of grain examined immediately after they are harvested give unreliable and generally high tests compared with the results obtained from the same samples a few weeks later.

Strong varieties when under test spread out in the beaker as shown in the photograph, and appear to derive some support from contact with it. They do not give quite such a high test in the larger beaker, but it is thought to be more reliable.

DISCUSSION.

Objection must always be taken to any attempt to measure the total of such a complexity as quality or strength by means of a single test. It is not reasonable to suppose that the sum of the behaviour of the numerous constituents in flour, which are subjected in dough making to the activities of a living organism, the yeast, and to reaction with the products of such activities, may be completely assessed in such a simple way. Under certain circumstances, however, such as those imposed by the limited amount of material available in breeding work, only simple, economical tests can be used. It is therefore necessary in such work to select the best of the available tests, and also to discover as much as possible of their special applications and limitations.

In making an *a priori* selection between possible tests greatest importance is naturally attached to either (a) those which isolate and measure a factor of outstanding importance in the main process (as does, for example, the determination of the nitrogen or the gluten content) or (b) those which approximate most

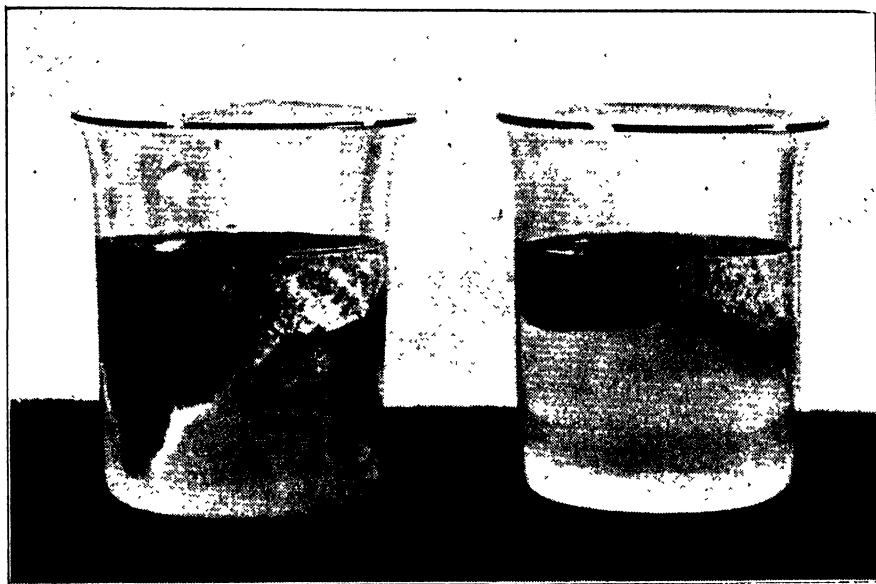


Fig. 3.—Showing how the wholemeal from strong varieties spreads out to form a disc. In the first vessel the "ball" is just breaking.

closely in the conditions they impose on the material to the actual process for which it is required (as does the baking test). Viewed in this way the Pelshenke test does approximate loosely to the earlier fermentation stage in dough making, but it is subject to the influence of offals and germ which are carefully excluded from flour, and to an excessive amount of yeast; it is not subject to the influences arising from ordinary milling and storage of flour, added constituents as salt and improvers, handling and panning, the stress of a full fermentation or baking. Nevertheless, from the results obtained, and as an inspection of the figures given in Table I. will show, this test does distinguish the varieties which are regarded as stronger, such as Cadia, Carrabin, Comeback, Dundee, Ford, Hard Federation, Merredin, and Minister for example, from varieties which are definitely weak, with reasonable certainty. In rare cases, as exemplified by Zealand Blue, the result is at variance with previous opinion of the strength of the variety.

An effort has been made to define the limitations of the test, partly to enlarge knowledge of it, and partly because it seems probable that further study of the why and wherefore of a test which, on logical grounds, seemed inadequate and

which yet appeared to perform so well, might throw new light on the general problem of strength. The attempt is being made to study the main factors of the test independently, namely:—(a) Gas Production which, if deficient, should tend to result in high test figures; (b) Gas Retention which, if deficient, should also lead to high tests; and (c) Extensibility, or the power of gluten to hold the gas formed.

VALUE OF THE TEST.

In view of the data presented in this paper, the test is of undoubted value in cereal breeding. It is probable that it has a definite value to the miller, also, enabling him to select high or low quality samples for special purposes. Since, however, the bulk of the f.a.q. wheat appears to vary over a rather limited range it is probable that it will not give much guidance in the handling or blending of the ordinary mixed commercial samples. It will be necessary to learn what a given range in test number means in terms of improved commercial results before an opinion can be formed of its value for this purpose.

For plant breeding purposes it is also necessary to determine what minimum test should be required of new varieties. From the evidence so far available it appears that a standard test time requirement of 35 minutes might be set, tentatively, with safety. This would ensure a small but definite improvement in quality over our present weakest commercial varieties without leading to excessive culling of varieties which might actually prove valuable.

It often appears to be assumed that the test number bears a direct relationship to strength. Experience indicates, however, that the relationship is not direct, but functional in such a way that a small difference in test number at the lower end of the scale means much more in terms of real strength than a comparatively large difference at the upper end of the scale. There are many evidences of this in behaviour during test, but it is perhaps best illustrated by the results obtained from blending. Though contrary opinion has been heard, we have definitely found that blends do not give the results that would be expected or calculated from a knowledge of the components. Several experiments of this kind have been done here, and the results from one of them are given in Table VI. All of the data given were obtained from one series of grindings, and the individual tests are comparable with those for the blends in every way; for individual varieties they are slightly lower than those given in Table I., but they do not differ by more than is normal for the same sample tested at different times. The duplicate results obtained for the blends are given.

TABLE VI.—*Test Numbers of 50 Per Cent. Blends.*

Varieties in Blend with Test Number.	Av. Test No. of Components.	Test No. of 50 : 50 Blend. (Duplicates.)	Average.
Hard Federation (119) + Carrabin (121) ..	120	120, 122	121
Hard Federation (119) + Canberra (39) ..	79	56, 57	51
Hard Federation (119) + Waratah (30) ..	74.5	48, 48	
Hard Federation (119) + King's White (33) ..	76	48, 49	
Carrabin (121) + Canberra (39) ..	80	56, 57	
Carrabin (121) + Waratah (30) ..	75.5	49, 49	35
Carrabin (121) + King's White (33) ..	77	51, 51	
Canberra (39) + Waratah (30) ..	34.5	39, 39	
Canberra (39) + King's White (33) ..	36	34, 34	
Waratah (30) + King's White (33) ..	31.5	31, 30	

It will be seen that the test figure obtained by blending varieties of nearly the same strength approximates closely to the average of the test of the individuals. A blend of varieties of different strengths gives a test figure below the average of the components. That is, low testing varieties reduce the test of the blend to a much greater degree than high testing ones can raise it. In other words, this particular experiment indicates that the range 35 to 50 means approximately the same in terms of strength as the range from 50 to 120.

It therefore appears that a variety testing between 20 and 30 is much weaker than one testing between 35 and 40, so that by setting a standard of 35 for all new varieties a definite improvement should be obtained. If the exact relationship between test number and strength could be accurately defined it would be of great service, for test numbers alone are likely to give the impression that our wheats are much weaker than they really are. Even at the present time their reputation for low strength does them less than justice.

The test has already proved of value in isolating from several commercial varieties strains that are higher testing and presumably stronger than the average of the variety, though it has still to be demonstrated whether the improvement is transmitted to future generations. From work done here, which will be reported shortly, it appears probable that improved lines can be fixed in this way from some of our present varieties and, if these selections retain the field characters of the variety, the method appears to offer a most economical and rapid way of improving their strength. Similarly, the test offers a convenient check against any falling off in quality in pedigree seed.

CONCLUSION.

Though it is generally agreed that some improvement in the strength of our wheat is desirable, and indeed necessary, if we are to retain and extend our overseas markets it is, as yet, problematical how far we must go. The classifications of wheats based on wholemeal fermentation tests that have appeared in the literature do not give much assistance towards establishing a useful classification for Australian wheat. The strength wanted in any particular market, and the conception of strength in any locality, are largely a matter of local demand and experience, and wheats that would rank as comparatively strong in Europe may be regarded as weak in America.

For example, an eminent Continental authority has stated that wheats having a test number of more than 90 minutes should be regarded as "medicine wheats" to be used to improve the strength of weak ones; that wheats testing between 30 and 90 will make bread without any admixture of stronger wheats; but that those testing below 30 minutes will only make bread with the addition of "medicine wheats." Again, Pelshenke has grouped the strains obtained from his crosses into the following three classes:—(a) High gluten quality wheats having a test number above 60 minutes; (b) fairly high gluten quality wheats testing between 30 and 60 minutes; and (c) wheats testing below 30 minutes and requiring the addition of the (a) group to give flour of good baking quality.

On the other hand, Cutler and Worzella in America classify as weak bread wheats all those testing between 150 and 225 minutes, and their strong bread wheats give a test of from 300 to 400 minutes. Again, very frequent criticism of the quality of English home-grown wheat is noticed in the literature; these, according to Pelshenke's data (Table X. in original paper), probably test on the average between 35 and 40 minutes, and though some popular varieties test much lower, some test considerably higher. But even the best home-grown samples are considered to be too weak to use without the addition of strong, imported wheat.

It therefore is difficult to determine just what degree of strength would give general satisfaction and, in fact, this probably varies considerably in different markets and even in different periods of the year according to the strength of other samples on the market at the time. Instead of trying to follow such changes it seems to the writer that it is desirable to consider how far we can make our wheats complete in themselves. With a minimum of conscious effort on our part, our wheats acquired the character of excellent filling or blending wheats. Jago, in 1911, described them as "choice colour wheats, valuable with reds as mixing," and their strength as "fair," and they have held this trade reputation until recently. Being neutral, neither strong nor weak in any special degree, their strength became a secondary consideration; this seems to be the reason behind the mistaken

idea that they were very weak. Kent-Jones (1927) stated: "There is but little doubt that either the Australian wheats have increased appreciably in strength of recent years, or that the idea that they were particularly weak was a mistaken one Where a good length patent flour is wanted, a large proportion of Australian wheat in the mixture is exceedingly useful."

To pursue this aspect would prolong this paper unduly, but our wheats have been, and all our natural conditions and advantages suggest that they should be, filling or blending wheats; as such, they should not interfere appreciably with the strength of an otherwise satisfactory blend, even when added in large amount. This means, in fact, that they should be capable of "standing on their own" and make a reasonably good loaf without any admixture of other wheat. And they can do this. Though the flour milled and baked locally is, to some extent at least, obtained from selected wheat, no one can deny that really good bread is being made by our bakers every day from purely Australian wheat. To consolidate this position is our most reasonable objective. In passing, it may be noted that the increasing proportion of our wheat milled locally, and the greater tendency shown by millers to select their wheat, must tend to reduce quality in exported f.a.q. wheat which, if these most desirable developments continue, will ultimately become nothing more than the locally unwanted residue.

Assuming the validity of the wholemeal fermentation test results for the comparison—a problem apart from its use in breeding work—the data presented here indicate that some fall in the quality of our f.a.q. wheat has occurred, chiefly as a result of the introduction of a comparatively few of the popular new varieties which have displaced somewhat better ones. A review of all the data available further suggests that the change cannot have been very great. For the present, therefore, it seems certain that we could at least regain our earlier standard by judicious use of present established varieties, and there does not appear to be any need to attach special importance to the really strong varieties that do not yield well as a rule.

In conclusion, the Pelshenke wholemeal fermentation test is regarded as sufficiently reliable to be extremely valuable in plant breeding work, but it would be a mistake to base selection entirely on this test. It must be supplemented by others as more material becomes available, and a baking test must be the final and critical one. It is unfortunate that this test, also, is not without its critics nor its variations and modifications. In the procedure developed mainly in America, and usually followed fairly closely by cereal chemists, the emphasis is placed on what might be distinguished as "blending strength" or ability to compensate for lack of strength in its complement of the blend. For strong wheats the result of this form of the test corresponds well with the result obtained by the commercial baker on the same sample, but when it is applied to wheats similar to ours the resulting loaf is much inferior to that produced by a good baker from the same flour. Consequently, unless a special procedure is developed, which takes into consideration the actual requirements and methods of the trade for which the flour is produced, this test does not assess the *baking value* of the sample. It is, in fact, essential for us to distinguish between strength and baking value and, since we are unlikely to find it profitable to produce really strong wheat, we should concentrate on the improvement and standardisation of its baking value, and the development of tests suitable for this objective. At the present time, in this State, we have no accurate information as to the baking value of any variety of wheat.

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- (2) CUTLER, G. H., and WORZELLA, W. W. (1931).—A Modification of the Saunders Test for Measuring Quality of Wheats for Different Purposes. J. Am. Soc. Agron., vol. 23, 1000.

OFFICIAL SINGLE TEST EGG-LAYING COMPETITION, 1934-35.

CONDUCTED AT PARAFIELD POULTRY STATION.

ONLY FIRST GRADE EGGS RECORDED.

SECTION 1.—WET MASH.

Class No. 1.—White Leghorns.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to June 9th, 1934.	Competitor.	Bird No.	First Grade Eggs. Progressive Totals to June 9th, 1934.
A. J. Hill, Sunraysia Poultry Farm Greensborough, Victoria	1	35	C. Guthridge, Yundi	49	18
	2	36		50	44
	3	13 84		51	36 98
	4	—		52	4
	5	30		53	27
	6	23 53		54	30 61
		137			159
A. H. Matthews, Bridgewater	7	45	S. Lambert, Echunga	55	35
	8	33		56	24
	9	29 107		57	5 64
	10	43		58	27
	11	38		59	—
	12	22 103		60	12 39
		210			103
G. W. T. Symes, Echunga	13	18	A. Young, Bridgewater	61	45
	14	19		62	36
	15	16 53		63	12 93
	16	5		64	41
	17	31		65	12
	18	31 67		66	29 82
		120			175
E. B. Gliddon, Yundi	19	36	D. J. Foxwell, Echunga	67	28
	20	29		68	19
	21	3 68		69	32 79
	22	—		70	—
	23	16		71	30
	24	19 35		72	23 53
		103			132
T. Cleaver, Bridgewater	25	36	J. C. Normandale, Yundi	73	15
	26	15		74	21
	27	35 86		75	15 51
	28	34		76	43
	29	31		77	38
	30	23 88		78	36 117
		174			168
J. E. Assender, Echunga	31	32	L. W. Sando, Echunga	79	36
	32	27		80	28
	33	12 71		81	10 74
	34	25		82	44
	35	31		83	40
	36	21 77		84	11 95
		148			169
S. Hill, Bridgewater	37	24	J. O. Marshall, Yundi	85	39
	38	35		86	45
	39	48 107		87	39 123
	40	39		88	6
	41	13		89	27
	42	21 73		90	3 36
		180			159
W. Restall, Echunga	43	40	Murray Powell, Jupiter Creek	91	30
	44	36		92	35
	45	28 104		93	43 108
	46	13		94	28
	47	19		95	35
	48	28 60		96	23 86
		164			194

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to June 9th, 1934	Competitor.	Bird No.	First Grade Eggs. Progressive Totals to June 9th, 1934.
S. Bridge, Yundi	97	39	H. F. Muirson, Yundi	151	26
	98	41		152	39
	99	28		153	4
	100	9		154	20
	101	7		155	38
	102	31		156	16
		47			74
		155			143
C. T. Rodger, Echunga	103	33	K. Pennack, Pooraka	157	3
	104	17		158	28
	105	36		159	25
	106	11		160	40
	107	24		161	42
	108	—		162	18
		35			100
		121			156
R. H. Smith, Yundi	109	9	C. A. L. Sandstrom, Yundi	163	26
	110	10		164	16
	111	38		165	36
	112	9		166	39
	113	29		167	32
	114	10		168	—
		48			71
		105			149
Willow Bend Stud Poultry Farm, North Walkerville	115	22	G. A. Bielby, Pooraka	169	19
	116	28		170	18
	117	33		171	36
	118	—		172	39
	119	23		173	29
	120	31		174	38
		54			100
		137			179
C. MacDonald, Echunga	121	4	W. M. Field, Yundi	175	11
	122	26		176	15
	123	43		177	35
	124	38		178	16
	125	29		179	1
	126	42		180	32
		109			49
		182			110
T. R. Smart, Yundi	127	42	T. Duhring, Mallala	181	38
	128	34		182	35
	129	38		183	36
	130	27		184	43
	131	dead		185	18
	132	43		186	37
		70			98
		184			207
Raymoor Poultry Farm, William Street. Kilkenny	133	19	W. R. Hedger, Yundi	187	46
	134	10		188	29
	135	11		189	14
	136	35		190	37
	137	26		191	43
	138	32		192	—
		93			80
		133			169
B. R. Whittington, Yundi	139	15	A. & H. Gurr, Bradbury	193	32
	140	42		194	25
	141	46		195	28
	142	17		196	35
	143	28		197	37
	144	28		198	13
		73			85
		176			170
W. A. Hazael, 11, Rosetta Street, Rosewater	145	—	J. V. McGinnis, Yundi	199	26
	146	42		200	24
	147	18		201	27
	148	5		202	19
	149	32		203	—
	150	28		204	2
		65			21
		125			98

EGG-LAYING COMPETITION—Continued.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to June 9th, 1934.	Competitor.	Bird No.	First Grade Eggs. Progressive Totals to June 9th, 1934.
A. G. Dawes, 230, Portrush Road, Glenunga Gardens	205	34	W. R. Williams, 28, Avenue Road, Frewville	259	46
	206	14		260	29
	207	42		261	5
	208	28		262	42
	209	—		263	29
	210	36		264	40
		64			111
		154			191
W. C. Jones, Yundi	211	4	R. W. McAllister, Yundi	265	30
	212	38		266	17
	213	31		267	24
	214	42		268	6
	215	37		269	34
	216	10		270	32
		89			72
		162			143
Langmaid & Bettison, Parafield, Salisbury	217	9	G. W. Sykes, Yundi	271	39
	218	14		272	36
	219	9		273	29
	220	18		274	40
	221	26		275	12
	222	21		276	33
		65			85
		97			180
A. Jarvis, Yundi	223	35	A. P. Urlwin, Balaklava	277	22
	224	27		278	27
	225	21		279	26
	226	37			75
	227	19	A. V. Dupen, Melton Street, Glenelg	280	13
	228	32		281	41
		88		282	7
		171			61
S. Eyles, Clarendon	229	7	F. F. Welford, Ludgate Circus, Colonel Light Gardens	283	28
	230	12		284	43
	231	32		285	19
	232	33			90
	233	29	Thomas & Elson, Clifton Street, Hawthorn	286	15
	234	19		287	17
		81		288	30
		132			62
Woodbury Poultry Farm, Stirling East	235	27	J. H. Dowling, Glossop, River Murray	289	30
	236	2		290	31
	237	19		291	32
	238	—			93
	239	6	E. Pape, Wynarka	292	—
	240	6		293	11
		12		294	11
		60			22
V. F. Gamcau, Findon Road, Woodville	241	40	L. S. Ekers, Mount Jagged Farm Mount Compass	295	30
	242	5		296	24
	243	10		297	30
	244	10			84
	245	19	V. E. Williams, 57, Fairford Terrace, Semaphore Park	298	6
	246	20		299	23
		49		300	38
		104			67
Geo. Lomax, Yundi	247	23	L. R. Badcock, 77, Findon Road, Woodville	301	11
	248	15		302	37
	249	27		303	31
	250	20			79
	251	—			
	252	20			
		40			
		110			
H. L. Bastin, Southern Cross Poultry Farm, Pooraka	253	18			
	254	43			
	255	37			
	256	17			
	257	11			
	258	16			
		44			
		142			

EGG-LAYING COMPETITION—Continued.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to June 9th, 1934.
W. H. A. Hodgson, Commercial Road, Salisbury.	304 305 306	30 18 40 <hr/> 88
Gallagher & Aslin, Pooraka	307 308 309	46 39 31 <hr/> 116
R. C. Crittenden, William Street, Kilkenny North	310 311 312	32 6 15 <hr/> 53
C. H. Lines, Junr., Gladstone	313 314 315	21 30 21 <hr/> 72
A. J. Monkhouse Woodside	316 317 318	34 10 22 <hr/> 66
B. Cooke, Kanmantoo	319 320 321	46 47 41 <hr/> 134
Gallagher & Aslin, Pooraka	464 465 466	22 29 23 <hr/> 74
The above birds are White Leghorns, and together with Nos. 307 and 309, will constitute a team in this class.		
W. C. Slape, Magill	467 468 469	14 15 14 <hr/> 43
Willow Bend Stud Poultry Farm, North Walkerville	474 475 476 477 478 479	50 7 29 9 46 43 <hr/> 98 184
Total Class 1. . .		8,312
Class 2.—Any Other Light Breeds.		
M. O. & C. A. Roberts, Torrens Road, Kilkenny (Minorcas)	322 323 324	7 2 1 <hr/> 10
G. Frisby Smith, Fulham (Minorcas)	325 326 327	16 23 18 <hr/> 57

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to June 9th, 1934.
V. F. Gameau, Findon Road, Woodville (Minorcas)	328 329 330	6 22 24 <hr/> 52
A. Heysman, Government Road, Eden Hills (Cuckoo Leghorns)	331 332 333	20 34 25 <hr/> 79
Langmaid & Bettison, Parafield, Salisbury (Black Minorcas)	471 472 473	3 20 28 <hr/> 51
Total Class No. 2.		249
Class No. 3.—Black Orpingtons.		
H. J. Mills, 108, Edward Street Edwardstown	334 335 336 337 338 339	37 36 45 18 27 50 <hr/> 213
A. G. Dawes Portrush Road, Glenunga Gardens	340 341 342 343 344 345	43 2 22 16 40 27 <hr/> 150
Willow Bend Stud Poultry Farm, North Walkerville	346 347 348 349 350 351	44 25 7 31 11 — <hr/> 118
H. L. Bastin, Southern Cross Poultry Farm, Pooraka	352 353 354 355 356 357	2 24 34 4 42 22 <hr/> 128
A. C. Byrne, 114, Rose Terrace, Wayville West	358 359 360 361 362 363	27 26 7 13 1 20 <hr/> 94
W. R. Williams, 28, Avenue Road, Frewville	364 365 366	33 36 40 <hr/> 109
C. H. Lines, jun. Gladstone	367 368 369	24 — — <hr/> 24

EGG-LAYING COMPETITION—Continued.

Competitor.	Bird No.	First Grade Eggs. Progressive to June 9th, 1934.	Eggs. Totals
J. H. Dowling,	370	—	
Glossop,	371	1	
River Murray	372	2	
		3	
F. F. Welford,	373	31	
Ludgate Circus,	374	32	
Colonel Light Gardens	375	37	
		100	
Mrs. M. Specht,	376	43	
Holder Avenue,	377	1	
Richmond	378	38	
		82	
W. Rentoul Christie,	379	10	
Claremont Avenue,	380	17	
Mitcham	381	—	
		27	
G. Frisby Smith,	382	19	
Fulham House,	383	28	
Fulham	384	17	
		64	
B. Cooke,	385	43	
Kanmantoo	386	48	
	387	52	
		143	
Willow Bend Stud	480	42	
Poultry Farm,	481	8	
North Walkerville	482	16	66
	483	29	
	484	35	
	485	22	86
		152	
F. F. Welford,	458	48	
Ludgate Circus,	459	20	
Colonel Light Gardens	460	56	
		124	

The above birds are Black Orpingtons and, together with Nos. 373-375, will constitute a team in Class No. 3.

Total Class No. 3. 1,531

Class No. 4.—Any other Heavy Breed.

A. G. Dawes,	388	9	
Portrush Road,	389	42	
Glenunga Gardens	390	21	72
(Rhode Island Reds.)	391	16	
	392	48	
	393	29	93
		165	
A. G. Dawes,	394	11	
Portrush Road,	395	37	
Glenunga Gardens	396	46	94
(Rhode Island Reds.)	397	32	
	398	12	
	399	43	87
		181	

Competitor.	Bird No.	First Grade Eggs. Progressive to June 9th, 1934.	Eggs. Totals
E. F. Snow,	400	14	
18, Mt. Barker Road,	401	2	
Glen Osmond	402	45	
(Rhode Island Reds.)		61	
W. R. Williams,	403	—	
Avenue Road,	404	16	
Fremville	405	23	
(Rhode Island Reds.)		39	
Woodbury Poultry Farm,	406	37	
Stirling East	407	52	
(Rhode Island Reds.)	408	45	
		134	
V. F. Gameau,	409	16	
1 Indon Road	410	4	
Woodville	411	1	
(Rhode Island Reds.)		21	
K. Pennack,	412	37	
Pooraka	413	10	
(Barnevelders.)	414	40	
		87	
G. W. Lindsay,	461	23	
Torrrens Road	462	9	
Kilkenny	463	22	
(Langshans.)		54	
Total Class No. 4.		742	

Class No. 5.—White Laghorns.

	415	4	
	416	24	
	417	13	41
A. O. Dawkins,	418	39	
Gawler	419	34	
	420	33	106
		147	
A. V. Dupen,	421	19	
Melton Street,	422	6	
Glencelg	423	28	
		53	
A. J. Monkhouse,	424	45	
Woodside	425	25	
	426	33	
		103	
Total Class No. 5.		303	

Class No. 7.—Black Orpingtons.

A. C. Byrne,	427	—	
114, Rose Terrace,	428	—	
Wayville West	429	2	
	430	5	
	431	20	
	432	2	27
		29	
G. Frisby Smith,	433	16	
Fulham House,	434	30	
Fulham	435	46	
		92	
Total Class No. 7.		121	

EGG-LAYING COMPETITION—Continued.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to June 9th, 1934.	Competitor.	Bird No.	First Grade Eggs. Progressive Totals to June 9th, 1934.
<i>Home Project Utility Section.—Wet Mash.</i>			Kevin Angus, Mallala School	449	27
John Plummer, Virginia School	436	17	Alwin Scott, Wellington Road School	450	30
Dudley Harper, Murray Bridge School	437	14	Jack Dietman, Wellington Road School	451	31
Jack Beauchamp, Murray Bridge School	438	9	Milton Smith, Salisbury School	452	42
Jack Beauchamp, Murray Bridge School	439	11	Owen Robinson, Ascot Park School	453	—
George Blelby, Abattoirs School	440	dead	Paul Mundy, Urrbrae High School	454	21
Eric Pratt, Abattoirs School	441	31	Max Couche, Thebarton School	455	42
Stanley Pratt, Abattoirs School	442	27	Robert Swift, Murray Bridge School	456	38
Mervyn Steer, Sturt School	443	38	Bruce Dooland, Thebarton Central School	457	18
Donald Welford, Westbourne Park School	444	9	Ian Slee, Two Wells School	470	24
E. Zblerski, Gawler School	445	40	Total		552
J. McInerney, Gawler School	446	26	All birds in this section are White Leghorns, with the exception of 455 (Rhode Island Red) and 444, 456, and 457 (Black Orpingtons).		
F. Martin, Gawler School	447	28			
Darcy Coleman, Mallala School	448	29			

DEPARTMENT OF AGRICULTURE.

SINGLE TEST EGG-LAYING COMPETITION, 1934-35.

Conducted at Parafield Poultry Station.

LEADING SCORES TO WEEK ENDING JUNE 9TH, 1934.—FIRST GRADE EGGS ONLY.

SECTION 1.—WET MASH.

Class 1.—White Leghorns.

<i>Singles—</i>	Eggs Laid.	Bird No.
Willow Bend Stud Poultry Farm	50	474
S. Hill	48	39
B. Cooke	47	320
<i>Trios—</i>		
B. Cooke	134	319-321
J. O. Marshall	123	85-87
J. C. Normandale	117	76-78
<i>Teams—</i>		
A. H. Matthews	210	7-12
T. Duhring	207	181-186
M. Powell	194	91-96

*Class 2.—Any other Light Breeds.**Singles—*

A. Heaysman (Cuckoo Leghorn)	34	332
Langmaid and Bettison (Minorca)	28	473
A. Heaysman (Cuckoo Leghorn)	25	333

Trios—

A. Heaysman (Cuckoo Leghorns)	79	331-333
G. Frisby Smith (Minorcas)	57	325-327

*Class 3.—Black Orpingtons.**Singles—*

F. F. Welford	56	460
B. Cooke	52	387
H. J. Mills	50	339

Trios—

B. Cooke	143	385-387
F. F. Welford	124	458-460
H. J. Mills	118	334-336

Teams—

F. F. Welford	224	373-375 458-460
H. J. Mills	213	334-339
Willow Bend Stud Poultry Farm	152	480-485

*Class 4.—Any othe Heavy Breed.**Singles—*

Woodbury Poultry Farm (Rhode Island Red)	52	407
A. G. Dawes (Rhode Island Red)	48	392
A. G. Dawes (Rhode Island Red)	46	396
E. F. Snow (Rhode Island Red)	45	402
Woodbury Poultry Farm (Rhode Island Red)	45	408

Trios—

Woodbury Poultry Farm (Rhode Island Red)	134	406-408
A. G. Dawes (Rhode Island Red)	94	394-396
A. G. Dawes (Rhode Island Red)	93	391-393

Teams—

A. G. Dawes (Rhode Island Red)	181	394-399
A. G. Dawes (Rhode Island Red)	165	388-393

SECTION 2.—DRY MASII.

*Class 5.—White Leghorns.**Singles—*

A. J. Monkhouse	45	424
A. O. Dawkins	39	418
A. O. Dawkins	34	419

Trios—

A. O. Dawkins	106	418-420
A. J. Monkhouse	103	424-426

Teams—

A. O. Dawkins	147	415-420
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*Class 7.—Black Orpingtons.**Singles—*

G. Frisby Smith	46	435
G. Frisby Smith	30	434

Trios—

G. Frisby Smith	92	433-435
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HOME PROJECT UTILITY SECTION.

Name.	School.	Breed.	Eggs Laid.	Bird No.
Max Couche, Thebarton		(Rhode Island Red)	42	455
Milton Smith, Salisbury		(White Leghorn) . .	42	452
E. Zbierski, Gawler		(White Leghorn) . .	40	445
Mervyn Steer, Sturt		(White Leghorn) . .	38	443
Robert Swift, Murray Bridge		(Black Orpington)	38	456

EXPERIMENTAL FEEDING TESTS CONDUCTED AT PARAFIELD POULTRY STATION.

[By C. F. ANDERSON, Poultry Expert.]

A series of feeding tests are being conducted at Parafield Poultry Station with a view to ascertaining if suitable foods which are obtainable on the majority of our farms can be satisfactorily fed to poultry. The tests are each of 50 White Leghorn pullets, and commenced on April 1st, 1933.

The feeding is as follows:—

No. 1 Test.—Morning—Wet mash composed of 1 part crushed barley, 2 parts wholemeal (by weight), $\frac{1}{2}$ lb. meat meal, 50 per cent. chaffed greenfeed.

Midday—1oz. wheat per bird.

Night—1oz. wheat per bird.

No. 2 Test.—Dry mash composed of same proportions as No. 1 Test.

Midday—Greenfeed.

Evening—Wheat.

No. 3 Test.—Morning—Wet mash composed of 1 part bran, 2 parts pollard (by weight), $\frac{1}{2}$ lb. meat meal, 50 per cent. chaffed greenfeed.

Midday—1oz. wheat per bird.

Night—1oz. wheat per bird.

No. 4 Test.—Morning—Wet mash composed of 1 part bran, 2 parts wholemeal (by weight), $\frac{1}{2}$ lb. meat meal, 50 per cent. chaffed greenfeed.

Midday—1oz. wheat per bird.

Night—1oz. wheat per bird.

No. 5 Test.—Morning—1 $\frac{1}{2}$ ozs. wheat per bird.

Evening—1 $\frac{1}{2}$ ozs. wheat per bird.

Greenfeed in season.

The following are the numbers of eggs laid by each pen from April 1st, 1933, to May 31st, 1934.

Definite conclusions, however, cannot be given at this juncture with regard to the various methods of feeding. It is necessary for the tests to complete the 24 months before any satisfactory opinions can be formed.

	No. Eggs Laid April 1st, 1933, to March 31st, 1934.	No. Eggs Laid Month of April, 1934.	Total Eggs Laid April 1st, 1933, to April 30th, 1934.
No. 1	7,387	346	7,733
No. 2	6,920	302	7,222
No. 3	6,433	278	6,711
No. 4	7,810	387	8,197
No. 5	3,354	89	3,443
	April 1st, 1933, to April 30th, 1934.	Month of May, 1934.	April 1st, 1933, to May 31st, 1934.
No. 1	7,733	230	7,963
No. 2	7,222	215	7,437
No. 3	6,711	260	6,971
No. 4	8,197	208	8,405
No. 5	3,443	146	3,589

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board of Agriculture was held on May 30th, 1934, there being present Messrs. H. N. Wicks (Acting Chairman), A. M. Dawkins, J. B. Murdoch, F. Coleman, G. Jeffrey, J. W. Sandford, P. J. Baily, A. L. McEwin, A. J. A. Koch, Professor A. J. Perkins, Dr. A. E. V. Richardson, and H. C. Pritchard (Secretary). Apologies were received from Messrs. A. J. Cooke and R. H. Martin.

Leave of Absence.—The Secretary was instructed to apply for six months' leave of absence on behalf of Mr. R. H. Martin, who has left on a business trip to England.

Life Member.—In recognition of 20 years' association with the Agricultural Bureau, Life Membership was conferred on Mr. A. G. Ifould, of the Port Elliot Branch.

New Branch.—Conditional approval was given to the formation of the Wilmington Women's Branch.

New Members.—The following names were added to the rolls of existing Branches:—Yaduarie—Paul G. Fiedler; Wepowie Women's—Mrs. E. Knauerhase; Warrambo Women's—Mrs. J. S. Mitchell; Wandearah—E. T. Sinclair, L. Crouch; Wallala—J. Kinnane; Truro—V. E. Munchenberg; Snowtown Women's—Mesdames T. Fryar, A. Hocking, A. Dolling; Rosedale—B. E. Schwartz, L. C. Schwartz, A. Heinjus, C. Mattiske; Petina—J. Irvin; Mount Gambier—A. E. Clayfield, A. C. Macmillan; Laura Bay Women's—Mrs. E. C. Lowe, Miss A. E. Searle, Miss E. D. Edson; Laura Bay—J. D. Blumson; Jervois—W. Shanklin; Hope Forest Women's—Mesdames W. R. Wheeler, C. Nicol, C. Jackson, H. Justin, P. Wollaston; Gladstone Women's—Mesdames Cox, Jeffries; Coonawarra Women's—Miss Gladys Teichelman; Boors Plains—J. Edwards.

Present number of members, 7,843; present number of Branches, 337.

Several items were discussed in Committee.

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DAIRY AND FARM PRODUCE MARKETS.

MESSRS. A. W. SANDFORD & Co., LIMITED, reported on June 1st, 1934:—

BUTTER.—The production of dairy produce during May was very disappointing indeed. This was, of course, due to the record dry weather conditions experienced, and even although dairymen generally were compelled to handfeed the stock this did not make up in milk returns, for there is nothing equal to the natural pastures. In many districts the fresh cows are coming into milk production, but the backwardness of the season is causing grave anxiety at the time of this report. Sales of butter were well maintained throughout the month, not only locally but the Broken Hill market was largely supplied from Adelaide. The "All Australia Plan" which has been adopted by the Eastern States was not acceptable to South Australia, and for the time being a local stabilisation plan has been arranged, and it is so far working satisfactorily. Prices at time of report were as follows:—Choicest creamery fresh butter in bulk, 1s. 3½d. per lb.; prints and delivery extra. (These prices are subject to stabilisation levies.) Store and collectors' lots, 6½d. to 7½d. per lb. at store door, according to quality. There was only limited exporting done during May, and this consisted more of lower grades than choicest, all the latter being required for local trade.

EGGS.—Supplies during the month under review kept well up, and are now increasing. Values fairly well maintained, but with the approaching of the export season they will have to ease to get back to London parity:—Ordinary country eggs, hen or duck, 11d. per doz.; selected fresh eggs, 1½ozs. and over, 1s. 1d. to 1s. 2d. per dozen.

CHEESE.—Western Australian and local buyers kept the markets cleared from week to week, although consignments received from the South-Eastern factories were heavy. Both for new and matured cheese the trade was satisfactory. Values continued on an even keel, and at date of report were:—Large and medium, 7½d. to 8½d. per lb.; loaf, 8½d. to 8½d. per lb.; semi-matured and matured, 8½d. to 9½d. per lb.

BACON.—The turnover in all cuts of bacon was well maintained, and the usual winter demand was experienced throughout. Hams, however, continued slow of sale, although prices were reduced, but these will be required later on when warmer weather is experienced:—Best quality sides, 9½d. to 9½d. per lb.; middles, 10½d. to 11d.; rolls, 8d. to 8½d.; hams, 11d. to 11½d.; cooked, 1s. 2d. to 1s. 2½d. per lb.; lard prints, 6½d. per lb.

ALMONDS.—The quantities of almonds received in the open markets showed improvement, although the crop this season is not nearly so great as in other years. However, buyers purchased all consignments offering from week to week both in shell lines and kernels, and rates showed an improvement during the month:—Softshells and Brandis, 8½d. to 9d. per lb.; hardshells, 5½d. per lb.; kernels, 1s. 11d. to 2s. per lb.

HONEY.—With the absence of really wet wintry conditions the sale of honey was not nearly so brisk as was hoped. Some shipments were made to both Melbourne and Sydney, but even with these the turnover was insufficient to clear stocks, and quantities are still held in hand by wholesale distributors. Rates, however, have been fairly well maintained:—Prime quality clear extracted in liquid condition, 3½d. to 4d. per lb.; lower grades, 2d. to 2½d. per lb.

BEEWAX.—Supplies were light, and there was no alteration in rates:—1s. 4d. to 1s. 4½d. per lb., according to quality.

LIVE POULTRY.—Sales are held every Tuesday, Thursday, and Friday, and our sale-rooms are the best equipped in the State. The numbers of birds marketed each week in the salerooms was larger than usual, but owing to poulterers and retail distributors having reduced stocks of dressed poultry in cold stores, the demand at each of the livestock sales was well sustained throughout. Fluctuations in prices occurred, more especially with turkeys. It is anticipated that the good demand will continue, and we advise consigning. Crates loaned on application:—Prime roosters, 3s. to 4s.; nice-conditioned cockerels, 2s. 4d. to 2s. 10d.; fair-conditioned cockerels, 1s. 9d. to 2s. 3d.; chickens lower; heavyweight hens, 2s. to 2s. 10d.; medium hens, 1s. 7d. to 1s. 11d.; light hens, 1s. 3d. to 1s. 6d.; couple of pens of weedy sorts, lower; prime young Muscovy drakes, 3s. to 3s. 11d.; young Muscovy ducks, 2s. to 2s. 9d.; ordinary ducks, 1s. 6d. to 2s.; ducklings, lower; geese, 2s. to 3s.; special, to 6s. 9d.; goslings lower; turkeys, good to prime condition, 7d. to 10d. per lb. live weight; turkeys, fair condition, 6d. to 6½d. per lb. live weight; turkeys, poor and crooked breasted, lower; pigeons; 3½d. to 4½d. each.

POTATOES.—New season's, 7s. 6d. per cwt.

ONIONS.—Brown 'Spanish, 5s. 6d. per cwt.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of May, 1934, also the average precipitation for May, and the average annual rainfall.

Station.	For May 1934.	Av'ge. for May	Av'ge. Annual Rain-fall.	Station.	For May 1934.	Av'ge. for May	Av'ge. Annual Rain-fall.
FAR NORTH AND UPPER NORTH.				LOWER NORTH—continued.			
Oodnadatta	—	0.31	4.69	Brinkworth	0.22	1.91	15.83
Marree	—	0.60	5.93	Blyth	0.06	2.09	16.80
Farina	—	0.66	6.48	Clare	0.22	2.95	24.56
Copley	—	1.00	7.93	Mintaro	0.29	2.80	23.47
Beltana	—	0.94	8.53	Watervale	0.14	3.15	26.91
Blinman	—	1.35	11.92	Auburn	0.13	2.81	24.00
Hookina	0.04	1.45	11.46	Hoyleton	0.32	2.02	17.35
Hawker	0.01	1.38	12.31	Balaklava	0.35	1.86	15.49
Wilson	—	1.25	11.82	Port Wakefield ..	0.12	1.59	12.96
Gordon	0.04	1.02	10.59	Terowie	0.12	1.25	13.40
Quorn	—	1.47	13.29	Yarcowie	0.17	1.35	13.63
Port Augusta	0.06	1.12	9.46	Hallett	0.34	1.71	16.48
Bruce	—	0.97	9.95	Mount Bryan	0.21	1.84	16.81
Hammond	—	1.06	11.27	Koorunga	0.25	2.00	17.92
Wilmington	0.05	2.01	17.43	Farrell's Flat ...	0.32	2.14	18.68
Willowie	0.06	1.30	12.28	WEST OF MURRAY RANGE.			
Melrose	0.17	2.59	22.94	Manoora	0.25	2.24	18.93
Booleroo Centre	0.18	1.61	15.23	Saddlesworth	0.25	2.26	19.61
Port Germein ...	0.18	1.55	12.55	Marrabel	0.52	2.23	19.94
Wirrabara	0.09	2.13	19.34	Riverton	0.18	2.41	20.81
Appila	0.09	1.48	14.66	Tarlee	0.10	2.10	18.13
Cradock	0.02	1.13	10.83	Stockport	0.09	1.83	16.97
Carrieton	0.04	1.27	12.29	Hamley Bridge ..	0.12	1.78	16.61
Johnburg	0.02	1.13	10.59	Kapunda	0.14	2.27	19.82
Eurelia	—	1.33	12.85	Freeling	0.12	1.93	17.88
Orroroo	0.07	1.33	13.23	Greenock	0.14	2.41	21.57
Nackara	0.57	1.24	11.18	Truro	0.04	2.19	19.95
Black Rock	0.09	1.30	12.43	Stockwell	0.20	2.21	20.17
Oodlawirra	0.13	1.27	11.67	Nuriootpa	0.17	2.26	20.72
Peterborough	—	1.34	13.27	Angaston	0.19	2.53	22.47
Yongala	0.14	1.45	14.47	Tanunda	—	2.49	22.03
NORTH EAST.				Lyndoch	—	2.55	23.46
Yunta	0.12	0.98	8.54	Williamstown ...	0.07	3.18	27.77
Waukarina	0.12	0.87	7.97	ADELAIDE PLAINS.			
Mannahill	—	0.82	8.21	Owen	0.51	1.81	14.53
Cockburn	—	0.98	7.98	Mallala	0.63	1.95	16.59
Broken Hill, N.S.W.	—	0.98	9.57	Roseworthy	0.47	1.91	17.39
LOWER NORTH.				Gawler	0.20	2.32	18.97
Port Pirie	0.19	1.60	13.26	Two Wells	0.39	1.89	15.75
Port Broughton.	0.30	1.70	13.92	Virginia	0.32	2.10	17.18
Bute	0.14	1.89	15.49	Smithfield	0.20	2.23	17.65
Laura	0.23	1.89	17.99	Salisbury	0.16	2.26	18.59
Caltowie	0.25	1.81	16.75	Adelaide	0.10	2.76	21.15
Jamestown	0.12	1.85	17.75	Glen Osmond	0.03	3.30	26.03
Gladstone	0.11	1.73	16.33	Magill	0.03	3.32	25.60
Crystal Brook ...	0.19	1.82	15.82	MOUNT LOFTY RANGES.			
Georgetown	0.12	2.13	18.41	Teatree Gully ...	—	3.51	27.33
Narridy	0.54	1.86	15.88	Stirling West ...	0.06	5.63	47.06
Redhill	0.21	1.97	16.61	Uraidla	—	5.53	44.19
Spalding	0.19	2.20	18.99	Clarendon	0.27	3.97	32.89
Gulnare	0.12	2.24	18.71	Morphett Vale ..	0.20	2.72	22.68
Yacka	0.13	1.78	15.40	Noarlunga	0.15	2.50	20.41
Koolunga	0.22	1.73	15.43	Willunga	0.77	3.47	26.03
Snowtown	0.24	1.88	15.71	Aldinga	0.14	2.53	20.28

RAINFALL—continued.

Station.	For May 1934.	Av'ge. for May	Av'ge. Annual Rain- fall.
MOUNT LOFTY RANGES—continued.			
Myponga	0.67	3.79	29.68
Normanville	0.85	2.70	20.73
Yankalilla	1.92	2.96	22.90
Mount Pleasant ..	—	3.06	27.24
Birdwood	—	3.28	29.24
Gumeracha	0.01	4.04	33.44
Millbrook Res....	0.02	4.89	34.82
Tweedvale	—	4.14	35.97
Woodside	—	3.71	32.30
Ambleside	0.01	4.01	34.90
Nairne	0.08	3.19	28.17
Mount Barker ..	0.23	3.76	31.97
Echunga	0.13	4.14	33.26
Macclesfield	0.20	3.38	30.44
Meadows	0.33	4.23	36.21
Strathalbyn	0.04	2.29	19.32

MURRAY FLATS AND VALLEY			
Meningie	0.10	2.26	18.42
Milang	0.48	1.71	14.97
Langhorne's Ck. .	0.27	1.61	14.90
Wellington	0.09	1.60	14.70
Tailem Bend	0.06	1.82	15.08
Murray Bridge ..	0.06	1.46	13.64
Callington	—	1.65	15.22
Mannum	0.06	1.29	11.53
Palmer	—	1.67	15.55
Sedan	0.01	1.33	12.11
Swan Reach	—	1.25	10.62
Blanchetown	0.02	1.28	11.03
Eudunda	0.21	1.87	17.18
Sutherlands	0.14	1.21	10.88
Morgan	0.19	1.02	9.21
Waikerie	—	0.94	9.70
Overland Corner ..	—	1.09	10.37
Loxton	—	1.29	11.65
Renmark	—	1.09	10.49

WEST OF SPENCER'S GULF			
Eucla	—	1.30	9.98
Nullarbor	0.02	1.26	8.84
Fowler's Bay	—	1.73	11.93
Penong	—	1.75	12.23
Koonibba	0.05	1.47	12.11
Denial Bay	0.07	1.49	11.52
Ceduna	0.11	1.41	10.16
Smoky Bay	0.17	1.44	10.51
Wirrulla	0.04	1.31	10.50
Streaky Bay	0.11	1.94	14.88
Chandada	0.36	—	—
Minnipa	0.92	1.56	13.87
Kyancutta	0.35	—	—
Talia	0.08	1.85	14.63
Port Elliston	0.39	2.11	16.50
Yeelanna	—	2.05	16.02
Cummins	0.06	2.16	17.61
Port Lincoln	0.53	2.36	19.43
Tumby	0.53	1.68	14.14
Ungarra	0.06	1.97	16.87
Port Neill	0.54	1.41	13.16
Arno Bay	0.69	1.37	12.63

Station.	For May 1934.	Av'ge. for May	Av'ge. Annul Rain- fall.
WEST OF SPENCER'S GULF—continued.			
Rudall	0.67	1.36	13.12
Cleve	0.39	1.78	14.79
Cowell	0.52	1.20	11.12
Miltalie	0.26	1.59	13.64
Darke's Peak ...	0.49	1.72	15.23
Kimba	0.53	1.39	11.84

YORKE PENINSULA.			
Wallaroo	0.53	1.88	13.99
Kadina	0.31	2.01	15.69
Moonta	0.31	1.97	15.10
Paskeville	0.47	1.94	15.52
Maitland	0.57	2.59	19.97
Ardrossan	0.35	1.72	13.98
Port Victoria ...	0.57	2.09	15.49
Curramulka	0.47	2.10	17.95
Minlaton	0.53	2.21	17.85
Port Vincent ...	0.36	1.62	14.50
Brentwood	0.43	1.93	15.58
Stansbury	1.10	2.09	16.84
Warooka	0.17	2.30	17.53
Yorketown	0.21	2.11	16.94
Edithburgh	1.00	2.04	16.40

SOUTH AND SOUTH-EAST.			
Cape Borda	0.49	3.21	24.86
Kingscote	0.99	2.52	19.16
Penneshaw	0.85	2.13	19.02
Victor Harbour ..	0.40	2.59	21.42
Port Elliot	0.55	2.45	19.95
Goolwa	0.66	2.20	17.87
Copeville	—	1.29	11.57
Meribah	—	1.53	11.46
Alawoona	—	1.39	10.29
Mindarie	—	1.48	12.22
Sandalwood	0.06	1.78	13.73
Karoonda	0.03	1.98	14.48
Pinnaroo	0.02	1.77	14.57
Parilla	—	1.74	14.01
Lameroo	—	1.89	16.10
Parrakie	—	1.90	14.64
Geranium	—	2.09	16.53
Peake	0.01	1.93	16.13
Cooke's Plains ..	0.07	1.60	15.43
Coomandook	0.08	2.13	17.20
Coonalpyn	—	1.93	17.53
Tintinara	—	2.30	18.73
Keith	—	2.38	17.96
Bordertown	0.02	2.11	19.26
Wolseley	—	2.05	18.52
Frances	0.01	2.22	20.01
Naracoorte	0.39	2.48	22.63
Penola	0.38	2.97	26.05
Lucindale	0.92	2.61	23.29
Kingston	0.20	3.10	24.37
Robe	0.87	3.08	24.68
Beachport	0.79	3.21	27.07
Millicent	0.88	3.49	29.81
Kalangadoo	0.87	3.88	32.38
Mount Gambier..	1.32	3.45	30.55

AGRICULTURAL BUREAU REPORTS.

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Branch.	Report on Page.	Dates of Meetings.		Branch.	Report on Page.	Dates of Meetings.	
		June.	July.			June.	July.
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Allandale East ..	†	22	20	Gladstone Women's	†	19	13
Alma	*	—	—	Glencoe	*	12	10
Appila-Yarrowie ..	1476	1	6	Goode	*	—	—
Arthurton	*	—	—	Goode Women's ..	*	—	—
Ashbourne	*	20	25	Greenock	†	4	2
Auburn Women's ..	1501	8	8	Green Patch	†	21	26
Balaklava	*	25	23	Gumeracha	*	25	23
Balhannah	*	—	—	Hanson	*	26	24
Balumbah	*	—	—	Hartley	1488	27	—
Balhannah Women's	†	20	18	Hindmarsh Island..	*	—	—
Balumbah Women's	†	6	4	Hope Forest	†	4	2
Beetaloo Valley ...	*	25	23	Hope Forest (Wom's)	†	—	—
Belalie Women's ...	1502	12	10	Hoyleton	*	18	16
Berri	*	27	25	Inman Valley	†	21	19
Belvidere	*	—	—	Jamestown	†	20	18
Blackheath	†	28	26	Jervois	*	14	12
Black Rock	*	5	11	Kalangadoo Women's	*	9	14
Black Springs	†	26	24	Kalangadoo	*	9	14
Blackwood	*	11	9	Kalyan	*	20	18
Blyth	†	22	27	Kangarilla Women's	†	21	19
Booborowie	†	25	23	Kanni	*	—	—
Bouleroo Centre ...	*	22	20	Kapinnie	*	—	—
Boolgun	*	—	—	Kapunda	*	8	13
Boor's Plains	1480	—	5 & 28	Karoonda	*	27	25
Borrika	*	—	—	Keith	†	21	26
Bowhill	*	25	23	Kelly	†	2	7
Brentwood	*	7	5	Ki Ki	*	—	—
Brinkley	*	27	25	Kilkerran	†	21	26
Brinkworth	*	25	23	Kongorong	*	25	23
Brownlow	†	—	—	Koolunga	*	—	—
Buchanan	†	—	—	Koonibba	*	21	19
Bute	†	21	19	Koonunga	*	—	—
Butler	*	—	—	Koppio	*	26	24
Caliph	*	7	3	Kringin	*	25	23
Caralue	*	20	25	Kuitpo	†	20	25
Carrow	*	27	25	Kulkawirra	*	12	10
Ceduna	*	—	—	Kyancutta	†	5	3
Charra	*	—	—	Kybybolite	*	21	26
Cherry Gardens ..	†	23	—	Kybybolite Women's	1497	—	—
Chilpuddie Rock ...	*	—	—	Lameroo	*	23	21
Clare Women's	†	—	—	Langhorne's Creek .	†	20	25
Clarendon	†	24	23	Laura	*	30	28
Cleve	*	2	7	Laura Bay	*	—	—
Collie	*	6	4	Laura Bay Women's	1505	12	10
Coomandook	†	29	27	Lensw'd & F'st Range	*	—	—
Coonawarra	*	28	26	Light's Pass	†	—	—
Coonawarra Women's	1503	20	18	Lipson	*	23	21
Cummins	†	8	13	Lone Gum & Monash	*	27	25
Cungena	†	7	5	Lone Pine	*	25	23
Currency Creek	*	25	23	Lowbank	*	27	25
Dudley	*	26	24	Loxton	*	8	13
Elbow Hill	†	21	26	Lyndoch	*	26	24
Eudunda	*	4	2	McLaren Flat	*	—	—
Eurelia	*	9	14	McLaren Flat Wm's	1506	7	5
Eurelia Women's ..	*	6	4	Macclesfield	*	21	19
Farrell's Flat	*	29	27	MacGillivray	*	26	24
Finnis	†	—	—	Mallala	*	18	16
Frances	*	—	—	Maltee	*	21	26
Frayville	†	21	26	Mangalo	*	—	—
Gawler River	†	—	—	Mangalo Women's .	*	13	11
Georgetown	*	23	21	Marama	†	—	—

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Branch.	Report on Page.	Dates of Meetings.		Branch.	Report on Page.	Dates of Meetings.	
		June.	July.			June.	July.
Meadows	*	27	25	Rosedale	†	—	—
Milang	*	23	21	Roseworthy	*	—	—
Millicent	*	29	27	Rudall	*	26	24
Millicent Women's ..	*	—	—	Saddleworth	*	29	27
Miltalie	1486	23	21	Saddleworth Women's ..	1507	5	3
Monarto South	†	—	—	S "		23	21
Moorlands	†	—	—			26	24
Morchard	1506	1	—			—	—
Morchard Women's ..	†	1	20	Snowtown	†	8	13
Mount Barker	†	18	16	Snowtown Women's ..	†	7	5
Mount Bryan	*	—	—	South Kilkerran	†	26	24
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Mount Gambier	1475	8	13	Stanley Flat	*	18	16
Mount Hope	*	26	24	Stookport	†	—	—
Mount Pleasant	*	8	13	Strathalbyn	*	13	11
Mudamuckla	*	9	14	Streaky Bay	*	22	27
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Myponga	*	21	19	Taplan	†	26	24
Myra	*	27	25	Taplan Women's ..	†	—	—
Nantawarra	*	21	26	Taragoro	†	21	26
Naracoorte	*	9	14	Tarlee	†	—	—
Narridy	*	—	—	Truro	1480	18	16
Narrung	*	—	—	Tulkinera	*	28	26
Nelshaby	*	—	—	Tweedvale	†	21	19
Nelshaby Women's ..	*	—	—	Ungarra	*	28	26
Netherton	*	27	25	Upper Wakefield	†	21	19
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Nunkeri	1486	21	26	Waddikee Rocks ..	*	23	21
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Owen	*	11	9	Wandearah	†	26	24
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Parilla Women's	1500	20	18	Warrambo	†	26	24
Parilla Well	*	25	23	Warrambo Women's ..	†	8	6
Parilla Well Women's ..	*	26	31	Wasleys	1480	14	12
Parrakie	*	—	—	Wasleys Women's ..	†	7	5
Parrakie Women's ..	†	26	24	Watervale	†	18	16
Paruna	*	1	6	Wauraltee	*	26	24
Paskeville	†	26	24	Weavers	†	11	9
Pata	*	1	6	Wepowie	†	25	23
Penola	*	2	7	Wepowie Women's ..	1507	—	—
Penola Women's	†	—	—	Wilkawatt Women's ..	†	19	17
Penwortham	*	27	25	Williamstown Wm's ..	1508	6	4
Petersville	*	26	24	Willowie	*	25	13
Petina	†	23	28	Wilmington	†	12	10
Pinbong	*	—	—	Wirrabara	*	—	—
Pinnaroo	*	—	—	Wirrilla	*	23	21
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Port Elliot	*	—	—	Wirrulla	*	20	18
Pygery	†	26	24	Wolsley	*	11	9
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Quorn	*	—	—	Yadnarie	†	26	24
Ramco	1487	25	23	Yandiah	†	8	13
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Rendelsham	†	23	21	Yeelanna	*	27	25
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Riverton	*	11	9	Yurgo	†	—	—
Roberts & Verran ..	*	—	—	Yurgo Women's	†	—	—

* No reports received during the month of May. † Held over. R In recess. ‡ Formal.

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

[The new Bureau subscription rate of 2s. per annum, which was recommended at the 1933 Congress, applies to all members as from August 1st, 1934, with the following exceptions:—Life Members, Branch Secretaries, and members who reside in the same house as (a) a Life Member, or (b) a Branch Secretary, or (c) a subscribing member. Subject to the foregoing exceptions, new members joining during the months of July to December will pay 2s. per annum, and those joining during the months of January to June 1s. for that period and 2s. for each succeeding year. Subscriptions must accompany the nomination forms unless the nominee is exempt.]

MEN'S BRANCHES.

VETERINARY FIRST AID CABINET.

[In view of the outstanding success which has attended the establishment of a Veterinary First Aid Cabinet by the Mundalla Branch of the Agricultural Bureau and because of the wider interest being taken in all forms of livestock husbandry, the following information—supplied by the Secretary of the Mundalla Branch, Mr. A. Ross—is published, in the thought that it may be of value to other Branches of the Agricultural Bureau.]

For some years I had a small veterinary first-aid outfit for my own use, and used to help neighbours with sick animals occasionally.

These people saw the advantage of having an outfit on hand in causes of sickness and accident to farm stock, and introduced the matter at a Bureau meeting. At that meeting a scheme was drawn up giving an idea of what an outfit would need to consist of and an estimate of what it would cost. This was done, and it was left in my hands to go ahead.

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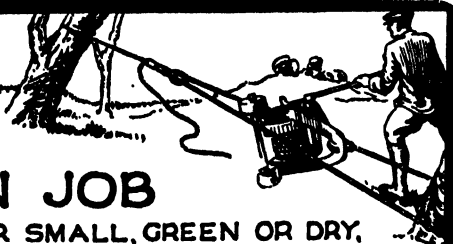
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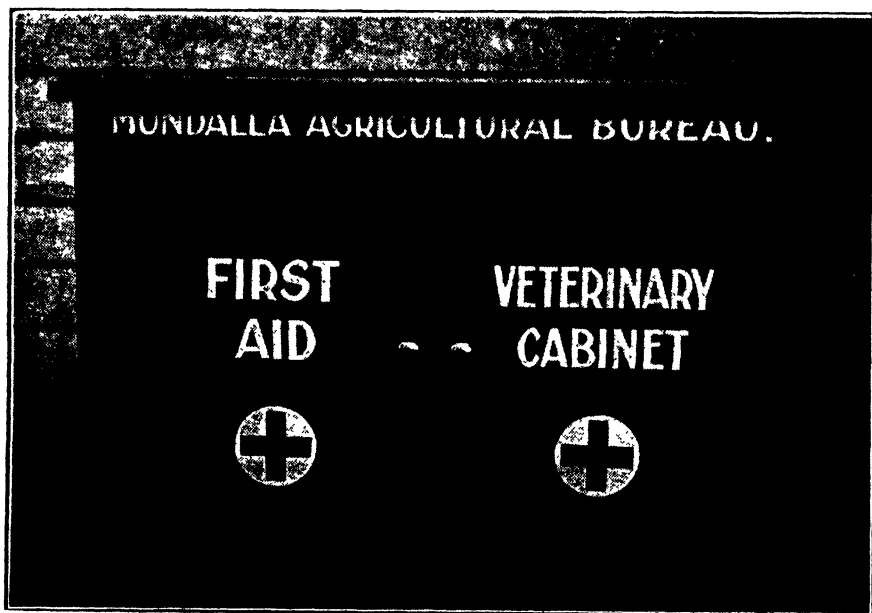
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The matter of raising funds did not present any very great difficulties, as the members wanted the outfit and knew about what it would cost to establish it, so donations came in fairly freely, some donating cash and others equipment, such as milk fever outfits, &c. The local Gun Club headed the list with a donation of £7.

While engaged in the preparation of the outfit the idea came to me that it would be a good plan to stage the outfit at our Bureau Social and have it declared open for service by an officer of the Advisory Board. This would give all an opportunity to see and inspect it, and also create an interest that would make it easy to raise more money if necessary.

For this purpose a good cabinet was required. I donated the timber as my share towards the outfit and Mr. Herring (a local carpenter) built it free of charge. Medicines and appliances were purchased with the money donated. After that it was no trouble to get funds—everybody wanted to give something towards it, and it is now as complete as it could possibly be. In fact, it has grown from a Veterinary First-aid outfit to a Veterinary Service, and is just about a full-time job attending to it.



In regard to running the outfit: It is run on business lines on a cash basis. We have a docket book similar to those used by stores, and every purchaser of medicines, &c., receives a docket, a copy of which is filed. By this means we can always check up at any time and see exactly how we stand. A diary is also kept in which every case is entered up with the result of the treatment. This is very important. Instruments, such as milk fever outfits, syringe, &c., are hired out at a charge which it is considered will provide sufficient to replace them when worn out. This money is "ear-marked" for that purpose and is not used for anything else.

The medicines are sold out at cost price, plus about 1d. in the shilling to provide for any bad debts. As the goods are sold out they are replaced, and the thing now keeps itself going. Donations are coming in and will continue to do so from grateful persons who have had animals successfully treated and more equipment is thereby added to the cabinet.

In regard to medicines, drugs, &c.: The local storekeeper, who is a good member of our Branch and very much interested in our work, is supplying us with goods at wholesale prices and our local chemist is also supplying drugs, &c., so that members not only have a first class Veterinary outfit available to them, but are also able to treat their sick animals with the least possible expense. Our doctor, too, is very interested and has offered his help at any time.

Officers of the Stock and Brands office are always glad to assist us at all times. We have found out from experience what is a suitable quantity of each medicine to keep in stock, and a list of medicines, &c., is set out hereunder, with the quantities, which may prove useful to any one stocking up a cabinet for the first time. All drugs, &c., for hypodermic injection, local anaesthetic, &c., the local chemist prepares for me as required:—

Soda bi-carb., 2lbs.
Soda—carb., 1 lb.
Oil—raw linseed, $\frac{1}{2}$ gall.
Oil of turps, 1 pint
Oil—camphorated, 1lb.
Oil—olive, 1 pint
Oil—castor, 1lb.
Oil—eucalyptus, 4ozs.
Copper sulph., 1lb.
Stockholm tar, 1lb.
Methylated spirit, 1 pint
Treacle, 2lbs.
Ginger—ground, 1lb.
Mag. sulphate, 6lbs.
Boric acid, 1lb.
Lysol, 1lb.
Iodine tr., 1lb.
Perm. potash, 2ozs.
Saltpetre, $\frac{1}{2}$ lb.
Petroleum jelly, 1lb.

Zinc. sulph. tabs., 100
Perchloride mercury tabs., 100
Nux vomica, 1lb.
Aconite, 2ozs.
Sweet spirits nitre, $\frac{1}{2}$ lb.
Aromatic sp. ammonia, $\frac{1}{2}$ lb.
Laudanum, 4ozs.
Chlorodyne (vet.), 3ozs.
Chloral hydrate, 4ozs.
Aloe balls, 6
Hyposulphite soda, 1lb.
Iodoform, 4ozs.
Bismuth subnitrate, 4ozs.
Glycerine, 1lb.
Paraffin oil, 2 pints
1 in 8 red iodide blister, 2ozs.
Sulphur, 1lb.
Alum, 4ozs.
Zinc oxide, $\frac{1}{2}$ lb.

A few instruments, &c., that would be absolutely necessary:—

1 or 2 milk fever outfits
1 enema syringe (hose and funnel is good substitute)
1 dressing forcep
1 curved scissors, 7in.
1 measure glass, 2ozs.
1 trocar and canula
 $\frac{1}{2}$ doz. assorted needles
Hank ligature silk
Cotton wool

A piece of 1in. garden hose about 8in. or 9in. long slipped over the neck of a beer bottle is excellent for drenching with—better than an expensive drenching bit.

The medicines and appliances, &c., mentioned are by no means a complete list, but are ample to provide a first-class First-Aid outfit.

We have found out from experience and observation what prescriptions give best results in many cases, and if any Branch is interested the information is available on application.

SOUTH-EASTERN DISTRICT.

MOUNT GAMBIER (Average annual rainfall, 30.55in.).

May 11th.—Attendance, 17 visitors.

CERTIFICATES PRESENTED.—On behalf of the donor of the cup for the best crop of wheat (Mr. A. Patzel), Mr. A. Sassanowsky handed the trophy to Mr. F. L. Koop, who won first with 94 points. A cash prize of £1 ls. also went with the cup. Other prizes were presented to the following:—Class 2 (barley)—Mr. A. H. A. Allen, 1st, with 106.5 points; Mr. L. T. Whitehead, second. Class 3 (potatoes)—First, Mr. B. Kannenberg; second, Clover Estates. Class 4 (pastures)—Mr. W. F. Button first, with 94 points; Mr. Cain, second. Class 5 (oats)—Hill Bros. 102 $\frac{1}{2}$ points, first; second, Mr. W. Harfull, 101 points. Class 6—Snowflakes—No competition. Class 7 (maize)—E. A. Kannenberg, 81 $\frac{1}{2}$ points, first; second, S. Norman, 81 points.

HERD TESTING.—Mr. Sassanowsky thought that the time had come when herd testing was necessary in this district. There was no doubt that the South-East was gradually turning to dairying. The potato industry was practically exterminated, and they had

to take on something where the carriage on produce was not so high. He thought that soon a huge herd testing society in the whole district would be formed, and in the course of eight or nine years the benefit would be apparent. In any part of Europe or America, he said, certain districts had a certain class of cow, and they brought it to the highest point of breeding. They should have that in the South-East. It would be advisable to specialise in the milking Shorthorn or the Holstein, the two outstanding cows for cheese making. (Secretary, G. Gurry.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Allandale East .	27/4/34	12	Conference Reports.....	J. Haslett
Keith.....	20/4/34	8	Address—A. L. Warren .	C. Densley
Mundalla	26/4/34	16	Address—Mrs. L. Cook ..	A. Ross

UPPER NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

APPILA (Average annual rainfall, 14.66in.).

May 4th.—Attendance, 14.

HOME GARDENING.—Paper read by Mr. A. Harvie:—"In laying out a home garden, allow plenty of space when fencing so that when the trees grow up the stock will not be able to reach them. Apart from the pleasure and satisfaction of having a plentiful supply of fresh fruit and vegetables for preparing the meals, most housewives realise the financial saving derived from the home garden. For fruit trees, early and late varieties of apples, apricots, peaches, pears, &c., are recommended. *Vegetables*.—Good cultivation and early sowing are essential for success. It is not always advisable to wait for general rains before sowing seeds or setting out seedlings. The best time to start sowing for spring use is in March, and for summer and autumn use in September and October, but the latter does not apply so much in this district unless there is an ample supply of good water, because it takes a considerable amount of water to keep the soil moist during summer. Turnips, carrots, beetroot, etc., do best when planted in rows and then thinned out. It is not advisable to use stable manure when sowing root crops, but plant in soil that has been heavily manured the previous year. The highest and best drained position of land should be selected for winter cultivation, and the most important point is to keep the soil loose and free from weeds. Transplanting should be done in the evening or on a dull, damp day, and each plant watered immediately after planting, even if the soil is moist. Almost any kind of vegetable can be planted during September, providing one is able to water them when necessary. Tomatoes are hot weather plants, and many failures are caused by too early planting, when the soil is cold and wet. When late frosts are likely to occur, protection is necessary. Before planting cucumbers, the ground should be prepared by mixing well-rotted stable manure with the earth in a trench which has been dug about 6in. deep. Pumpkins, melons, and marrows, &c., require similar treatment. Before the dry weather sets in it is a good plan to mulch with a good layer of stable manure. Beetroot does well in a light sandy soil. On no account use manure, unless dug deeply into the soil. The roots will most likely be forked. The ground between the rows of all growing crops should be kept in a loose, open condition by surface cultivation. The flower garden, no matter how small, helps to improve the appearance of the home, and provides pleasant recreation for most women. Plants can be secured to suit almost any locality, soil, or position. Hardy shrubs make a good display, and when once established require very little attention. The same applies to a hedge, which, if well clipped, gives a neat, complete appearance to the garden." (Secretary, E. Wurst.)

WARCOWIE (Average annual rainfall, 12.31in.).

May 1st.—Attendance, 13.

FARM ECONOMY.—Mr. L. Jarvis read the following paper:—"Horses are to be found on nearly every farm, and of all farm animals should be kept as few in number as possible. It is a good plan to breed a few foals each year to maintain a team of young and active animals. Harness should be oiled at least twice a year. Mutton fat, neat-foot oil, and a little Stockholm tar make a good harness dressing. Implements are too often left standing in the weather; one season in the open does more harm than the work they do in two years. A good shed of timber and straw will guard them

against all weather. All woodwork of the machinery should have a coat of paint occasionally. Fences should be re-strained if wires become broken or slack, and new posts used to replace any that are broken. This will make the fence last for a number of years. Gates can be constructed at little expense out of old piping or a few shillings' worth of timber and a few bolts. Hinges can be made out of old parts of machinery. Tools should always be kept in the one place; it often takes longer to find the tools than it does to do the job."

Mr. F. Williams read a paper, "Mendelism." (Secretary, A. Crossman.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Wepowie	27/3/34	14	Address—W. J. Spafford	E. Roocke
Wepowie	23/4/34	10	Address—E. L. Orchard	E. Roocke
Wilmington	11/5/34	27	Address—E. L. Orchard	C. Cole

MIDDLE NORTH DISTRICT.
(PETERBOROUGH TO FARRELL'S FLAT.)

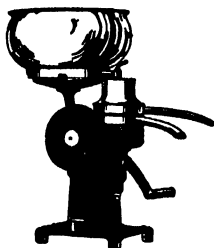
MURRAYTOWN.

April 21st.—Attendance, 7.

THE OAT CROP.—The Hon. Secretary (Mr. E. Pitman) contributed the following paper:—"The farmer who grew oats for sale last year found them a very profitable crop. Throughout all of the older settled areas there has been a very keen demand for seed oats. Oats can be grown with very little trouble if sown early in the season, i.e., by, say, the middle of May. My practice has been to grow oats on wheat stubble ground, sowing direct with the combine on the burn, as soon as possible after burning. Sown on fallow, oats produce a rank, high crop that is difficult to either cut or reap. I have grown Algerian, Mortgage Lifter, Sunrise, Cape, and Guyra, and while giving

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satisfactory yields, most of them are not early enough to be done with before the wheat was ready to reap. Mainly for that reason I have grown Early Burt for a number of years. I am trying a small area of Palestine oats this year. Early Burt is a fairly sweet oat; most livestock will, when grazing, leave other crops alone and feed off this variety. If cutting oats for hay, cut according to the time needed for the variety grown. Some oats if cut green prove bitter when chaffed up, while others, if left to ripen, are not eaten very readily. As oaten hay alone when cut for chaff is heating on horses, I prefer, if possible, to put in the stack alternative loads of oaten and wheaten hay which makes good feeding chaff for stock. If leaving the oats to strip and the crop is at all heavy, make a big lip sieve for the header. Oats can be stripped in much cooler weather than wheats. *Storing*.—I much prefer to tip them out loose in a corner of the barn, building a bag wall to keep them up. If stored in bags, rats and mice do a lot of damage." In the discussion which followed all took part. Mr. Borgas said that oats at a clearing sale realized 12s. 2d. a bag, and they were being delivered at Port Augusta for sheep feed from Kimba at 8s. bag. He preferred Pride of York for grain, being a plump, short-strawed variety that did not shake in rough weather. He preferred to cultivate before sowing and found oats cleaned the weeds off a paddock better than any other crop. Oats for hay should be cut fairly green. He would sow one bag of oats to 2 acres, and thought every farmer could use for hay and grain from 30 to 40 acres each year for his horses. Mr. Joppich spoke of the large areas of oats grown in Western Victoria, where the oats were fed off by stock to a large extent. Oaten stubble was one of the best feed stubbles for all livestock. He ploughed a "lay-out" paddock, and although the ground would not work down, he reaped a 7½-bag crop. He preferred to fire-work stubble land before sowing oats. Mr. Bleischke said they were trying out oats this year as sheep feed, and asked how much per acre should be sown. Mr. Pitman advised about two bags to 5 acres. There would probably be some very cheap oats in 1934-1935, for nearly every farmer was sowing this seeding. It was a waste of time and labour to grow oats on fallowed land.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Jamestown	7/5/34	12	Annual Meeting	B. Phillips
Red Hill	7/5/34	9	"Sheep on the Farm," W. Cronin	S. Pengilly
Wandearah	2/5/34	23	Address—W. J. Spafford	J. O'Shaughnessy

**LOWER-NORTH DISTRICT.
(ADELAIDE TO FARRELL'S FLAT.)**

SUTHERLANDS (Average annual rainfall, 10.88in.).

February 8th.—Attendance, 55.

Mr. W. C. Johnston (District Instructor) delivered an address, "Sidelines on the Farm."

A special meeting was held on February 23rd to discuss pasture experimental work. **BOOKKEEPING**.—Mr. W. Twartz read the following paper at the March meeting, which was attended by 14 members and 9 visitors:—"Every farmer should do a certain amount of bookkeeping, the same as other business people. The farm is a business, and it is very necessary to know whether it is a paying proposition. It is too great a tax on the mind to attempt to memorise the many affairs connected with the working of a fair-sized farm. The practice of recording transactions on odd pieces of paper, and reference to the heel of a cheque book or a file of receipts, is very unsatisfactory. To enable a farmer to correctly estimate his profits and losses it is absolutely necessary for him to keep books. Farmers should keep separate books for each sideline, as well as for the farm. The number of books will depend on the nature of the business, but three books are absolutely necessary, viz., waste book, journal, and ledger. The waste book contains a record of all transactions as they occur, but for temporary purposes only. From the waste book the items are entered into the journal and ledger. Every 12 months the farmer should make a valuation of his stock and plant, and draw up a balance-sheet. Double entry bookkeeping has many advantages over single entry, and is so called because each transaction is recorded twice—one relating to the giver, the other to the receiver. Farmers that have really no knowledge of bookkeeping should at least keep records of income and expenditure, and all receipts and account sales should be filed. By doing bookkeeping on the farm farmers save a lot of time and money, especially when filling in income tax returns. Farmers who have sheep should

also have a special book for wool and shearing records, showing how much wool was clipped and how many sheep were shorn. The number of sheep on the holding should be recorded from time to time, and any sold or slaughtered deducted. Farmers should keep a crop record showing how many acres sown, times worked, kind of wheat, &c., and the number of bags reaped. The number of cows milked during the year should be recorded, and when the cream cheque comes the butterfat lbs. booked down, and at the end of the year it will be easy to calculate how much each cow is giving. By keeping these records it is easy to see if the farming methods are improving, and if the farm is carrying more and better stock. It will also facilitate the compilation of statistics. Trusting to memory is a very unreliable way of doing it. Where farmers have a rain gauge the falls should always be recorded, and it is always handy to know how much rain has fallen on the farm for the year. It is just a few minutes every now and again to keep particulars up to date, and the information obtained will be well worth keeping. The principles of bookkeeping are in every way necessary for a farmer's business, and the little time spent will be amply repaid."

STORING FODDER.—Paper read by Mr. L. Niemz:—"During seasons of periodical drought farmers turn their attention to the all-important question of fodder storage. A large number of farmers in this district do not give this important matter due consideration. While seasons are bountiful they forget to reserve fodder for the lean years which will come again. An important operation of farm activities should be the conservation of fodder of some description. Every farmer should make large stacks of straw in good seasons which will last for many years without getting damaged by weather or mice, and in time of drought it can be fed, mixed with a little hay. This would be much cheaper than purchasing hay chaff at a high price. The best method of storing fodder for dairying cows in good years is to make ensilage. Hay conservation does not appear to be the most successful, because of mice. Cocky chaff is also a valuable fodder. When storing hay and chaff each should have a good bedding of straw and good straw covering to prevent damage by rain and mould. If preserved under a good shelter it will keep for years. Ensilage is not suitable for feeding horses." (Secretary, E. Schiller.)

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TRURO (Average annual rainfall, 19.95in.).

February 19th.—Attendance, 15.

HARVEST REPORTS.—Trophies for this year's local Crop Competition were presented. Mr. L. Miller gained the first prize with 95 points with Gallipoli and Nugget varieties of wheat. Mr. W. Rice was awarded second prize with 90.5 points with Dan and Sword wheats. The crops through the district averaged from 8 to 30bush. on fallow, the lower returns owing to the early sown ground becoming set due to the early rains. Ploughed ground returned an average of 16bush. Oats averaged 8 to 15 bags and barley 9 to 10 bags. Hay cuts were up to the average, yielding from 30cwt. to 2 tons per acre. (Secretary, L. Davis.)

WASLEYS.

February 8th.—Attendance, 14.

HARVEST REPORTS.—Mr. T. Day reported: Throughout the district Sword proved the best variety. He had not seen a bad crop during the four years it had been grown. Yield, 34bush. Nabawa only yielded 18bush. and was inclined to grow rank. Prior's barley sown on late fallow produced 38bush., and 20bush. were obtained on stubble land. Mr. R. Currie: Sword 28bush. on fallow following oats. Nabawa on fallow after wheat 12bush. Barley on grass land ploughed prior to sowing during May yielded 27bush. as compared with 18bush. on stubble; both treated with 50lbs. of 45 per cent. super per acre. Oats on stubble land and fed off twice yielded 1½ tons of hay as against 1 ton on land ploughed up after grass; both sown with 60lbs. of 45 per cent. super per acre. Mr. A. Sellick: Sword, early sown, 33bush. per acre. Ford frost affected. Nabawa on poorer fallow 18bush. per acre. Barley on stubble land 15bush. good sample; whilst oats on stubble only grew feed, although 2bush. was sown per acre together with 1cwt. super. Mr. E. Day: Sword (Selection No. 1) yielded 9bush. better than Nabawa. Glucub yielded the same as Nabawa. Sword (Selection No. 2) yielded 3bush. more per acre than first variety, very tough to thresh, but grew very thick. Taldra 18bush., against Sword 33bush. Mr. L. George: Sword 33bush, Ford 24bush., Nabawa on ploughed land 15bush. Mr. J. Koch sowed Sword (Nos. 1 and 2), much preferred No. 1 as it stood up better, whilst No. 2 had to be reaped one way during hot weather. Barley sown with super and ammonia on stubble land produced 2bush. more per acre than that sown with super. Better results were obtained on clay land following oat pasture ploughed in February than on stubble land stirred up with cultivator. (Secretary, C. Currie.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Stockport	27/4/34	16	Address—F. W. Coleman	L. Klaffer
Nantawarra	1/5/34	10	Address—R. Herriott ...	S. Herbert
Black Springs ..	1/5/34	20	Address—W. J. Spafford	K. Dunn
Buchanan	4/5/34	12	"Farm Pests" Culbertson	L. Bell
Rosedale	20/4/34	18	Question Box	S. Sincok
Tarlee	8/5/34	15	Address—W. C. Johnston	N. Clarke
Snowtown.....	11/5/34	12	Question Box	A. Hocking
Wasleys	12/4/34	12	Address—S. Pimlott	C. Currie
Wasleys	10/5/34	35	Illustrated Address—Mr. Guster	C. Currie

YORKE PENINSULA DISTRICT.**WHEAT DISEASES.**

[Paper read by Mr. L. Carter at the April meeting of the Boors' Plains Branch.]

From time to time wheat yields are considerably lowered by the devastating attacks of various diseases such as stinking smut or bunt, loose or flying smut, flag smut, take-all, foot rot, rust, &c. Each disease is caused by a parasitic fungus which may cause severe losses at some period or other in practically every district. Fortunately rust is somewhat intermittent in its attacks, several seasons often elapsing between serious outbreaks. Frequently others are met with year by year and tend to cause increased losses unless special control method are adopted to combat them. For years efforts have been made to produce resistant varieties and partial success has been achieved in several cases. Early maturing rust escaping varieties have been produced and extensive experiments carried out to combat flag smut, &c., but complete success is difficult as varieties displaying these characteristics have been found in numerous cases to be far from prolific enough.

SMUTS.

The two wheat diseases, bunt, ball smut or stinking smut, and loose or flying smut are commonly known as smut. When a farmer refers to smut he usually means stinking smut or bunt which is caused either by *Tilletia tritici* or *Tilletia laevis*, two closely related fungi. Stinking smut and flying smut differ greatly, but from the growers' point of view the main one is in the treatment of seed. Stinking smut, which gets its name from the objectionable smell noticeable if only a little is present in the grain, can be treated in infected seed, but to do so in the case of flying smut requires a very intricate process.

STINKING SMUT OR BUNT.

In this disease minute black particles are frequently found adhering to the grain and though commonly called smut they might more correctly be defined as bunt as they are really the spores of a fungus just as grains are the seeds of the cereals. Germinating in the soil the fungus growth of these spores under suitable conditions enters the germinating seedling and grows with it, living on the plant tissues to finally produce the "bunted ear." Enclosed in the ovaries and glumes these spores cannot escape. At first they appear somewhat greasy, but later they dry and harden. This mass of spores in the ovary is spoken of as a bunt ball, resulting in the disease being commonly called "ball smut." The fungus grows to maturity with the plant, and finally produces spores in the ear which replace the normal grain. These spores are produced in enormous numbers, one single bunt ball no larger than a wheat grain being calculated to contain approximately 4,000,000 spores, which if evenly distributed are sufficient to supply each grain in a bushel of wheat with from 4 to 6 spores, each capable of causing the resulting plant to be diseased. Infection from soil which has previously grown smutted crops is possible, though fortunately is relatively rare. The chief cause of the smut is the sowing of seed with healthy spores adhering to it. It follows therefore that if the vitality of these spores can be destroyed or the fungoid growth resulting from such spores is destroyed the crop will be clean. Methods have been introduced which successfully bring about such results. Occasionally as in self sown crops there may be sufficient moisture present in the soil to germinate the spores of the fungus without germinating the wheat. As a result the fungus plant is unable to attack the wheat and dies before the wheat germinates. Too much is left to chance by trusting to this hazardous result so that early sowing is not sufficiently trustworthy for farmers and pickling methods are recommended.

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WHEAT PICKLING.

Seed Treatment as a Control Method.—Satisfactory success in combating stinking smut has resulted from treating seed prior to sowing. Two distinct treatments are available, namely dry dusting with copper carbonate and wet pickling with bluestone (copper sulphate) or formalin.

Dry Pickling.—Thoroughly dusting wheat grain with copper carbonate powder at the rate of approximately 2ozs. per bushel has proved comparatively satisfactory control of this disease in seed samples not seriously infected. Furthermore, copper carbonate appears to prevent injury from attacks of ordinary soil fungi, thereby improving the yield in some instances where non-smutted grain has been treated with the powder before sowing. The dry method of pickling has advantages over the wet methods in that it may be done at any time of the year and the grain so treated stored until required for seeding. Further, it is less troublesome and fool-proof to carry out since no solution of correct strength need be made up as is necessary in wet pickling, to overcome the danger of lowering germinating capacity of the seed by using solutions of incorrect strength. It must be remembered that the powder if breathed causes nausea and in large quantities is poisonous so that in dusting, an air-tight churn should be used if possible. The farmer is recommended to always pickle in the open where if a little care is exercised there need be no fear of any ill effects ever resulting.

Wet Methods.—Bluestone pickling has become obsolete in many districts on account of the poor germination often resulting from seed treated with this pickle. Where this wet method is still used the solution recommended is 1-1½lbs. copper sulphate to 10galls. of water in which the seed is dipped for 3 minutes then drained and allowed to dry for at least 12 hours before sowing. Unfortunately reinfection may take place immediately the solution has dried, as this pickle is only effective while wet. In the case of badly bunted wheat samples fresh seed samples should be selected, but if the farmer must sow the dirty seed it is recommended that he first pickle the seed in a bluestone solution (1½lbs. copper sulphate in 10galls. of water) then spread the seed on a floor or tarpaulin and immediately sprinkle the whole with a solution of limewater (1lb. of quicklime to 10galls. of cold water, using the clear water decanted off) and turn the seed several times with a shovel. If formalin is to be used care should be taken that a ¼ per cent. solution be used (1lb. formalin to 40galls. of water). Though formalin if correctly applied does not hinder the germinating capacity of wheat seed as much as bluestone, it has been found that where the seed is not sown within 2 days, a poor germination results. Wherever wet pickling methods are used the farmer should float off as many bunt balls as possible.

LOOSE OR FLYING SMUT.

Wheat affected with this disease which is caused by the parasitic fungus, *Ustilage tritici* frequently has somewhat stunted stalks. The smut is produced in the ovaries and destroys the parts of the flower. The spores produced are a blackish powder easily blown about, which characteristic, together with the freedom from objectionable odours, serves to distinguish this disease from stinking smut. Infection can only be produced by spores which are blown on the flower just after heading and cannot result from spores on the outside of the grain or in the soil. Under favourable conditions the spores germinate, the fungoid threads produced entering the ovary and remain dormant in the embryo of the apparently normal grain. These threads grow up with the plant when such infected grain is sown and produce the disease once more so that the treatment recommended for bunt has no appreciable effect on this disease.

Control Measures.—Seed should always be selected from a crop which examined at flowering time proved to be unaffected. Fortunately the disease is not nearly so commonly met with in South Australia as stinking smut. Where it is necessary to sow seed infected with this disease the hot water method is recommended. There are several modifications of this intricate treatment though both are tedious and far from convenient on the farm. In America they advocate soaking the seed for 10 minutes in hot water at a temperature of 129°F. or 54°C., taking pains to maintain a constant temperature.

FLAG SMUT.

The parasitic fungus *Urocystis tritici* causes the disease known as flag smut, which is sometimes responsible for serious losses in wheat crops, reducing the yield in some cases as much as 50 per cent. In its early stages the disease, which only attacks wheat, is difficult to detect. Later the leaves take on a leaden or faintly bluish hue. As the crop heads it is noticeable that the flag is curled and abnormally grey. At harvest time the grey flag breaks into innumerable fine sooty black spores which are readily distributed over the soil and throughout the harvested grain. The disease may be propagated by the germination of spores in the ground or of spores attached to the seed.

Control Measures.—Though copper carbonate has proved effective in treating spores attached to the seed grain it is apparently not sufficient to combat the spores already

in the soil. Introducing rotations where another crop not susceptible to the disease is sown, followed by a year's fallow before sowing wheat, for example oats-fallow-wheat has proved very effective. The seedbed should be thoroughly prepared early and shallow sowing of early maturing varieties such as Nabawa and Yandilla King, &c., is recommended. Burning the wheat stubble destroys many spores which might otherwise be left healthy and free to attack the next wheat crop sown. The practice of feeding livestock with diseased hay is indeed unwise, as it has been proved that the spores of flag smut pass uninjured through animals.

STEM RUSTS.

These appear later in the season than leaf rust, and may be observed in the commencement of summer. The first signs are pale yellow spots on the leaves evident when the plant is held to the light. Some days later large reddish orange patches develop, around the edges of which may be seen the ruptured epidermis or leaf covering. This rupturing of the epidermis is a feature which characterises stem rust from leaf rust. Numerous spores, known as uredospores or summer spores, are produced on these reddish patches throughout the season. Being small and light they are readily distributed by the wind, and under favourable conditions start new centres of infection in neighbouring plants. In severe attacks the spores are so numerous that the surface of the ground may appear red owing to a covering of these reddish spores. As the summer advances and the plants mature the reddish patches change to black owing to the production of black resting spores or teleutospores. Teleutospores are incapable of infecting wheat but may carry over the disease on the Barberry plant which is fortunately rarely found in Australia. Stem rust reduces the yield, and the grain if present is generally small and shrivelled, whilst the straw is brown or greyish brown and brittle. In severe attacks no grain forms and the brittle straw is useless. The severity of rust attacks depend on many factors, warm weather, frequent showers, and heavy dew favouring the development of rust. Early maturing varieties may ripen so early that the grain is fully formed before infection occurs, in which case little damage may occur. Some fertilizers affect the final degree of rustiness of plants by hastening or delaying the ripening process. A few days difference in the ripening of two fields of wheat may have a marked influence on the amount of rust which develops. Super hastens maturity, aiding the crop to escape rust, while nitrogenous fertilisers predispose the plant to disease by increasing succulence, and lodging and by delaying

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maturity. Barley is susceptible to the stem rust of wheat, but oats are not attacked. There are two distinct strains of stem rust and apparently some wheats are susceptible to one strain and resistant or escape the other strain, and *vice versa*, while yet other varieties of wheat are susceptible or *vice versa* to both strains of the disease. The solution therefore appears to be in selecting and breeding rust escaping varieties suitable for the various districts. Liberal applications of superphosphate are recommended.

LEAF RUST.

The damage occasioned by this rust (*Puccinia triticina*), while far less than that caused by stem rust, is often of some importance in our crops, appearing later in the season than stem rust. This disease is almost entirely restricted to the leaves, upon the upper surface of which it causes light yellowish-red scattered rust spots which do not rupture the epidermis, which is a distinguishing factor when comparing stem and leaf rusts. Later in the season black teleutospores are produced, which serve no useful purpose in the life cycle in Australia. The red uredospores are responsible for propagating this rust in Australia and carrying it over from season to season. Fortunately this leaf rust only attacks wheat so that the introduction of suitable rotations assists in starving out the disease.

Control Measures.—Early maturing resistant or escaping varieties of wheat should be sown and liberal quantities of superphosphate drilled with the seed that the plants may have every opportunity of maturing early, so escaping severe leaf rust attacks. Careful fallowing and early seeding are beneficial. In very wet soils drainage may prove to be of assistance as very damp conditions tend to favour the spread of rust.

TAKE-ALL.

The fungus *Ophiobolus graminis* which causes take-all exists in the soil and attacks the roots of the wheat plant. At first the disease makes its appearance in patches which are usually round, being large or small according to the severity of the attack. Sometimes the affected plants give rise to ears which are white and possess no grain, which has led to the term "white heads." Only in rare cases is any grain present in these "white heads" and if found is pinched. The straw of such plants is found to be discoloured at the base or butt and blackened from the ground level upwards for as much as two inches. Roots, especially in the later stages of the disease, show an abnormal development of root hairs producing a "fuzzy" or "woolly" appearance. Further, the roots become brittle and break off readily if pulled up. Sometimes an excessive development of secondary roots is noticeable. In later stages the butts of the plants are frequently completely rotted through and the leaves above show malnutrition. Examined microscopically the plants show a felt-like mycelium of fungoid threads or a plate of brown to black colour is noticed encrusting the stem and leaf sheaths of the plant at the base. These threads ramify the tissues at the base of the plant and cause the early death of many cells. In very advanced stages the blackened basal straws may show the development of fungoid spore cases which shed loose spores into the soil. All infection takes place from the soil, the young growing wheat plant being attacked by the fungus, the threads of which enter the plant near the ground level, establish themselves in the root system and lower portions of the stems living parasitically at the expense of the wheat plant. Other hosts affected and conveying the disease are barley grass, broome grasses, pyrum, &c. Cultivated barley is attacked, but oats only rarely.

Control Measures.—Burning stubble of a take-all crop certainly destroys many spores on the surface but those in the soil are generally unaffected. To defeat these healthy spores the farmer must introduce oats into the crop rotation (if not already practised). Such familiar rotations as early fallow, oats, early fallow, wheat, or early fallow, oats (feed off), oats (harvested), fallow, wheat, assist in killing out the disease. It has been recommended that where severe attacks of the disease have occurred no wheat crop should be sown for at least five years. Under no condition should the farmer plough take-all patches when dry and dusty, as this materially favours the spread of the disease spores. Late fallowing is claimed to be worse in the case of take-all ground than no fallow at all. Many favour the seeding of early maturing varieties which may get a good start on the disease. It should be emphasised that where an attack of take-all is to be feared no wheat crops should be fed off, as the setback to the plants apparently predisposes them to attacks from the disease.

FOOT ROT.

It is considered that the disease foot rot is caused by either of the two parasitic fungi, *Helminthosporium sativum* or *Wojnowicia graminis*. Outbreaks are generally observed shortly after flowering time. Isolated heads appear to be ripening off prematurely, and either fail to set grain or produce grain which finally becomes shrivelled and practically worthless. Though most frequently seen in scattered patches the disease may occur in definite areas. Plants affected are sometimes killed in the seedling stage, whilst in more mature plants poor stooling may result, and only a few heads set seed. As in

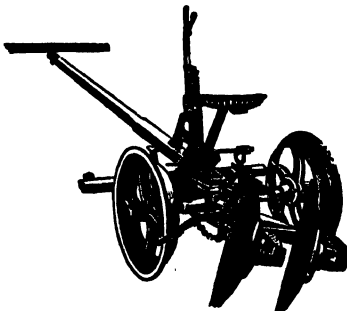
take-all, which disease foot rot closely resembles, there is an abnormal development of secondary roots, causing a "fuzzy" appearance. Furthermore, the roots are so brittle that they break off easily if the plant is pulled up. Close examination of such plants at or below ground level shows characteristics brownish markings of the straw and leaf sheaths. Sometimes the markings are in the form of brownish tobacco-coloured streaks or spots, and at other times there is a uniform discoloration of both straw and sheath. In a dead plant the destruction extends into the straw, and the basal colour of the plant is ashen grey, though sometimes it may be charred or black as in take-all. Infection takes place via the soil, consequently stubble and refuse serve as hosts to carry it over from crop to crop. Only in relatively few cases is the disease carried over in the seed, in which case a brownish discoloration is noticeable at the germ end of the grain. Never sow seed showing indication of the presence of foot rot. Barley, barley grass, Brome grasses, and spear grasses are attacked by this disease, but oats is immune.

Control Measures.—Where the following are practised the losses caused from this disease are minimised. All stubble and refuse should be burned. Rotations including bare fallowing and oats as recommended in the control of take-all have proved beneficial. Good plump seed samples should be selected where possible, and early sowing employed in a carefully prepared seedbed. As in the case of take-all the practice of feeding off should be discouraged, as the resulting setback to the plant is dangerous.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
South Kilkerran	24/4/34	12	Paper from <i>Journal</i>	R. Hasting
Weavers	10/4/34	13	" Seeding," L. Slade	H. Cornish
Boors Plains	3/5/34	—	Discussion	S. Chynoweth
Bute	17/5/34	15	Discussion	H. Perry

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WESTERN DISTRICT.

MILTALIE (Average annual rainfall, 13.64in.).

March 24th.

PREPARATIONS FOR SEEDING.—Paper read by W. J. Bagnell:—“Seeding is the beginning of the year’s profits and therefore the land should be well cleared of stumps, stones, weeds, and shoots if they can be destroyed. Good fallowing is half the battle. Fallow on heavy land should not be too deep, it spoils the subsoil which is very close to the surface—at least from 3in. down. Scratching instead of fallowing is a useless proposition. The cultivator is a good fallowing implement providing it is used at the right time, but if the ground is too hard or boggy it does not make a satisfactory job. The cultivator does not turn in grass which may lead to diseases. Working back fallow should be crossed as much as possible to cut through all the ground. Working back the fallow is important and should be done at least twice a year. Fallow land is the most profitable, therefore do not overdo it by trying to do more than can be done satisfactorily. The first working after fallowing in September gives the ground a good airing and kills weeds. A second working can be given in February, and a third if necessary before seeding operations. The second should be well done and all weeds killed, because there may not be time to go all over the same ground again before seeding. If shoots on the fallow are too big for the seeding implements, they are best cut, raked, and burnt. Anything to delay seeding operations should be done as soon as possible after harvest. When working back the fallow, it is a mistake to work deeply, it may spoil the firm seed bed, but go as deep as is necessary to root up all weeds that are in the furrows or hollows.” (Secretary, G. Smith.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Green Patch ...	26/4/34	6	Paper from <i>Journal</i>	C. Whillas
Yadnarie.....	10/4/34	9	Address—F. Jericho	E. Spriggs
Elbow Hill	24/4/34	9	Discussion	J. Wildman
Pygery	28/4/34	13	Discussion	A. Day
Cungena	3/5/34	10	Paper from <i>Journal</i>	A. Voumard
Kelly	22/5/34	28	Question Box	F. Illman
Petina	5/5/34	12	Address—W. H. Brownrigg	W. Stone
Kyancutta	4/5/34	14	Discussion	E. Kelly

EASTERN DISTRICT.

NUNKERI.

February 28th.—Attendance, 17.

WHEAT AND WOOL.—Paper contributed by Mr. E. Peltz (Hon. Secretary):—“When farming in this mallee district a farmer should grow wheat and wool, making both his main line, for wheatgrowing alone in this district is never a paying proposition, even at an average price, and wool on its own is not advisable either, because a farmer would not be able to meet his liabilities, although last year’s wool receipts exceed those for wheat. This light, sandy country does not stand any heavy cropping; it can easily be overcropped, and by extensive cropping it will drift more rapidly, especially when being fallowed. If the land is not fallowed it will not grow a paying crop unless an artificial manure is found that will give the same results off grassland fallow. A great deal of this country—as soon as it is cleared—should never be broken up for fallow or wheatgrowing, chiefly white sandhills. Sown with oats and grasses, top dressed every four years, and then used for grazing only would be the best paying proposition for the white sandhills. This land is too expensive to work against the low-yielding crops that grow on them. It might be difficult sometimes to keep them separate, but they could be top dressed when the better ground is in wheat if in the same paddock. That would give the grass a chance to seed and get a decent covering over the sand. A farmer should try and divide his farm into no less than seven paddocks—in addition to the small feed paddocks—to get one year’s fallow, one wheat, one oats on stubble, and the remaining four for grazing. That would give the ground four years’ spell, and get it into better heart by running sheep on it, after which

it could be fallowed and cropped with wheat, &c. Then one sheep on $1\frac{1}{4}$ acres on the grassland could be run, which will give about two acres to one sheep over the whole farm, providing that the land is free from shoots and sown with various grasses. When it is all well grassed it might carry more, but overstocking is a poor policy; it is better that some feed is wasted rather than make the sheep have to suffer. The latter tells on the lambs and wool prices at once. When that many sheep are carried provision must be made for years of drought. Keep oats and hay on hand for hand-feeding. By working a farm on this rotation there would be no need to have such a strong plant for cultivation, the working expenses would not be so great, and the crop returns per acre would be better. The expenses in keeping a flock of sheep are not so very great. Be careful when selecting ewes which are to be the foundation of the flock—big framed, young Merino ewes are the best to buy. Keep a good type of medium woolled Merino ram, and always select from the same blood if possible. At shearing cull out the inferior ones, and keep young lambs to replace them. If interested in fat lambs keep one or two English rams, and mate them with the ewes that have the best wool. Sell those lambs as soon as they are fit, and never keep them over for next shearing. Keep the Merinos to maintain the flock. It takes many years of hard work and cash to get a new block into the rotation that has been suggested, but the farmer should have a plan drawn out under what system he intends to work his farm, so that it does not interfere with clearing and fencing operations. If this system is carried out a farmer will not go far wrong under normal prices and seasons, and will obtain the best results from his farm in the mallee."



Phalaris tuberosa is well established on Mr. W. T. Vigar's grazing land at Eden Valley.

RAMCO.

March 3rd.—Attendance, 8.

TICK IN POULTRY.—Paper read by Mr. J. Boehm:—"Almost every fruitgrower keeps a few head of poultry, and as a rule the fowlhouse is built either of iron, bushes, bags, or hessian, and very little care taken of the house or fowls. Finding that my fowls were very badly infested with ticks. I mixed about 2 tablespoons of sheep dip in 8galls. of water, and dipped 6 fowls and left them for two days, then I made another inspection and found the tick almost cleared. So I mixed another dip, this

time using 3 tablespoons and dipped the whole flock. About 10 days later I examined 3 hens and found no more tick on them. We have since killed a number of roosters, but no more ticks have been seen and no more fowls have died. Another cure is to brush oil over the fowls. The best oil to use is the oil drained out of a motor car or any other oil from an engine, but the dip is quicker and is always effective." (Secretary, J. Odgers.)



Subterranean Clover and Grass have been conserved as ensilage by Mr. A. E. D. Francis, Bugle Ranges.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Caliph	17/4/34	17	Addresses—R. L. Griffiths and F. C. Richards	W. H. Todd
Taplan	27/4/34	17	"The Dairy Cow," D. Chancellor	P. Hodge
Marama	5/5/34	8	Formal	T. Hinkley
Overland Corner	27/4/34	11	Question Box	L. Atkinson
Coomandook ...	7/5/34	14	Address—R. L. Griffiths .	W. Trestrail
Taplan	18/5/34	16	Address—R. Chellen.....	P. Hodge
Yurgo	30/4/34	16	Address—R. L. Griffiths .	H. McKenzie

SOUTH AND HILLS DISTRICT.

HARTLEY (Average annual rainfall, 15in. to 16in.).

March 28th.—Attendance, 12.

THE AUSTRALIAN HORSE.—Paper contributed by Mr. C. Faehrmann—"A little over 100 years ago, when the first railway journey in history was made, men said that the age-long friend of man would vanish from the civilization which it had helped to create, but such was not the case. Instead, horses multiplied in spite of the trade and traffic carried on by the railways. Horses were needed by the man on the land to convey his heavy loads to the railway centres. Other trades arose and horses were again called in for their development. When the Great War broke out in 1914,

coal was the vital material needed for munitions, industries, medicines, fuel for the Navy and merchant fleets, which carried men and food from all parts of the globe. This coal could not be produced without the aid of tiny ponies who hauled it along the narrow ways in the mines where machinery could not be safely employed. Without these ponies the ships at sea, and the railways, would have ceased to run. The history of the horse runs back into centuries, and it is generally believed that the horse originated in America, from where it became distributed throughout the whole of the earth, and man by his arts, has developed the horse to suit his requirements. The breeding of horses in Australia was commenced in a small way, between 1,780 and 1,800, and the stock gradually increased until it has reached a total of about 2½ millions. The Australian horse is regarded as being the toughest domesticated horse in the world. Australia is an ideal horse-breeding country, for the climate is so suitable that winter stabling of stock is rarely necessary. At various times, however, severe droughts are experienced in certain parts of Australia. Gradually water



On Mr. D. F. Sheppard's property at Prospect Hill the Advisory Dairy Council recently inspected a good cut of Clover and Grass Hay.

supplies diminish until dams, creeks, and other sources of water became exhausted. At such times the thirsty animals have been known to dig holes several feet deep in the beds of creeks searching for water. In most cases the grass disappears before the water gives out. Though hundreds of animals may die before relief is available, it is surprising how many survive. Bred in many cases from the survivors of the above conditions, the Australian horse inherits a measure of toughness that is not possessed by the horse of any other country. His power for 'picking up' and regaining good condition rapidly, when the first rain comes, is very surprising. During the Great War and also the Boer War, in which horses were used in great numbers, the Australian horse established a record for endurance which has not been equalled by the horses of any other country. In some cases, during the campaign in Palestine, horses were known to go without water for 84 hours, covering in the meantime large distances, with up to 20 stone on their backs. The present generation is doing very little to maintain the splendid breed of horses that have been handed down to them.

The heavy draught horse standard has certainly been improved by careful breeding throughout most of the States of the Commonwealth—particularly in Victoria and parts of the South-East of South Australia. On the other hand, the lighter breeds—hacks, hunters, buggy, and light van horses, probably due to the advent of the motor car—are not quite up to the standard. The breeding of thoroughbreds is fairly well catered for by racing followers, but there is a strong tendency for those breeders to see only two points of view—speed and the winning of races. When attending important racing fixtures it is remarkable to note the number of geldings and the small number of entires. Many of these geldings, when their racing days are over, would make excellent station sires if they were not gelded—with a view of making a racing machine of them. The army is chiefly concerned in the breeding of utility horses suitable for military purposes. Two types of horses are required—a cavalry horse from 15 to 15.3 hands of the hunter stamp, with substance, quality, and true action; and a small, compact, light draught horse, from 15 to 15.2 hands, with short back, deep body, strong quarters, plenty of bone, and a good, true walker, suitable



Mr. G. Cleggett, of Mount Barker Springs, exhibits a very fine stand of Perennial Ryegrass and Subterranean and White Clovers.

for artillery purposes. These animals are becoming harder to obtain. There is a demand for them every year from India, Java, and other countries, approximately 6,000 horses a year being exported, in addition to which about another 5,000 a year are required in Australia. In recent years it has been rather difficult to obtain the standard required by these countries. In some years the Indian Government has had to go short of its requirements because horses of the required type were not available. At other times they have had to take reluctantly a horse which falls below the required standard. Unless greater attention is given to the production of the types required overseas in Australia, we are very liable to lose our valuable overseas markets. Horse breeding could be made one of the agriculturist's most attractive sidelines, but it is being neglected. If the present rate of deterioration in the type of horse being bred is allowed to continue it will only be a matter of a few years before Australia will not be able to command a market for her horses. There is an inclination among some breeders to believe that the motor has done away with the demand for the horse. It is admitted that many horses have been replaced by mechanical appliances, but there are still many activities in which the horse is indispensable, and for which he

will be in demand for many years to come. Especially is this the case with army remounts in all countries. Even with the reduced cost of motor fuel, the horse is gradually 'coming back into its own' simply because it is more economical than the motor in making short runs from house to house in the case of delivery carts, &c. There is a good market all over Australia for the utility horse, suitable for artillery and light transport, while the good boned light horse, suitable for the baker's cart, is practically unprocureable. There is still a sufficient number of horses bred in Australia annually to meet all requirements, but the breeding is so neglected, and the selection of mares and horses so carelessly made, that there is a rapid deterioration taking place in the type and class of horses bred. The Australian saddle horse, which has become famous throughout the world, owes its name to the early breeders who demanded the very stoutest of thoroughbred blood to mate with their mares, and many of the best horses to-day still have strains of that blood. It is only by going back to the methods of our early breeders that we can hope to stem the tide of deterioration, and we should and must adopt these methods at once before all the good mares have disappeared.

"Breeding on Right Lines.—A good price can be obtained for a good horse, and anyone breeding a good, sound horse of the right type need not hesitate to ask a good price, as he will have no trouble in finding a market; but so long as breeding of unsound horses of inferior type, poor quality, and nondescript class continues, so will prices that will not repay the expense of breeding be offered. Now is the time to start breeding on the right lines. Good horses have never been harder to find in Australia, and in a very few years the man who has good horses for sale will be able to obtain almost any price within reason, because the demand is here, and will stay here, if the right types of animal are available, otherwise our chief buyers will have to go to other countries for their supplies, and these other countries are going to a great deal of trouble and expense to improve and increase their horse breeding in order to capture the market which we have held for many years, yet which we do not appear anxious to maintain. It is generally recognised that the best horses for military purposes, and for commercial light delivery classes are bred from thoroughbred stallions and three-quarter or half bred mares. It is fully recognised in this district that the horse is by no means 'a back number,' and farmers and pastoralists would be well advised to give a little attention and thought to the breeding of suitable horses of the types in demand. There is no apparent reason why the conditions in and around this locality should not be suitable for the production and rearing of the animal which has carried us on its back, hauled our goods for thousands of years, and proved itself to be man's staunchest friend throughout the ages." (Secretary, D. Harvey.)

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Finniss	16/4/34	28	Address—W. J. Spafford.	L. Dunn
Monarto South .	27/4/34	21	Address—H. B. Barlow .	C. Altmann
Frayville	26/4/34	12	Paper from <i>Journal</i>	H. Ramm
Blackheath	3/5/34	9	" Sheep Feeding "—A. Jones	E. Paech
Cherry Gardens	28/4/34	17	Homestead Meeting	D. Stone
Langhorne Ck.	23/5/34	6	" Over Production," H. Eckert	P. Nurse
Yundi	16/5/34	—	Address—C. F. Anderson	T. Smart
Hope Forest ...	7/5/34	—	Address—E. Gleddon ...	R. Coad
Scotts Bottom .	28/4/34	9	" Mendelism," Moore ...	E. Atkinson
Mt. Barker	16/4/34	—	Address—E. W. Pritchard	P. Wise

WOMEN'S BRANCHES.

SUBJECTS FOR BUREAU MEETINGS.

If you have no other subject in mind, here is a list from which you might choose when asked to contribute to your branch programme.

The Farm.	The Home.	General.
Dairying— Care of Milk and Cream Buttermaking Cheesemaking	Home Management— Furniture— Choice Repairing Needlework Knitting Rugmaking	Inter-Branch Visits Competitive Exhibition Flower Show Practical Demonstrations Social
Pigs— Bacon Curing	Clothing— Choice Repairing	Music in the Home Good Reading Hobbies
Beekeeping— Honey	Dressmaking	Physical Culture Labor Saving Hints
Horticulture— Vegetable Growing Flower Growing	Pattern Afternoon	Spring Cleaning
Poultry— Dressing Incubation Rearing Chicks Turkeys Ducks	Children— Care and Management Cooking— Recipes Recipes for Christmas Lunches Jam Making Fruit Preserving Fruit Drying Fruit. Value of Pickles and Sauces Sweet Making Exhibition of Home Crafts Christmas Gifts Home Nursing	Entertainment in the Home.

GOOD THINGS FROM THE OVEN.

(*Circular 370. Illinois, U.S.A.*)

[By GRACE B. ARMSTRONG, A. MARIE SCHRIEBER, and MARY A. MCPHEE,
of the University of Illinois, Urbana, U.S.A.]

Part I.—General Information.

EQUIPMENT NEEDED IN BAKING.

Before beginning to work assemble in a convenient place all general equipment for baking. Learn to use the minimum for efficient work; too much or too little wastes time and labour. In this manual the equipment necessary for each recipe is listed under that recipe. Following is a list of equipment most often required:—

Measuring cups
Mixing bowls
Teaspoons
Tablespoons
Set of standardized
 measuring spoons
Mixing spoons

Spatula
Knife
Egg beaters
Baking pans
Coarse strainer
Bread board
Rolling pin

MEASURING INGREDIENTS.

Correct measuring is one of the most important factors in making good baked products. Note the directions given below:—

1. All measurements given in standard recipes are level unless otherwise stated.
2. To measure a cupful of a dry ingredient, fill the cup and then level it off with the straight side of a knife.
3. To measure either a teaspoonful or a tablespoonful of a dry ingredient, dip the spoon into the material and level off with the straight side of a knife (Fig. 1). Divide the level spoonful lengthwise with a knife for a half spoonful; divide a half crosswise for a quarter.
4. Always sift flour once before measuring.
5. Do not dip measuring cup into flour, sugar, milk, &c. Such practice not only is untidy but wastes the material being measured and may result in inaccurate measurements. Use a tablespoon or a small scoop to fill the cup.
6. An accurate measure of shortening (butter, lard, or other fat) especially if it is hard, can be obtained by packing it down (Fig. 2). Another method, if a fraction of a cupful is to be used, is the water method. From a full cup of water, pour off a fraction equivalent to the amount of fat to be used. Then put in fat until the water reaches the "full" mark. Pour off the water and you have an accurate measure of fat.

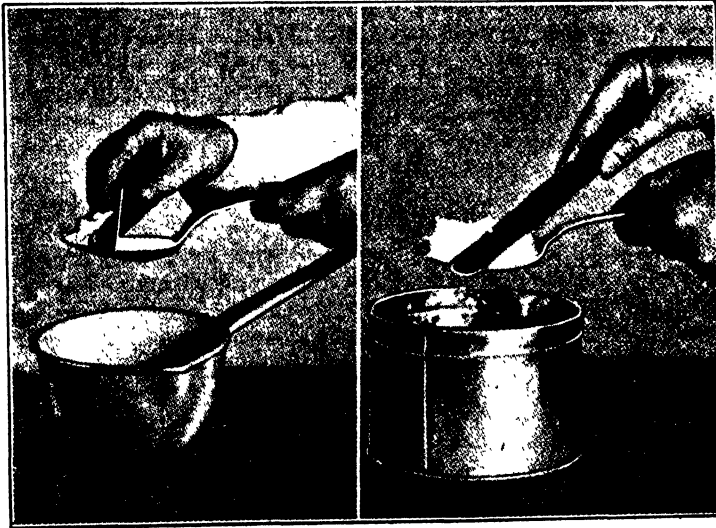


Fig. 1.—Measuring a level spoonful of flour.

Fig. 2.—Measuring a level spoonful of fat.

EQUIVALENTS AND ABBREVIATIONS.

Study the table of equivalents and abbreviations so you will be able to interpret the recipes in this manual.

3 teaspoons (t.)
 16 tablespoons (Tb.)
 2 cups (c.)
 2 cups (c.) fat
 2 cups (c.) granulated sugar
 4 cups (c.) sifted flour
 2 tablespoons (Tb.) butter or fat
 2 tablespoons (Tb.) liquid
 4 tablespoons (Tb.) sifted flour
 16 ounces (oz.)

= 1 tablespoon (Tb.)
 = 1 cup (c.)
 = 1 pint (pt.)
 = 1 pound (lb.)
 = 1 pound (lb.)
 = 1 pound (lb.)
 = 1 ounce (oz.)
 = 1 ounce (oz.)
 = 1 ounce (oz.)
 = 1 pound (lb.)

OVEN TEMPERATURES.

Custards—250°F. Very slow	Bread	} 410°F. Hot
Meringues	Muffins	
Sponge cake	Popovers—425°F. Hot	
Angel cake	Parker House rolls—435°F. Hot	
Gingerbread—350°F. Moderate	Baking-powder biscuits—475°F. Very hot	
Plain cake	Pastry—475°F. Very hot	
Cookies		

ESSENTIAL INGREDIENTS.

Flour, liquid, and a leavening agent are the necessary ingredients for most kinds of baked products. Certain other ingredients which improve the taste and texture are sometimes used. These will be discussed as they occur in the recipes.

DIFFERENT KINDS OF FLOUR.

Wheat flour is generally used in this country for bread making, both because people in the United States think it has a more desirable flavour and because it will make a lighter loaf of bread than will oat, rye, or corn flour. The reason for the latter fact is that wheat contains more gluten than other flours—a substance which gives light, springy bread. One can find out what gluten is like by chewing some wheat grains for a few minutes; the gummy mass left in the mouth is gluten.

The difference in the gluten content of hard and soft wheat flours may be seen by tying a cupful of each in a cheesecloth bag and washing out the starch by holding the bag under running water or by dipping it in a number of waters until the water is clear. The resulting sticky mass is gluten, and the difference between the two glutes may be seen by rolling each into a ball and then stretching it. It will be found that the gluten from the hard wheat is more elastic, can be more easily stretched, and breaks less easily when stretched; in other words, it is stronger than the soft-wheat gluten. The colour of the two also differs; the hard wheat is more yellow, the soft wheat is grey.

In making yeast bread it is desirable to use flour that has gluten of good quality, as it is the gluten which stretches to form a framework for the loaf. For this reason hard-wheat flour is usually preferred for yeast breads. Since a spongy, elastic product is not desirable in making quick breads, cakes, and pastry, soft-wheat flours are preferable. Soft-wheat flour, unless it is too soft or has gluten of poor quality, may be used for yeast bread if properly handled. Millers, recognizing this fact, are producing flours which are labelled "all purpose." They are neither strictly hard wheat nor strictly soft wheat but a blending of the two.

A person familiar with flours can easily distinguish between the two flours by colour and "feel." Soft-wheat flour has a tendency to be whiter than hard-wheat flour, the latter being of a creamy colour. Hard-wheat flour is granular and feels slightly gritty. Soft-wheat flour is soft to the touch, and if a little is squeezed in the hand it will retain the imprint of the fingers.

LIQUIDS.

Liquids that may be used for baked products are:—

Whole milk	Water
Skimmed milk	Potato water (yeast breads)
Dried milk	Molasses and syrup

LEAVENING AGENTS.

Mixtures are made light with a leavening agent, which renders them more palatable and more easily digested. There are four types of such agents:—

1. Water expanded into steam, as in popovers.
2. Air introduced mechanically: (a) by beating, as in beaten biscuits; (b) by the addition of beaten eggs, as in sponge or angel food cake.

3. Carbon dioxide from soda plus acid (sour milk, for example), as in muffins or biscuits.

4. Carbon dioxide from yeast, as in bread.

Water Expanded into Steam.—When water is heated to the boiling point it expands and changes into steam. This principle is illustrated in the making of popovers. As the water of the milk expands into steam during the baking, it puffs up the mixture, or makes it light.

Air Introduced Mechanically.—Air also expands when it is heated, and this principle, too, is made use of in making mixtures light. Air may be introduced into a mixture either by long beating or by adding beaten eggs. This air expands, when heated, to several times its size, and in so doing makes the mixture light.

Action of Soda with an Acid.—When acid and moisture are added to soda, tiny bubbles of gas are formed which try to escape; and in forcing their way to the top, they are caught and baked in the mixture. These bubbles make the finished product light, porous, and larger in bulk. Examples of this are baking powder, which is soda and an acid, and soda used with sour milk or molasses. The gas that is formed in both cases is called carbon dioxide, which is the leavening agent.

Yeast.—Yeast is a very small plant that requires warmth, moisture, and food for growth. These requirements are met in making bread; the yeast uses for food the sugar which is added; the milk or water furnishes the moisture; and during the process of making, bread is always kept warm. As the yeast grows it produces a gas (carbon dioxide), which accumulates in small bubbles. The gluten in the dough stretches and confines these bubbles and prevents their escape. This causes the mixture to rise and become light. There are three kinds of yeast:—

1. *Compressed Yeast.*—This is the most convenient and reliable type of yeast if it is fresh. It consists of active yeast plants. Since these plants are already in a vigorous, active state when added to the dough, they begin to grow and multiply immediately, thus shortening the time of the process of bread making. The disadvantages are that compressed yeast keeps only a few days and that it is expensive if large quantities of bread are to be baked.
2. *Dry Yeast.*—Yeast is mixed with corn meal or some other similar ingredient, pressed into cakes, and dried. The drying kills part of the yeast plants, but some live in an inactive state and will grow if given the proper conditions which, as already stated, are moisture, food, and warmth. These yeast cells are not in so vigorous a condition as are those in the compressed cake so the action is slower. The advantages of this kind of yeast are that it will keep for weeks and is cheaper than compressed yeast.
3. *Liquid Yeast.*—This yeast may be made at home if desired, but it requires much care and attention and is not recommended for beginners.

EFFECT OF VARIOUS INGREDIENTS.

Sugar.—Sugar acts as a liquid, improves the flavour, and makes a finer texture in the baked product. The use of too much sugar results in a heavy, sticky consistency and may be the cause of a cake falling. *Cane* and *beet sugar* are chemically the same and may be used interchangeably. The difference in quality sometimes found is due to a variation in the market grades; poor quality may be found in sugars derived from either cane or beets.

Brown Sugar is cane sugar which is not highly refined. It contains a small amount of acid, and when a quantity is used in a cake, soda is added to neutralize the acid, usually about $\frac{1}{4}$ teaspoon to 1 cup of brown sugar.

Pulverized, or confectioner's, sugar is made by grinding and sifting cane sugar. Cornstarch is sometimes added to prevent lumping. Powdered sugar is made in the same way but is not ground so fine. Both make a very close-grained cake.

Molasses is the "mother liquid" from which sugar has been crystallized. It is frequently used as a substitute for part or all of the sugar called for in a recipe

and also serves as a liquid. One cup of molasses is equivalent to $\frac{1}{3}$ cup of sugar and one cup of liquid. Molasses contains some acid, the amount depending upon the way it is manufactured. Canned molasses may contain little or no acid. Sometimes syrups are used for their distinctive flavour, as maple syrup, cane syrup, sorghum, and corn syrup.

Fats.—Fats act as a liquid and serve to make products tender. They also prevent the products from drying out quickly. The kinds of fat which may be used in baking are *butter* and *butter substitutes* such as lard, oleomargarine, the commercial combinations and preparations of fats, and *clarified meat drippings*. Butter is only 85 per cent. pure fat, the rest of the contents being casein, salt, and water. When substituting other fats for butter, therefore, a smaller amount of the substitute should be used and a little salt added. In general, the rule is to use 2 tablespoons less of lard or other pure fat per cup of butter required.

Eggs.—White of egg is composed of albumin, which thickens readily as it cooks. This thickening is called coagulation. While eggs may seem to add moisture to the unbaked product, they act as a thickening agent when the batter or dough is baked. As a leavening agent they affect the texture of the product.

Flavouring.—The enjoyment to be had from eating cake or dessert is due largely to flavour. A natural flavour is better than a commercial extract. Chocolate, spices, dried fruits, nuts, and grated orange or lemon peel make the product delicious and also change its texture. Vanilla, lemon, and other commercial flavourings lose some of their flavour through evaporation when heated.

Other Ingredients.—Chocolate contains a hard fat which adds a little richness but which tends to make the cake stiffer as it dries out than it would be without the chocolate. It also contains starch, which thickens the baked product; consequently in adding chocolate to a recipe for white or plain cake, or cookies, one teaspoonful less of flour is needed for each square of chocolate used. Cocoa may be substituted for chocolate. This should be done by weight rather than by measure; approximately 3 tablespoons of cocoa weigh the same as one square of chocolate.

Fruit adds flavour and moisture to baked products. Raisins or other dried fruit chopped fine give a better flavour than when added whole and also help to retain moisture.

GETTING READY TO BAKE.

1. Study in detail the foregoing general information.
2. *Read the directions in each recipe completely and carefully before starting to mix the ingredients.*
3. Make sure that the oven temperature will be right by the time the oven is needed.
4. Wash the hands thoroughly. Should it be necessary to use a handkerchief or handle the hair while working with food, wash the hands again before continuing.
5. Assemble all utensils and ingredients.
6. Be sure the egg beater is dry.
7. Grease the baking pans if they are to be greased.
8. Sift the flour once before measuring.
9. If the sugar is lumpy, sift it also.
10. Remember that all measurements are level unless otherwise stated.
11. Dried fruit which needs to be cleaned may be washed by placing in a sieve and pouring hot water over it. The fruit should be dried on a paper towel or a clean cloth (an excess of water adhering to the fruit may make the product too moist).

[Part II., which refers to recipes and directions for cooking, will appear in next issue.]

(To be continued.)

WINDOW TREATMENT.

[Paper read by Mrs. A. Anderson at the April meeting of the Kybybolite Branch.]

Centuries back people lived in drafty, windy rooms; in fact the original name for windows was "wind eyes." In order to overcome the draughtiness, hangings were used. These hangings gradually developed into wall tapestries and window curtains of somewhat rude materials. As progress was made in the art of weaving, the rough curtains were gradually displaced by beautiful decorative draperies woven with flowers, fruit, and other attractive designs, which were the forerunner of modern curtains and draperies. Those ancient folk did not enjoy the advantages of a curtain rod, and fastened their window and wall hangings by means of pegs or such like devices. While the people of several hundred years ago must have given some thought to a more improved method of hanging the window decorations of their abodes, advancement towards more convenient and artistic ways of hanging those useful and ornamental home adjuncts was slow.

Window treatment is half the room, and can either make or mar the best furnished of rooms. Many a length of material, of which any artist could have felt justly proud, is wasted through lack of forethought. The greatest innovation and greatest improvement in curtain rods was made during the past half century, the main one being the metal extension rod, to fit different styles and types of windows. Before the advent of the extension rod, the popular window pole, as it was then known, was a 2in. affair, with an end of Rococo pattern. At that time a conspicuous support for curtains rather than one in good taste seemed to be the chief desire. Curtain rods having floridly patterned ends or bright, flashy knobs have practically disappeared except in cases where the rod itself is a beautiful example of craftsmanship, having been replaced with the narrow metal extension rods, except in the case stated. All remember the familiar bamboo or plain wooden pole with brass knobs and brackets, and the simple lace curtains. Only the home of the very wealthy were furnished with draperies beyond those. To-day, the draperies in the average home of people of very limited means outclass, for artistic beauty and attractiveness, the draperies of many wealthy homes of a few decades ago. All this tends towards a brighter home circle, and no home need be drab, for with selective instinct any home can have cheerful harmonious window treatments at the minimum of expense.

Cretonnes, for instance, if selected with judgment, can make one of the most effective of treatments, and need not cost more than from 5s. to 10s., and the idea that one must pay high prices for artistic effects is entirely wrong. The majority of people buy materials without the least thought being given to the surroundings. Blue may be their favourite shade, and blue they must have, even if it should "bark" at the rest of the room for all time. Again, they have a floral wallpaper of fairly bright hues, and must have curtains containing the maximum hues contained in that paper, instead of some quiet subdued colourings, or self tones, which art demands. A tall, narrow window naturally requires a design to flatten it, likewise a flat window requires material to give it height, although this rule does not always apply, for a great deal depends on the surroundings, yet the maxim holds good in nearly every case. One will find a window occupying almost the whole side wall of a room, and yet people will make the mistake of extending the curtains beyond the architrave, thereby giving the room, not only a three-sided appearance, but reducing the apparent size of same. Balance must be maintained, and drapings selected and arranged to fit in and harmonise with each room.

When purchasing curtains, adopt the following procedure:—Get a pencil, writing pad, or sheet of paper, and a measuring stick or tape. Sketch a rough plan of the window to be draped. Measure very carefully, even to $\frac{1}{4}$ in., the outside width and length of framework. Then sit down on a chair facing the window, but at the opposite side of the room; visualise how wide and how long the curtains should be to fit in with the type of window and size of room, taking the size and style of furniture into consideration. If advantageous to extend the curtains beyond the architrave, then measure how far out your eye tells you it should be, likewise the length required, and note on the paper the additional width and length. Then add the quantity required for hems, and purchase only the exact length required. It is foolish to purchase 2½ yds. for each drape if 2in. less will do. Then return to the chair and study the walls, floor coverings, and furniture, &c. Make a note if a floral, stripe, plain, or check effect is likely to prove most suitable. Then note the predominating colours in the room. With this information half the work is done, and the information will eliminate the waste of a lot of valuable time and worry, and certainly go far towards ensuring a satisfactory and pleasing result. The almost endless variety of draping fabrics on the market at the present time provides a very interesting study, and affords the decorator great latitude in the production of artistic effects.

Great attention should be paid to the selection of materials, and suitable materials are those which are of the same character as the other furnishings of the room; for—

instance, checked gingham may make fascinating curtains for a child's room or kitchen, but would be unsuitable for a formal living room. Large pattern cretonne is not suitable for a small room. It is effective only when used in a large room with dignified furnishings. In a room with a great variety of furniture or figured wallpaper, plain draperies or those with unobtrusive patterns are most suitable.

Fastness to light and washing should be taken into consideration. Some dyes are fast to light yet not fast to washing, and *vice versa*, although to-day one has little to worry about dyes, which are generally fast to both light and washing. If in doubt get a sample of the material, and place under a piece of glass, half of which is painted black, or covered with black paper. Place it where the full sunlight strikes for a day, or two days for preference. The part of the material under the black strip will remain the original colour, the part exposed to the sun will show the amount of fading, if any.

The foundation of successful, artistic room furnishings rests to a large extent in the attractiveness of the draperies. Apart from the style and designs of the draperies, colour is the most important factor. Modern wall coverings and decorations are usually more or less neutral, throwing the weight of colour requirements to a very large extent to the draperies. A careful study of colour analysis is necessary to secure correct colour combinations for draperies that will be in harmony with the other furnishings. What is the use of beautiful fabrics if their colour value in relation to the room in which they are to be hung is not studied?

Red, blue, and yellow are the three primary colours. Green, orange, and violet are known as secondary colours. Other colours are obtained by mixing the three primary colours in many and various ways. The best way of selecting the right colour scheme is to decide upon the leading colour. After the colour or tone has been chosen, decide whether quiet or bright tone effects are desired. Quiet tone effects are arrived at by choosing similar colours. Then the colour scheme will remain within one colour family by mixing the leading colour with white, black, or some other primary colour. Bright colour schemes are produced by relying upon contrasting colours placed side by side. Contrasting colours are red and green, orange and blue, yellow and black. Contrasting colour schemes are more difficult to carry out, because they demand a correct sense of their true balance in the room where the curtains are to be hung, but with patience and observation, anyone can accomplish the task.

For decorative purposes colours are classified "warm" or "cool." Red and yellow are the warmest colours, and blue the coolest. Grey is neutral, and may be made either warm or cool by tingeing with colours of either class. Thus we may have pinkish grey or yellowish grey, which are warm, or bluish grey or greenish grey, which are cool. The same method may be used to modify any other colour. In deciding whether warm or cool colours should be chosen, take into consideration:—(1) The amount of natural light. Rooms facing south or shady rooms a substitute for sunshine is required in warm, cheery colours, preferably light tones. Sunny rooms demand cool colours, preferably medium dark, except in bedrooms. The use of very light colours in a sunny room produces a glare, which is a severe tax on the eyes and nerves. (2) The size of the room is an important factor, and demands a variation from the rule; a warm colour tends to make a room appear smaller, this effect is accentuated in proportion to their brightness. Cool colours make a room appear larger, and this effect is increased in proportion to their lightness and delicacy. A dark ceiling causes a room to appear lower, a light one higher.

In planning a colour scheme take into consideration such items as, say, a fine carpet or rug, a cherished picture, or a valuable piece of pottery, whose colour may be taken as the keynote of the room, the other furnishings being planned to lead the attention up to the treasured object, and show it off to the best possible advantage. The majority of people, in furnishing a room, start off by purchasing, say, the floor covering, or having the walls done, and then find no end of trouble awaits them in finding the other items, such as a suite, or curtains to harmonise, therefore, to obtain a successful scheme, it is necessary to complete the whole plan on paper before purchasing. A safe plan is to follow a happy medium between the use of too few and too many colours. A room all grey, or all brown, or all green, is monotonous and depressing, especially when nearly everything in it is of about the same tone, but on the other hand, if several colours are given equal importance, the result is lacking in unity and repose. One way is to follow the example set by the designers of carpets, who allow only one, or at most two colours to predominate, but at the same time give variety and brilliancy by introducing from one to a dozen additional colours so skilfully subordinated that the effect of unity is not impaired, and we speak of a carpet as blue, or green, or brown, or whatever the predominating colour may be.

There are quite a variety of window types, each demanding different treatment, and even two of one type may necessitate quite different styles, as the interior or exterior of the room may have such an influence on the window as to necessitate entirely opposite schemes, therefore, because a window is a certain shape and size, it is

not practicable to say that all windows of that size and type must conform to one set style of drapery. The outside view, the extent of inside privacy, the architecture of the window, and the decorative effect desired, determine the character of the draperies to be used—whether they are to be simple or elaborate, long or short, to hang straight, or to be draped black. Be careful to have the curtains reflect the colours used in the floor coverings and upholstery materials, otherwise the window treatments stand out in vivid contrast and clash with the wall decorations. Double windows, or windows in groups of three or more, admit much more light than single windows, which make it necessary to give the matter of window glare even more serious consideration than in the case of single windows. Valances are desirable in draping double windows; they help to maintain an architectural unity. Draping triple and group windows in the simplest fashion is usually the best. The over-draperies or side curtains may be of the same material as the valances, or any contrasting colours and materials. Bay windows present a draping problem which the home maker finds difficult to solve. The most pleasing and successful way of draping the bay window is to treat it as a single unit, except when there is too much wall space between the windows which form the bay, when each window should be treated as a separate unit.

Casement Windows.—The treatment of this type of window, which may be single, group, or bay type, depends mainly on whether they open outwards or inwards. If they swing in, the variety of treatment is very limited, and the most popular and most practical method is to shirr the glass curtains on rods fastened to the sash top and bottom. When a valance and overdraperies (or side curtains) are used they must be so designed and put up as not to interfere with the inward swinging of the sash. For casements that swing out, it is not advisable to have the curtains attached to the sash; they are apt to be damaged by the weather. For that reason the drapings should be hung from rods attached to the window casings. Over-draperies for casement windows should not come beyond the lower edge of the apron of the window. If there is a seat, it should be upholstered in the same material as the side curtains, if the material is sufficiently substantial. Casement curtains always look more attractive edged with frills, simple fringe, or a gimp or braid. Curtains are the draping of the glass, and over-draperies that which covers the framework, which are better known as side-curtains.

A tendency to-day is to dispense with curtains, and use only over-draperies or side-curtains. This can only apply where the outlook is attractive, such as a flower garden or a pleasing landscape, but where the outlook is not pleasing to the eye curtains are essential. They may be half-sash or full-sash, or hung from a rod inside the over-draperies, but never on the same rod, although expense often demands that they shall. A means of overcoming this difficulty is to hem the curtains and over-draperies as one at the top, allowing them to overlap about 6in. to 9in. according to the size and width of the window. This plan is used with cross curtains, which are hemmed at top in pairs.

Tie-backs.—Tie-backs take various forms and styles, and depend entirely on the window and material used. For light muslins and nets used as a casement treatment, the tie-back must be in keeping, therefore, something light and dainty is necessary, such as a cord or light braid, or a narrow strip of the material used in the curtains, or narrow-shaped tie-backs, frilled all round with a narrow frill about a quarter the width of the frills on the curtains, while for heavy over-draperies the reverse applies. The over-draperies and valance may be of the same material, or of different materials, or may be of similar tonings in a different material, such as the valance in a self-toned cloth, featuring the shade which predominates in the over-draperies. The tie-backs should be of the material of which the valance is made, unless, of course, there is no valance, and then you can use the same material as the over-draperies are made of, and use your discretion as to trimming which will bring out the desired colouring. The tie-backs for over-draperies should be cut boomerang shape, with a lining and semi-stiff interlining. All should be stitched together on the principle of making a mattress, and then turned and finished off. The width is usually from 4in. to 6in. according to the size and type of the curtain, and the length depends on what the window requires. This can be ascertained by tying back with a tape to the desired angle, and then cut accordingly, allowing for hems. The shape of the valance should rule the shape of the tie-back, as any outstanding curves in the valance can be followed in tie-backs in a modified way. Small rings at the ends generally finish the job. Tie-back for centre curtain.

Valances.—Their types are far too numerous to go into fully. Those in general use are Dutch and French valances, pinch-plaited valances, festoon valances, and pelmets. In window draping, valances are preferable in almost every instance, because the valance gives a finishing touch to the window treatment. When side draperies, for instance, which are rather dark hang in long straight folds in a room with two or three windows, they give the effect of sombreness, whereas on the other hand when the line of

colour in the side draperies is connected with the valance, there is a horizontal line which breaks the continuous vertical effect. Without a valance the space between the side draperies gives the window an unfinished appearance. It seems rather illogical to drape a window with coloured side draperies without connecting them with an appropriate valance to complete the job. Like all things, there are exceptions to the rules. Valances can make or mar a room, as, for instance, a window which is set too low to have a full depth valance would be ruinous. The valance in this case should be narrow, and if necessary raised slightly above the frame. Plain gathered valances being easily laundered are best adapted to bath rooms and kitchens, and, in most cases, to bedrooms. Fitted or shaped valances, on the other hand, suggest permanence and dignity, and hence are better suited to the more formal rooms of the house. Midway between the two extremes are the box-plaited valances. Plain gathered valances have a 1in. to 2in. standing heading above the casing. If a different toning to the over-draperies is desired, it is wise to keep the valance dark in tone.

The average depth of a valance is one-sixth of the window height, not the framework. Valances are unlined, lined, or interlined according to the material and type of valance. In making a pinch-plaited valance work on a basis of 6in. for each plait, say five in all, making extra 30in. of material. The space between each plait should be 8in. This is on the basis of 6in. for plaits to 8in. for plain or scallop. This makes 78in. for the five plaits and six plain or scallop. The plaits are drawn together, which reduces the width from 78in. to 48in., the 30in. being accounted for by the five plaits of 6in. each. Further allowance must be made for the side of the rod or board plus turnings, and joins if any. This will appear very intricate, but is actually very simple, although it takes a little time to cut the paper pattern, which is absolutely essential. The width of the valance decides the width of the plaits, but get as near 6in. for plaits and 8in. for plain as is possible.

Pellets are more simple although worked on the same system. Sketch the design, which may follow the frieze of the room in shape, and then work out to scale. Cut the paper patterns from the measurements, and it is a matter then of plain sailing. Old window blinds are ideal for interlining; buckram is too stiff, and liable to get out of shape in a hot climate. Shirred valances are merely French headings on top and bottom with a rod top and bottom to keep valances taut. Festoon valances are also effective. The principle to be followed is to make as if making a pellet, with the only difference that the material hangs in draped curves between two or more points. Usually two for single window, and three for double window can be most artistic with care.

COOKERY AND FLOWER SHOW.

Members of the Parilla Branch of the Women's Agricultural Bureau conducted a successful cookery and flower show in the Parilla Institute on April 19th. This was the third occasion on which the cookery show has been held, and each year is seeing increased success. On this occasion flowers were exhibited for the first time, and a very promising display was seen. Competition was keen in the cookery classes, and left no doubt as to wisdom of continuing these fixtures. There was a very large attendance including many visitors.

The opening ceremony was conducted by Mr. F. C. Richards (Assistant Secretary to the Agricultural Bureau).

During the afternoon the gathering was entertained with a number of appreciative items, which added variety as well as additional pleasure to the function. Those who contributed were:—Miss Sheila McCormack, Peggy Foale, Peggy Dauncey, Maudie Harrip.

Excellent entries were received for the show, particularly in the cookery section. In all, 20 classes were exhibited, and keen competition took place. The judges, Mesdames H. G. Fewings, C. H. Atze, and W. B. Davis, of Pinnaroo, experienced great difficulty in selecting the various winners, due to the splendid class of exhibits. So keenly was the cookery classes contested, that in every one of the 20 shown it was necessary to give second prizes. Several special prizes had been donated, and the committee are indebted to the following donors—Miss Colwill, Mrs. R. C. Kerley, Mrs. H. G. Fewings, Mrs. F. Kerley, and Mrs. H. G. Johnston (flowers). In all, six classes were shown among the flower section,

The following were the results:—Brown sponge, decorated top, Mrs. G. Belling 1, Miss Foale 2; Sponge roll, Mrs. Dabinett 1, Mrs. F. Belling 2; Cornflour sponge, Mrs. G. Belling 1, Mrs. Dabinett 2; Sultana cake, Mrs. Welden 1, Mrs. Brown 2; Coffee cake, Mrs. Colwill 1, Mrs. F. Kerley 2; Ribbon cake, Mrs. Phillips 1, Mrs. Childs 2; Napoleon squares, Mrs. Phillips 1, Mrs. Pearce 2; Scones, Mrs. Bailey 1, Mrs. Johnston 2; Walnut roll, Mrs. Welden 1, Mrs. Howie 2; Cream puffs, Miss Colwill 1, Mrs. Dabinett 2; Puff pastry (Special donated by Miss Colwill), Mrs. F. Belling 1, Mrs.

Pearce 2; Biscuits, Mrs. Howie 1, Mrs. Brown 2; Small cakes, Mrs. Foale 1, Mrs. Dabinett 2; Bread, Mrs. Foale 1, Mrs. Colwill 2; Bread rolls, Mrs. Phillis 1, Mrs. Welden 2; Buns (yeast), Mrs. Phillis 1, Mrs. Welden 2; Rich dark cake (Special donated by Mrs. E. C. Kerley), Mrs. Welden 1, Mrs. F. Kerley 2; Decorated cake (Special donated by Mrs. F. Kerley; Special second prize donated by Mrs. H. G. Fewings), Mrs. Howie 1, Mrs. Brown 2; Jams, Miss Colwill 1, Mrs. Foale 2; Jelly, Mrs. Pearce 1, Miss Colwill 2; Marmalade, Mrs. Foale 1, Miss Colwill 2; Preserved fruits, Mrs. F. Belling 1, Miss Colwill 2; Tomato sauce, Mrs. Colwill 1, Mrs. Pearce 2; Pickles, Mrs. F. Kerley 1, Mrs. Foale 2; Collection of dahlias, Mrs. Welden 1, Mrs. Foale 2; One cut dahlia, Miss Foale 1, Mrs. Foale 2; Sweet Sultans, Miss Dauncey 1; Carnations, Miss Dauncey 1; Gaillardias, Mrs. Foale 1, Mrs. F. Kerley 2; Miniature sunflowers, Mrs. Foale 1.

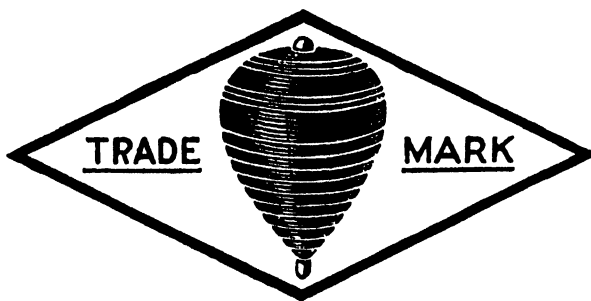
Junior Section (members under 20)—Miss Foale 1, Miss McCormack 2; (Special prize donated by Mrs. H. G. Johnston).

AUBURN (Average annual rainfall, 24in.).

April 27th.—Attendance, 14.

A THREE-COURSE DINNER.—A number of papers dealing with this subject were read and discussed. *No. 1.—Soup:* Boil 2 knuckles with a gallon of water for a few hours, pour off the liquid, and stand all night. Then skim off the fat, put in a saucepan, and when boiling add an onion cut up, $\frac{1}{2}$ cup pearl barley, salt and pepper to taste. Put a carrot, turnip, and a little of any vegetable through a mincer and add to the soup. Simmer $1\frac{1}{2}$ hours; add a little parsley when serving. *Australian Goose:* Take a leg of mutton, 2 cups of breadcrumbs, a chopped onion, salt and pepper, a little grated lemon rind, 1 dessertspoon of sage (or thyme if preferred), 1 tablespoon dripping, 1 egg, and tablespoon of milk. Bone the leg of mutton and place it flat on the table, spread with seasoning, roll up, and shape like a goose. Sew up with strong cotton, put dripping on top and in dish. Use a quick oven at first. Baste often. Serve with roast potatoes, cauliflower and white sauce, or any other vegetables in season. *Sago Plum Pudding:* Take 1 heaped cup breadcrumbs, 4 tablespoons sago, 1 dessertspoon butter, 1 teaspoon carb. soda, $\frac{3}{4}$ cup each milk and sugar, 1 cup raisins or dates, $\frac{1}{2}$ teaspoon lemon juice. Wash sago and soak in milk, mix breadcrumbs, sugar, raisins, and soda together, melt butter and mix in. Then pour in sago and milk, and mix well.

TOP SPECIAL SUPER



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Pour into a well-buttered mould covered with buttered paper, steam $2\frac{1}{2}$ hours, serve with sweet sauce or cream. *No. 2.—Pea Soup:* Have ready some stock made from knuckles of mutton. Add to this a finely-chopped onion, pepper, and salt, and thicken with pea meal. Allow it to simmer gently for 30 minutes. Before serving add a little sugar and some finely-chopped mint, and serve with small cubes of toast. *Mutton Pudding:* Cut the meat from a leg of mutton into small pieces. Mix in a chopped onion, salt, and pepper, and (if liked) a pinch of herbs, sprinkle with flour. Make a crust as follows:—Sift 3 cups flour with 1 teaspoon salt, $1\frac{1}{4}$ teaspoons baking powder. Rub into this 3 tablespoons dripping. Mix with water into a stiff dough, turn on to a floured board, and roll out. Grease a large enamel basin and line with the crust, keeping enough to cover the top. Put in the meat, and well cover with cold water. Wet the edges of the crust, put on a round piece to fit the top. Tie a cloth over the basin, and stand in a saucepan of boiling water, and keep boiling for three hours. Young cabbage or turnips are nice with the pudding. *Pudding:* $1\frac{1}{2}$ cups flour, 1 tablespoon butter, $\frac{1}{2}$ cup sugar, 1 egg, 1 heaped teaspoon baking powder, $\frac{1}{2}$ cup of milk. Mix well, and steam in a buttered basin $1\frac{1}{2}$ hours, boiling all the time. Serve with golden syrup or cream. (Miss L. Dennison, Secretary.)

BELALIE (Average annual rainfall, 17.71in.).

April 10th.—Attendance, 26.

A TROUSSEAU.—Mrs. D. Brookes presented the following paper:—“ ‘Trousseau’ is a French word meaning a bunch of keys; a sheaf of arrows; outfit of a lady about to be married; or a girl going to boarding school. The subject of the paper can be divided into five sections:—(1) House linen, which includes sheets, pillow cases, towels, tablecloths, table napkins, and bed covers. (2) Fancy linens, tea cloths, table covers, bedroom sets, d’oyleys, mats, and portieres. (3) Blankets, eider downs, cushions. (4) Personal wear. (5) Useful articles: dish cloths, dusters, peg bags, &c. General observations that must be considered are:—(1) Suitability of purse, the conditions of life, size of the future home, and climate. (2) Quality.—This should always be of the best. It is better to have a few things and good than many and poor. (3) Express Individuality of Owner.—Do not slavishly follow the fashion as fashion alters in household linen, fancy work, &c., as well as personal wear. *Household Linen.*—Have as large a supply of household linen as finance will permit and the best quality available, as there is a great wear on these articles. Pride in a house is aided largely by the kind of linen one is able to possess—dozens of everything if possible; one cannot have too much. Sheets may be linen or cotton according to taste, and pillow slips similarly. Towels should be large and soft, and a few only of the huckaback variety. Have a few dainty guest towels; they are much nicer than a large towel to offer a guest. Tea towels should be of very good forfar, and a large size. Bed covers may be plain or fancy, probably both, and the number according to the number of beds. Tablecloths and table linen are sometimes supplied by the bridegroom, but most girls prefer to choose their own. A few small tablecloths are very handy, and save much work when the laundry is considered. Cheap table linen is never satisfactory. *Fancy Linen.*—A variety is essential. One gets very tired of the same kind of fancy linen. A good supply is necessary, but fashions in fancy goods change very rapidly. Large cloths for supper or small tables are most useful, and one cannot have too many. Here again have a variety. There should not be too many sets for wash stands and dressing tables, but if possible have them to match the colouring of various rooms. Have d’oyleys of different shapes and sizes, but do not make too many. Portieres are very handsome and useful in draughty houses. (3) *Blankets, &c.*—These are sometimes provided by the bridegroom, but the bride usually has a say in this matter, so remember that good quality is essential. The quantity depends entirely on the climatic conditions of the place of abode. For sleep-outs and rougher use a few coloured blankets save labour. Eider downs are very nice, and a real comfort on cold nights, but buy them for use, not show. The better quality are more lasting, hence cheaper in the end, also more artistic. Make plenty of cushions to suit your own taste; also have some useful ones that will stand hard usage. (4) *Personal Wear.*—It is not wise to buy too many clothes; a better plan is to put a fund aside for buying future garments than to buy large quantities to become old fashioned and undesirable. Some girls buy dress lengths and put them away. This may be quite right for cotton, but risky for silk or wool, and dress materials change in style and design. Undergarments should be good in quality and in fairly large quantities. Modern silk underwear obviates the necessity for the elaborate hand-worked garments of earlier times. Have stockings, shoes, and gloves to match the frocks, but again only in moderate quantities. House frocks and aprons are as important as afternoon and evening frocks, so include a few of these in the trousseau, and be neat and attractive. Buy good furs (if means permit) and coats that are not in extreme styles, if they must last more than a season or so. The same rule applies to hats, which should be useful and ornamental. (5) *Dusters, &c.*—Do not forget to provide

a supply of dusters and dish cloths for the new home. A quantity of old white linen or cotton material is useful for many things. If torn into squares and put into a drawer the pieces are ready for use when required. Everything in the final analysis depends on the suitability of everything to the home and life to which the bride to be is going. To buy luxuries where strict economy will be the future lot would be absurd, but good quality fits every sphere. Shun shoddy, though striking articles. A good rule to remember is: 'Buy the most of the best your purse will allow.'" (Secretary, Mrs. A. Cummings.)

COONAWARRA.

April 18th.—Attendance, 37.

RECIPES.—*Bran Biscuits* (Mrs. Alder).—2 cups bran, 1 cup flour, $\frac{1}{2}$ cup sugar, 1 teaspoon cream of tartar, $\frac{1}{2}$ teaspoon carbonate of soda, small teaspoon salt. Enough cream to mix into stiff paste. Roll out, cut into shapes, and bake in moderate oven 20-25 minutes.

Honey Biscuits (Miss F. Jackson).—1lb. sugar, 1½lbs. honey, 4 eggs, 4 teaspoons soda, 2 teaspoons mixed spice, $\frac{1}{2}$ nutmeg, few drops essence lemon, and, if liked, little ginger. Enough flour to roll out. Makes a large number of biscuits; will keep for months in airtight tin.

Walnut Crisps (Miss J. Webber).—Melt 4ozs. butter, allow to cool, but not to set. Add 4ozs. each castor sugar and chopped walnuts, and little essence vanilla. Add 1 small beaten egg. Sift 5ozs. S.R. flour and pinch salt. Form into balls size of walnut and bake in moderate oven about 20 minutes.

Cocoanut Jumbles (Mrs. Hoffman).—Cream cup butter or dripping and 2 cups sugar. Add 2 well-beaten eggs and 3 cups flour, $\frac{1}{2}$ cup milk, $\frac{1}{2}$ teaspoon vanilla. Roll out and sprinkle with sugar and cocoanut. Bake 10 minutes.

Flakes (Mrs. R. J. Childs).— $\frac{1}{2}$ lb. each butter and sugar, 1lb. plain flour, 1 egg. Beat butter and sugar, add eggs and flour. Put through forc. Keeps in shape better if no rising used; 2 tablespoons coffee essence may be used.

Cornfl (Mrs. Len. Redman).— $\frac{1}{2}$ lb. butter, $\frac{1}{2}$ cup sugar, 2 eggs, $\frac{1}{2}$ cup chopped dates, $\frac{1}{2}$ cup nuts, 1 cup S.R. flour. Cream butter and sugar. Add eggs separately, then dates, and nuts and flour. Have cornflakes on greaseproof paper, drop mixture on this in teaspoons. Bake in moderate oven 10 minutes.

Weetie Biscuits (Miss G. Teichelman).—3 cups S.R. flour, 2 cups weeties, 7 dessertspoons butter, $\frac{1}{2}$ cup sugar, 4 eggs. Cream butter and sugar, add eggs separately, then weeties, and lastly flour. Mix well, roll very thin, and cut into shapes. Cook 10 minutes.

Plain Biscuits (Miss G. Teichelman).— $\frac{1}{2}$ lb. butter, $\frac{1}{2}$ cup sugar, 2 cups S.R. flour, 1 egg. Beat butter and sugar to cream, add egg, then flour, mix well, roll thin, glaze tops, and sprinkle with cocoanut. This mixture can be made into:—Shortbread Rounds.—Cut into rounds, cutting a smaller round in centre of half the number. When cooked join together with jam. Cocoanut Tarts.—Cut into rounds, line patty tins, drop in each a little jam, then add filling— $\frac{1}{2}$ cup sugar, 1 cup cocoanut, and 1 egg. Apple Cheese Cakes.—Line patty tins; add stewed apples, mash well, add 3ozs. sugar, 1oz. butter, 2 eggs, 1 lemon rind. Place stiffly beaten egg white on top.

Apple Marmalade (Mrs. Teichelman).—6 lemons, 6lbs. apples, 6 pints water, 9lbs. sugar. Slice lemons thinly; soak overnight in the boiling water. Next morning put on to boil until rinds are tender (about $\frac{1}{2}$ hour). Meanwhile peel and cut up apples. When rinds are tender, add apples and cook until soft ($\frac{1}{2}$ hour). Add sugar and cook quickly ($\frac{1}{2}$ to $\frac{3}{4}$ hour); test after $\frac{1}{2}$ hour. (I use stone pippins to give nice colour).

Quince and Apple Jam (Mrs. Alder).—2lbs. quinces sliced thinly (not peeled), put on to boil with 1½ pints water. When mashed add 4lbs. apples, boil until well mashed, add 5½lbs. sugar. Boil about half an hour. Add another $\frac{1}{2}$ pint water when adding sugar.

BISCUITS.—Paper and recipes supplied by Miss E. Skinner.—Biscuits are a wonderful standby. They are quite easily made. Good ingredients should be used. The biscuits, when prepared, should be put into a very steady oven, and in most cases cooked only until a fawn colour. They should be allowed to cool on the tin on which they have been cooked, and when quite cold stored in an airtight jar or tin. Well made biscuits, if properly stored, should keep for an indefinite period. Biscuits are much nicer if put away in tins for a few days before using. Flavoured icings improve plain biscuits, while rich biscuits are nice with jam between.

Cocoanut Biscuits.—2½ cups flour, 1 cup each butter, sugar, desiccated cocoanut, 2 teaspoons cream of tartar, 1 teaspoon soda, 3 eggs, a little milk. Beat butter and sugar, add eggs, then dry ingredients and milk; roll out thin and bake in a moderate oven 15 minutes.

Shortbread Biscuits.—2 cups S.R. flour, $\frac{1}{2}$ cup sugar, 6ozs. butter, 1 egg. Rub butter into dry ingredients, then add egg, roll out thinly, and cut. Bake in a moderate oven until cooked. This recipe can be made up in several different ways. Makes

very good jam tarts, with a mixt. spread on top of the jam. Also *and 1 egg, green biscuits.*

Cocoa Biscuits.—2 cups flour, 1 cup sugar, 1/2 lb. butter, 2 eggs, 1/2 cup cream of tartar, 1/2 teaspoon soda, 1/2 cup cocoa, 1/2 teaspoon ground ginger. Rub butter into dry ingredients, beat eggs and sugar together. Icing (brown)—2 tablespoons butter, then add 2 tablespoons each boiling water and cocoa, 1/2 cup vanilla essence vanilla, and icing sugar. Spread while hot.

Monte Carlo Biscuits.—1lb. plain flour, 3ozs. sugar, 1/2 lb. butter, 2 tablespoons water. Rub butter and sugar well together with fingers. mix in water, and shake flour in gradually. Rub all together, roll out on floured board to desired thickness, cut into shapes, and mark with the back of a fork. Bake in a quick oven until light brown. Filling.—Make a paste of the following mixture:—1/2 lb. icing sugar, 2 tablespoons butter, 1/2 to 1 teaspoon of vanilla or pineapple essence. When biscuits are cold spread generously with paste and lightly press another biscuit on top. These biscuits will keep a long time in an airtight tin.

Nutty Crunch.—2 cups rolled oats, 1 cup flour or wheatmeal, 1 cup each cocoanut and sugar, 1 eggspoon cream of tartar, 1/2 eggspoon soda, 1/2 cup of any shortening or cream. A little boiling water or milk to mix. Put all ingredients in bowl, rubbing shortening in. If it is cream just stir it in and moisten with a very little boiling milk or water. Knead a little to make pliable, roll out, and cut. Before cutting, take white of egg beaten stiff, enough icing sugar to make stiff icing, flavoured as desired and spread over dough. Sprinkle with almonds, chopped, or desiccated cocoanut, and bake a straw colour in a fairly hot oven. They should have a nutty flavour and be very short.

HOME MADE BREAD.—Paper read by Mrs. Jackson:—"Three essentials to good breadmaking are good yeast, good flour, proper attention and baking. When mixing bread, always see that the bread dish is thoroughly clean and dry; flour should be kept in a dry place. Take 6 sifts of flour, 1 handful of salt, sprinkle salt over flour, and mix thoroughly with both hands. Flour worked in this way makes bread much lighter than if the flour is sifted. Make a hole in centre, put in 2 cups of yeast, have ready 2 dippers of luke wark water, add a little at a time until all the flour is used. Sprinkle some flour on the table from a plate of flour, then put the dough on the floured table and mix thoroughly, adding more flour if needed until it can be rolled on the table without sticking. Put back in bread dish and leave 9 hours to rise. In cold weather I put a sheet of paper on the bottom of the oven and sprinkle a little flour on it, put the bread dish in the oven and cover with two large flour bags, so that if the dough rises over there is no bother in getting the dough off the paper. Have the oven just warm when the bread is put in to rise. When the weather is very hot I put one bag on the bread and leave on a chair in front of the stove. In the morning grease the bread tins, make loaves—using as little flour as possible—put in tins, and leave to rise until the loaves crack on top, then bake 1 hour in a moderate oven. About 1 1/2 dippers of water is needed to mix 6 sifts of flour, so that by having the 2 dippers full there is plenty of water to wash the table and hands, and which saves getting water when the hands are covered with dough.

YEAST RECIPE.—Boil 2ozs. hops in 2galls. of water 1/2 hour. When cool, strain and add 1 pint flour, 1 pint sugar, and 3 or 4 mashed potatoes. When finished fermenting, add a good handful of salt—about 3 days.

Pastry made from yeast dough is very nice. Roll out 1lb. of dough (when fit to put in baking tins), take 8ozs. dripping, spread some over the dough, fold over in three, and roll out again. Repeat spreading and folding 6 times. Then use for covering meat or fruit pies. Eat while hot.

Brownie.—Take about 2lbs. of dough after it has risen. Spread it out on a board or mix in a pan. Mix into it 1 cup of currants, raisins, or any fruit liked, 1 small cup of sugar, a little more than 1/2 a cup of butter or dripping, and a little cut up lemon peel. Knead all together well, adding a little more flour. Put in tins the same as bread. Stand aside to rise, and bake the same as bread in an oven not quite so hot as for bread.

Yeast Buns.—1/2 lb. butter, 1 pint milk (hot). Dissolve butter in milk, 1/2 lb. sugar, 4 eggs (well beaten), 1 large cup yeast, currants, raisins, dates, and peel to taste. Sufficient flour to make a rather soft dough. Mix all ingredients together, let dough rise all night, make into buns in the morning, and bake in a quick oven. Brush over with sugar and milk 5 minutes before taking out of oven. This makes a rich German cake if a softer dough is made.

Yeast Cake or German Cake.—Ingredients: 12 cups of flour, 2 cups sugar, 1 cup cream (1/2 each of butter and lard, or 1 cup of lard will do instead of cream), 6 eggs, 1 teaspoon ground mace, essence of lemon or vanilla, a few sultanas, about 2 cups of milk, 2-tablespoons salt. Sift flour, warm milk, melt butter or lard, beat eggs and sugar with a little warm milk. Make a hole in the middle of the flour, put in all

ingredients, mix with a little warm milk and flour; lastly, put in sponge with some more warm milk (make sponge the same way as for bread). Mix ingredients in gradually; mix well—much softer than bread; cover and put in a warm place to rise for about 3 hours. Then put on well greased slides about an inch thick, using as little flour as possible. Put in a warm place to rise for another hour, then brush over with some melted butter. Put on topping and bake 20 minutes to half an hour.

Topping.—3 cups of flour, 2 cups of sugar, essence of lemon, cinnamon if liked, enough butter to make it crumbly. Put on cake and bake. (Secretary, Mrs. F. Skinner.)

LAURA BAY.

April 10th.—Attendance, 11.

DRESSMAKING.—Mrs. A. J. Bowell contributed the following paper:—“Be sure to take all measurements correctly to ensure a good fit. A person to be measured must stand erect. Tie a piece of tape around the waist, and pull gently into position to make a waist line, because a number of measurements are taken from the waist line.

PARAFIELD POULTRY STATION.

NOW BOOKING ORDERS FOR SPRING, 1934.

EGGS FOR HATCHING AND DAY OLD CHICKENS

WHITE LEGHORNS.

EGGS.—7s. 6d. per Setting of 15 Eggs. Incubator Lots, £2 per 100.

DAY OLD CHICKENS.—15s. per dozen; £4 per 100.

BLACK MINORCAS.

EGGS.—7s. 6d. per Setting of 15 Eggs. Incubator Lots, £2 per 100.

DAY OLD CHICKENS.—15s. per dozen; £4 per 100.

Free on Rail,
Salisbury.

DELIVERY.—CHICKS—July to September.
EGGS—July to September.

Intending breeders should recognise the importance of establishing their flocks with only the very best of stock also, pay particular care to the size of the egg. The future of the poultry industry in South Australia is almost entirely dependent on the export trade; the size of the egg for export is of the greatest importance. The breeding stock at Parafield is carefully selected and every egg set or sold is of a minimum weight of 2ozs., and a large percentage considerably over.

All Eggs and Chickens sold from Parafield Poultry Station are guaranteed to be produced at Parafield.

EARLY BOOKING IS ADVISABLE.

Further particulars can be obtained from the Manager, Parafield Poultry Station, Salisbury, or Poultry Expert, Department of Agriculture, Flinders Street, Adelaide.

C. F. ANDERSON, Poultry Expert.

Other measurements are the neck, bust, across chest, across back, under arm, sleeve, skirt, and hips, &c. Place all patterns on the material with the centre front straight down the fold of the material, and allow $\frac{1}{2}$ in. for turnings, except for hems and other wider turnings. If the material has a figure or flower design be very careful and watch cutting out; see that the pattern is all running the same way, and that it matches. All cut-out material should be tacked before it is put on the machine to be sewn to keep it all in place, and also to give the desired effect when finished. To secure this great care must be taken from the very beginning of the work; do not slight in the least instance. Handle the work carefully. Each little wrinkle or fold that is carelessly pressed into new material takes away the freshness that is so much desired. Pressing is one of the most essential points in dressmaking. The short, stout person should not wear trimmings or stripes, &c., running around the figure. Trimming running around is most suitable for the tall and thin person. After a garment has been tacked together try it on to see if it fits properly. Never waste scraps in the sewing room, they can be put to many good uses. Never tack up a garment without first pinning it well. When folding material for cutting pin carefully selvedge to selvedge, and two or three places across the width. Both layers of material should be as smooth as possible before laying on the pattern. Care should be taken when laying patterns on the material, and always try to lay patterns so that material is not wasted; it will often come in handy to alter the frock, or perhaps it may be useful to help make garments for kiddies. Keep the machine oiled, but not overdo it or surplus oil may get on the material. Have plenty of pins, a good sharp pair of scissors, and a smaller pair of scissors for cutting cotton, &c., also a good measuring tape." (Secretary, Mrs. D. Morrison.)

McLAREN FLAT.

May 13th.—Attendance, 15.

A tatting demonstration was given by Misses Bell and Nicolle. The remainder of the meeting was occupied with a Question Box.

A successful dahlia show was held in the Institute on April 7. Mr. F. C. Richards, of the Department of Agriculture, opened the function. Mr. R. Elliott judged the exhibits. (Secretary, Miss I. Nicolle.)

MORCHARD (Average annual rainfall, 13.59in.).

May 24th.—Attendance, 24.

BISCUIT MAKING.—Mrs. Lang read a paper on this subject:—"Although biscuits take up rather more time in making than other cakes they keep so much longer, and they are also a great standby for afternoon teas and suppers. Put aside one day a month for biscuit making, then a good supply is always on hand. A variety of biscuits can be made from the one mixture if different-shaped cutters are used, iced in various ways, and decorated. *Foam Biscuits.*—Boil together 1 cup sugar with $\frac{1}{2}$ cup milk, 1 level teaspoon carb. soda, let cool. Take 3 cups flour, 1 cup butter, rub together and mix with the liquid, cut in fancy shapes, and press half almond or cherry on each. *Sao Biscuits.*—2 small cups plain flour, pinch salt, rub in 2 heaped tablespoons butter, mix to a stiff paste, roll out thin, and cut in squares, and prick with a fork. Bake a light brown. Using 4ozs. flour less and adding the same amount of grated cheese makes a nice biscuit to serve for supper with slices of tomato. *Chocolate Mushrooms.*— $\frac{1}{4}$ lb. butter, $\frac{1}{4}$ lb. each sugar and flour, 3 eggs, $\frac{1}{2}$ teaspoon soda, 1 teaspoon cream tartar, 4 teaspoons cocoa or chocolate, 3 tablespoons milk. Put on slide about 1 dessertspoon and bake. When cold ice the top white and underneath light brown. The stalks can be made of white of an egg moulded to shape with icing sugar. *Baskets.*—Make flaky pastry, roll and cut in rounds, and line deep patty tins. Cut thin pieces pastry, twist, and lay on slide in horseshoe shape for the handles. Cream 2ozs. butter, 4ozs. sugar, 1oz. almonds, 3ozs. sultanas, 2ozs. cake crumbs, 1 egg. Half fill pastries, and bake about 20 minutes, handles 10 minutes. Coconut top: $\frac{1}{2}$ cup sugar, $\frac{1}{2}$ cup coconut, 1 egg." (Secretary, Mrs. Schulz.)

PINNAROO (Average annual rainfall, 14.54in.).

The Second Annual Flower and Cookery Exhibition, conducted under the auspices of the Pinnaroo Branch, was held on April 20th. The show attracted a very good attendance during the afternoon, and there were several visitors from Parilla and surrounding districts. Mr. F. C. Richards opened the function.

The arrangements for the show were carried out by the lady members of the Bureau, who proved an enthusiastic body, and threw themselves wholeheartedly into their tasks in order to bring about the success which the show merited. They were headed by Mrs. P. N. Dowd (President) and Mrs. C. H. Atze (Secretary). Their efforts were characterised by a commendable energy and enthusiasm. In Mrs. Atze the members have a very capable and keen officer as secretary, who carried out her duties in an efficient and

thorough manner. In all 134 entries were received. These were judged by Mesdames A. Welden, C. Phillis, and Miss Colwill, of Parilla, and Mesdames Slater and Johnson. Trophies were donated by Mesdames H. G. Fewings, C. R. Mattiske, H. Harding, P. Dowd, — Pearce, C. O'Loughlin, S. Dowd, J. Hannagan, G. McCabe, J. Longford, E. Staker, A. F. Young, C. H. Atze, and Miss G. Harding.

The following was the prize list:—

Cookery.—Loaf bread, Mrs. C. V. O'Loughlin 1, Mrs. C. H. Atze 2; Yeast buns, Mrs. J. T. Longford 1, Mrs. G. C. Pearce 2; German Yeast cake, Mrs. J. T. Longford 1, Mrs. H. Ahrens 2; Six scones, Mrs. L. Vaughan 1, Mrs. Hill 2; Wholemeal scones, Mrs. L. Vaughan 1, Mrs. G. C. Pearce 2; Coffee cake, Mrs. C. V. O'Loughlin 1, Mrs. J. T. Longford 2; Sponge roll, Mrs. G. McCabe 1; Sponge sandwich, Mrs. A. T. Hawthorne 1, Mrs. L. Vaughan 2; Chocolate sponge cake, with butter, Mrs. A. T. Hawthorne 1, Mrs. J. T. Longford 2; Collection pastry, Mrs. C. H. Atze 1, Mrs. H. G. Fewings 2; Jam tarts, Mrs. Hill 1, Mrs. H. G. Fewings 2; Cream puffs, Mrs. G. McCabe 1, Mrs. A. T. Hawthorne 2; Collection of biscuits, Mrs. H. G. Fewings 1, Mrs. J. T. Longford 2; Dark fruit cake, Mrs. J. T. Longford 1, Mrs. G. C. Pearce 2; Currant cake, Mrs. C. H. Atze 1, Mrs. J. T. Longford 2; Sultana cake, Mrs. G. C. Pearce 1, Mrs. C. H. Atze 2; Seed cake, Mrs. J. T. Longford 1, Mrs. C. H. Atze 2; Collection small cakes, Mrs. Hill 1; Plate sandwiches, Mrs. A. T. Hawthorne 1, Mrs. H. Ahrens 2. Pickles, three varieties, Mrs. C. H. Atze 1; Tomato sauce, Mrs. C. H. Atze 1, Mrs. A. T. Hawthorne 2; Chutney, Miss K. O'Loughlin 1, Mrs. C. H. Atze 2; Jam, Mrs. A. F. Young 1, Mrs. Ahrens 2; Marmalade, 1 glass, Mrs. A. F. Young 1 and 2; Preserved fruits, Mrs. A. F. Young 1; 1lb. home-made butter, Mrs. Ahrens 1, Mrs. R. Gilbert 2.

Flowers.—Best dahlias, Mrs. C. H. Atze 1, Mrs. F. Muirhead 2; Six dahlias, distinct, Mrs. A. F. Young 1, Mrs. F. Muirhead 2; Three dahlias, distinct, Mrs. Eley 1, Mrs. F. Muirhead 2; Vase of Chrysanthemums, Mrs. C. H. Atze 1, Mrs. J. T. Longford 2; Vase of cosmos, Mrs. H. G. Fewings 1, Mrs. C. H. Atze 2; Vase Gaillardias, Mrs. C. H. Atze 1, Mrs. A. F. Young 2; Vase flowers, any kind, Mrs. C. H. Atze 1, Mrs. H. G. Fewings 2; Three roses, Mrs. C. H. Atze 1 and 2; Any flower, not previously mentioned, Mrs. H. G. Fewings 1 and 2.

SADDLEWORTH (Average annual rainfall, 19.6in.).

May 1st.—Attendance, 12.

The Branch conducted a cake competition, "Butter Sponge," the successful competitors being Miss Frost first and Miss Coleman second prize. Mrs. Coleman reported having visited the exhibition of women's handicrafts recently held under the auspices of the C.W.A., at Spalding. (Secretary, Miss G. Frost.)

TANTANOOLA.

May 1st.—Attendance, 17.

Miss E. Campbell, of the Education Department, delivered an address, "The Food Value of Milk." The Hon. Secretary, Mrs. Telfer, reported in connection with the S.E. Conference that receipts amounted to £11 6s. 9d., expenditure £10 5s. 4½d., leaving a credit balance £1 1s. 4½d.

WEPOWIE (Average annual rainfall, 12.46in.).

April 24th.—Attendance, 8.

HAND-FEEDING CALVES.—Mrs. H. Noske read the following paper:—"Feeding calves properly is most essential in raising a good herd. A calf that is improperly fed will not develop into a first-class cow, no matter how good it may be when born; it should be let run with the cow for at least 24 hours before being weaned from its mother. The calf should then be put out of sight of the cow. The cow's milk is not good for at least four to six milkings. It is best to feed the calf as soon as possible after milking, because the milk direct from the cow is at the correct heat. It is a good plan to miss one feed, then the calf will readily suck the finger. The fingers of the hand should be placed in the calf's mouth, and then place its mouth in the bucket of milk. Half a gallon a day is sufficient new milk for the first week, when the amount should be gradually increased to 1gall. a day. It is best to feed calves twice a day. A little green grass during the day is much better than feeding on too much milk. The calf will get a good start if fed on new milk for two weeks; then gradually wean it from new to skim milk. By this time the calf should have all skimmed milk. This tends to keep them healthy, free from scour, and very little cream is lost. When there is more than one calf in the yard at feeding time stalls should be built to separate them while drinking. Every calf should have its own drinking vessel to enable it to have the same amount of milk. If this is not done the calf that can drink the fastest will get more milk than one that drinks slower. Kerosene tins cut in halves make excellent drinking vessels for calves. The calves when drinking

should be bailed until all desire for sucking has passed. Calves if not kept apart in some way or other will certainly suck one another, which tends to spoil the shape of the udders, and is liable to injure them. All calves should have access to a small, green paddock where they are able to run about and pick grass if they so desire. A shed should be provided to house calves during wet weather. They should be fed with milk for at least four months before being turned out. If a calf is weak and miserable it may be advisable to feed it with milk a little longer. A calf from a poor milking cow may be reared to become a profitable animal if it is well cared for at the start. If a calf becomes scoured from feeding on skimmed milk, put one handful of flour in the milk and stir well. On no account should a calf be ill-treated; it tends to make them very bad tempered and stubborn. A calf or cow with these faults is a very untrustworthy animal to have about the place, and may as well be sent to the abattoirs." The paper was then discussed. Members did not think it necessary to feed on new milk for three weeks. Meggitt's meal was suggested as a good addition to the milk, which should be scalded and added to the milk. Mrs. E. Knauerhase preferred 1 tablespoon of flour dissolved in cold water, and then hot water added to make it the consistency of starch. She has used this with great success. (Secretary, Mrs. E. Roocke.)

WILLIAMSTOWN (Average annual rainfall, 27.77in.).

May 2nd.—Attendance, 8.

USEFUL HOUSEHOLD HINTS.—Contributed by Mrs. Hamilton:—"When making plain suet pudding add two or three tablespoons of rolled oats to the flour before mixing the pudding will be lighter and more digestible. To prevent cooked beetroot from becoming mouldy, place a little prepared mustard in the jar in which it is kept. If a dish sticks to table baize, do not attempt to pull it off. Instead, fill the dish with hot water and leave for a minute or two; the utensil can then be lifted without leaving a mark. Before washing coloured towels, table cloths, &c., set the colours by pouring boiling water over them, then wash as usual. This will obviate any likelihood of the dye coming out and spoiling other clothes. A teaspoon of orange juice added to tomato soup will greatly improve the flavour. If voile and crepe de chine frocks are hung out without wringing they will never shrink. To remove coffee stains from material, apply to the stain the yolk of an egg mixed with a little water and allow to dry. Rub out before washing. Kerosene applied quickly to a burn will relieve pain and often prevent a blister. To prevent pastry at the bottom of fruit pies or jam tarts from becoming heavy and sodden, brush over the pastry with a beaten egg white before putting in the fruit or jam. When washing out tea towels, do not rinse in clear water but wring them with the hands out of the soapy water and hang them on the line. By this method they remain beautifully white. To keep away moths insert cloves thickly into the skin of a ripe orange, set it in a cool oven until the skin is dry then place it among blankets or furs. Sago soaked in water until quite soft is an excellent substitute for suet in boiled puddings. Use in the proportion of 1 part sago to 4 parts of flour. When stewing prunes add a small teaspoon of lemon juice to the stewing water. The prunes will then have a smoothly and finer flavour. (Secretary, Mrs. Cundy.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Taplan	26/4/34	21	"The Kitchen Garden," Mrs. Chancellor	Mrs. Flynn
Penola	2/5/34	52	Demonstration, C.W.A. Members	Mrs. E. Kidman
Hope Forest and Dingabledinga	3/5/34	15	Address—H. J. Apps ...	Mrs. L. Fincher
Kangarilla	17/5/34	15	Annual Meeting	Mrs. M. Steer
Warramboos	11/5/34	14	Annual Meeting	Mrs. A. Steer
Wasleys	3/5/34	40	Address—Miss H. Clarke	Miss J. Braun
Balhannah	16/5/34	15	"Jersey Cattle," Mrs. Boehme	Miss Spoehr
Gladstone	15/5/34	23	Question Box	Mrs. L. Sargent
Yurgo	25/4/34	7	"Pickles," Mrs. Easton	Mrs. R. Sanders
Snowtown	3/5/34	17	Address—F. C. Richards	Mrs. A. Hocking

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All communications to be addressed:

'The Editor, Journal of Agriculture, Education Building, Adelaide.'

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A. P. BLESING,
Minister of Agriculture.

AGRICULTURAL VIEWS AND COMMENTS.

MISCELLANEOUS.

Agricultural Bureau Conferences.

District Conferences will be held as follows:—

Murray Lands (West), at Karoonda (Nunkeri Branch), Tuesday, July 31st, E. R. Peltz, Nunkeri (Secretary).

Southern, at Strathalbyn, Thursday, August 16th, F. W. Allison (Secretary).

Hills, at Coromandel Valley (Blackwood Branch), Thursday, August 23rd, H. Goldsack, Coromandel Valley (Secretary).

Eyre's Peninsula (Southern), at Yeelanna, Wednesday, September 5th, R. R. Wilson (Secretary).

Eyre's Peninsula (Central), at Kyancutta, Friday, September 7th, E. A. Kelly (Secretary).

Pinnaroo Line, at Pinnaroo (Parilla Well Branch), Tuesday, September 18th, E. C. Slater, Pinnaroo (Secretary).

Murray Lands (East), at Caliph, Thursday, September 20th, W. H. Todd (Secretary).

Fruit (Non-irrigated Districts), at Balhannah, Tuesday, November 6th, C. G. Grasby (Secretary).

In each case the Conference will commence at 10.30 a.m. Members of Branches are invited to submit papers and questions for the agenda.

Agricultural Shows.

We have been advised by Secretaries of Agricultural Show Societies that their shows will be held as follows:—

Maitland, Wednesday, September 26th.

Denial Bay, Friday, September 28th.

Gawler, Saturday, September 22nd.

Jamestown, Wednesday, October 10th.

Karoonda, Wednesday, October 3rd.

Loxton, Wednesday, October 10th.

Burra, Wednesday, October 24th.

Minlaton, Wednesday, October 24th.

Mount Gambier, Wednesday and Thursday, October 24th and 25th.

Murray Bridge, Thursday, October 25th.

Woodside, Saturday, November 3rd.

Cancellation of Stock Brands.

In accordance with the provisions of section 53 of the Brands Act, 1933, the Registrar of Brands (Mr. H. O. Laurenti) states that on and after January 2nd, 1935, the registration of all brands and marks which were registered prior to December 31st, 1934, will be cancelled unless the owners give notice in writing to the Registrar that they wish to retain the brands registered in their names. No fees are required when giving such notice. If an acknowledgment of the notice is requested, however, a stamped addressed envelope must be enclosed.

Any person who has already applied for brands or marks to be retained need not comply with this notice.

Readers will facilitate the operation of these provisions of the Act if they will advise others, and Branch Secretaries are requested to bring the matter under the notice of their members at an early meeting.

Mr. Laurenti proposes to send a "poster" to each Branch with a request that the Secretary display it in some conspicuous part of the township.

ROYAL

SHOW.

ENTRIES CLOSE

S.A. INDUSTRIES and MANUFACTURES (including Apiculture, Cookery, Needlework, Arts-Crafts, Woodwork, &c.

FRI. Aug. 10, at 4 p.m.
THUR. Aug. 30, at 4 p.m.

CATTLE

SHEEP

WOOL

FAT STOCK

HORSES (Heavy, Roadster, & Blood)

SWINE

JUDGING COMPETITIONS

SHEAF TOSSING

LOG CHOPPING

POULTRY

EGGS

PIGEONS

DOGS

FRUITS (Classes 1725 to 1729)

HORSES-IN-ACTION & TROTting

FRUIT PACKING COMPETITIONS

FRUITS (Classes 1735 to 1772)

VEGETABLES

CATTLE (Dairy Cow)

TUES. Sept. 4, at 4 p.m.

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Are You a Member?

It pays to be a Member of the Society. There is considerably more in this than the personal gain of being able to visit the Show when you so desire. Your Membership means a personal interest in the activities of the Society, which is endeavouring to improve every phase of primary production of the State.

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HAROLD J. FINNIS,

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Secretary.

SPRING

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Wheat Qualities.

Reference has been made in recent reports from the Argentine on quality in wheat, and it is stated that certain varieties are being excluded by the Grain Control Board with the object of maintaining the standard of the recognised export type and enabling these to compete in more equal terms with the product of other exporting countries such as Canada. One of the difficulties with which the grain trade has had to contend in the past in this country has been the tendency of the wheat grower to favour varieties which yield heavily, regardless of quality. The inauguration of the Grain Control Board offered a splendid opportunity to take steps to combat the evil, and it was decided to exclude certain varieties in the area tributary to Rosario and the neighbouring ports. At the same time it was decided to form a new grade, to be known as No. 3, in the composition of which these varieties would be permitted and which would be quoted at a discount under No. 2 for this crop year. No. 3 is not permitted to be mixed in with Nos. 1 and 2, under penalty of losing their grade. In a country which has no official grading system, this latter provision is not very easy to enforce. But a great deal of good can be effected by propaganda, and in the meantime there is little doubt that the Grain Act now before Congress will provide the necessary compulsory powers before another crop year comes round, even though the mechanical equipment may still be lacking. Meanwhile, a National Wheat Commission has been called into being and charged with the investigation of the matter of inferior wheats. It reports that there are no less than 6½ million acres on which wheat is being grown which is unfit for exportation. The list of undesirable types is expanded to a list of 24. The Commission has divided the cereal region of the Republic into zones, for each of which it recommends certain high grade pedigreed strains of proved adaptability to each zone.

Obviously it is not possible to provide pedigreed seed for more than a fraction of the acreage where it is needed. But the Grain Control Board has undertaken to collaborate by placing at the disposal of the Ministry of Agriculture whatever parcels of suitable wheat fit for seed which come into its possession, and the Ministry is proposing to exchange such seed for wheat of the inferior types which would otherwise again be sown. By this means, it is hoped to do a good deal to eradicate the objectionable types now being grown and effect a distinct improvement in quality of the Argentine wheat exported. It is calculated that there are about 275,000 bags of pure seed wheat available in the various experimental farms, private and official, of the Republic, most of which will be sold in small parcels to individual farmers desirous of sowing a few acres in order to provide a quantity of seed for the following year. In this connection, a plan adopted in the important wheat-growing province of Cordoba is of great interest. In these times of low prices few individual farmers can afford to purchase the expensive pedigreed seed they would like to sow. So the provision of the seed wheat has been undertaken co-operatively. On some of the large estates which have been "colonized," the proprietor or the administrator has been induced to purchase seed which is entrusted to the most capable of the colonists to sow, with the condition that the product when threshed is to be exchanged, bag for bag, on equal terms, with the other colonists for their ordinary wheat to the extent calculated as necessary to provide seed for the following year. In districts where this plan is not possible, it is being attempted to organise the farmers into groups to co-operate by making an individual contribution to the cost of the seed, and select one of their number to act as "seedsman" and undertake the growing of the wheat, distributing the product along the same lines. In each case the arrangements are supervised and the necessary instructions are given to the "seedsman" by a representative of the Provincial Department of Agriculture, who also inspects the growing crop and superintends the exchange of seed for wheat after threshing.

Publications Received.

The Library of the Department of Agriculture acknowledges the receipt of Bulletin No. 75, "Poisonous Plants on the Farm," by H. C. Long, issued by the Ministry of Agriculture, England. Price, 2s. net.

AGRICULTURAL INQUIRIES.

[Replies supplied by Mr. W. J. Spafford, Deputy Chief Director of Agriculture.]

Agricultural Enquiries from Tumby Bay.

11. "Would it improve a wheat crop in this district to drive a flock of sheep backwards and forwards over it when it is about 4in. high?" Reply—The consolidation of the soil which would result from repeatedly driving sheep over a wheat crop would do it a great deal of good in most seasons in your district, but it would generally be better to do it before the crop reaches 4in. in height. The complete feeding down of the crop after it has grown 4in. would not be a good practice in your district, but so long as the flock was kept moving the quantity eaten would not be sufficient to damage it.

2. "Does Wimmera Rye Grass do well on sandy soil?" Reply—Wimmera Rye Grass does well everywhere that Barley Grass grows strongly. It is easily established by putting a couple of pounds of seed per acre in with a cereal crop which is to be harvested for grain, by throwing some seed on to the superphosphate every time that the seeddrill is filled. Sown in this way it seeds itself for a certainty and when once established remains as an ordinary farm weed.

Dry, Matured Free Running.



HIGH GRADE 45% SUPER.

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WALLAROO-MOUNT LYELL FERTILISERS, LTD.,
Wallaroo and Port Adelaide.

What is Fallow?

The Secretary of the Warramboe Agricultural Bureau asks what is the definition of fallow. Reply—The term "Bare fallow," as used in Australia is usually applied to land which was ploughed or cultivated in the winter, kept free from weeds, and loose and open on the surface throughout the spring and summer, to be seeded in the following autumn or winter. If the land receives its first stirring at the end of summer and is kept loose and free from weeds for 13 to 15 months before it is seeded it is generally known as "Summer fallow." If the original stirring is not given until the spring, about 6 to 7 months before seeding the land, it is usually spoken of as "Late spring fallow." Grass land stirred up in late summer or early autumn to be seeded the same year is not bare fallow in any sense of the word as used in Australia.

Control of Wild Oats.

"Mannum" asks: "*Would it better to sow wheat immediately after rain comes and risk a strong growth of wild oats, or wait about a week, cultivate to a shallow depth, with wide shares, and then sow?*"

Reply—If Early Gluyas or Waratah wheat is to be sown, wait until the oats have germinated, cultivate, and then seed, but with most of the other popular varieties of wheat seed as soon as it rains, using more seed than usual and risk the damage to be done by the oats. The correct way to tackle wild oats as seeding time approaches is to get them germinated, cultivate them out, culti-pack or roll the land, sow the seed and culti-pack or roll again. Under conditions obtaining at Mannum it is as well to use wheats like Early Gluyas or Waratah, so that seeding can be delayed a little longer.

Wheat Varieties for Stubble Land.

Bundaleer Springs Branch of the Agricultural Bureau asks for the names of varieties of wheat suitable to sow on stubble land.

Reply—Most varieties of wheat which germinate quickly and immediately commence to make strong growth are suitable for sowing on stubble land. Of these varieties Early Gluyas has proved the best for the purpose, but Waratah is also very promising, and King's White is really useful. Any of the above wheats can be sown with perfect safety well on in June in the Bundaleer district. Full success with cropping wheat the second time depends upon—(1) Securing a good stubble burn. (2) Cultivating or ploughing the land as soon after the burn as possible. (3) Cultivating or ploughing to a very shallow depth. (4) Using an early strong-growing variety and delaying seeding to suit the variety.

High Bunches of Cereals in Stubble Crops.

"Black Springs" asks: "*What is the cause of high bunches of cereals seen in stubble crops?*"

Reply—The high bunches of cereals frequently seen in crops sown on stubble, if not due to the presence of self-sown plants which germinated some time before the sown seed—as is a common occurrence—are obviously caused by greater fertility at the spots where they occur. As a rule this greater fertility is derived from the droppings of animals, and the principal plant food leading to the greatly increased growth whilst the cereal plants are young is—in all probability—nitrogen. In well-fallowed land there is generally sufficient nitrogen at seeding time to lead to full growth of all of the young cereals, and so the presence of the droppings of animals is not noticeable in the crops, but the position is quite different in stubble land, particularly if the soil is not in really good heart, because the crop used up the available nitrogen and relatively small amounts are collected and held in the soil until the soil is moist and warm at the same time. This need of moisture and warmth together seems to explain why it is that in some seasons this clumpiness only lasts a short time, whilst in other years it persists until well on into the spring.

HORTICULTURAL INQUIRIES.

[Replies supplied by Mr. G. QUINN, Chief Horticultural Instructor.]

Treatment of Green Aphis of the Peach Tree.

The prevalence at the present time of the over-wintering eggs of this very injurious pest on the fruiting twigs of peach trees has been reported to the Horticultural Branch of the Agricultural Department from various fruitgrowing centres of the State.

Experiments carried out over several seasons at the State Orchard at Coromandel Valley, near Blackwood, and verified by more elaborate trials made in New South Wales and Victoria indicate that the tar distillate sprays are the most effective spraying remedy we have yet used against this pest. It is used as an ovicide in mid-winter whilst the peach trees and the pest are quite dormant. Those peach growers who have been troubled with this pest should not apply this spray later than the end of July in most districts of this State, otherwise risk of injury to the buds and bark may be expected. Growers have been informed from various sources that even when used during the most dormant stage of the trees these tar distillate washes will seriously damage the bark of the last summer's shoots. The Chief Horticultural Instructor (Mr. Geo. Quinn) reports that he has not heard any statements relative to its injurious effects on peach trees in New South Wales and Victoria when it has been used in the middle of winter, and the Manager of the Government Experiment Orchard near Blackwood (Mr. R. Fowler) assures him he has been unable to detect any evidence of injury arising from the use of several brands of the tar distillate sprays on the test trees treated with them during mid-winter in the Experiment Orchard during the past couple of years.

(River Murray Conference.)

Dusts v. Sprays.

"Have any tests been conducted in the River areas with the object of proving the comparative value of dusts versus sprays in the control of disease in vineyards and orchards, and if so, what results were noted?"

Reply—I have no knowledge of any carefully controlled tests having been made in the Murray Valley to determine the comparative values of dust sprays and liquid sprays for the suppression of diseases and pests commonly found in the orchards and vineyards in the irrigated areas.

At Blackwood Experimental Orchard tests have been made between arsenical dust sprays containing arsenate of lead powder and arsenate of lead powder in the form of liquid spray. The evidence showed that the protecting powers of the liquid form far exceeded that of the dust spray in so far as codlin moth attacks were concerned.

Further, in respect to the curl leaf fungus disease in peach trees, the prepared copper dust sprays give infinitely less protection than the liquified forms known as Bordeaux Mixture (copper sulphate and lime) or Burgundy Mixture (copper sulphate and carbonate of soda crystals).

At Hackney Road, Adelaide, Experiment Orchard, lime sulphur liquid spray controlled the oidium or powdery mildew in grape vines much more effectively than sulphur dust sprayed on dry with a Niagara dust gun. This was particularly outstanding when the early summer remained cool.

For some pests in vegetables, the market gardeners around Adelaide find nicotine and arsenate of lead applied as dust sprays very effective against aphides and leaf wigglers (cabbage moth caterpillars) respectively. Celery growers have also found some measure of protection to their plants against the leaf spot fungus (*Septoria apii*) by the use of copper dust sprays, but there is some reason—from a few tests made with liquid copper sprays (Bordeaux or Burgundy) for believing they are superior in their action.

The application of the dust sprays is a cheaper and more rapid process, but the efficient distribution of the dusts to the under parts of the leaves and fruits attained by liquid sprays is rarely possible of achievement with the dusting appliances thus far available.

(*River Murray Conference, Barmera Branch.*)

Green Manure Crops.

"How do rye and oats compare with peas or beans as green manure crops?"

Reply—Thus far, the comparative values of cereal crops—rye and oats—with those of peas and beans as a means of green manuring the irrigated lands in the Murray Valley have not, to my knowledge, been tested. This season, a number of growers in the various settlements are trying rye as a green cover crop, and the crops are giving good promise thus far. It is claimed that these cereals will produce a greater weight of green growth than will the legumes—peas, beans, tares, or lupins. Further, that the rye will grow more quickly during the cold season than the legumes mentioned.

In discussing the use of crops for green manuring purposes it should be remembered that they return organic matter containing only the same quantities and kinds of mineral substances drawn from the land and carbon acquired by the plants from the atmosphere. The legumes return all of these with additional nitrogen which is collected for them from the atmosphere by the bacteria which attach themselves to the roots of the legumes. Whilst we do not know what proportion of the nitrogen was extracted from the soil by the plants themselves, we have found that a crop of an acre of beans 6ft. tall, grown at Berri Experiment Orchard, contained in its roots and tops the equivalent of nitrogen to that found in a dressing of over 8cwts. of sulphate of ammonia per acre. A good crop of field peas returned a slightly lesser quantity of nitrogen per acre. It will be seen, therefore, that if equal areas of cereal crops do not yield an outstanding greater weight of organic matter than the beans or peas, the effect may be offset by the discrepancy above referred to. It is true, that at the outset organic matter may be most desirable, but crops of beans such as are produced annually at the Berri Experiment Orchard introduce large volumes indeed of this soil correcting factor.

It is claimed that rye crops will develop rapidly and reach large dimensions of growth in time to be ploughed under before the roots of the trees or vines start into activity, and are likely to be injured by the ploughing or the decaying of the green vegetation. Our experience at the Berri Experiment Orchard indicates that, providing the crop is got in early in March and given a good start, the same may, with equal force be claimed for the beans, which have often been ploughed under at the end of July and early August.

VETERINARY INQUIRIES.

[*Replies supplied by Veterinary Officers, Stock and Brands Department.*]

Currency Creek asks treatment for lice in horses?

Reply—A liberal application of raw linseed oil over the whole of the body will kill the lice, and dressing should be repeated in five to seven days. The effect of the oil dressing is to clog the breathing pores in the body of the louse, through which it breathes, so that it dies of suffocation.

Manoora reports pigs with scaly-like condition of the skin, the animals are continually rubbing themselves.

Reply—The skin trouble with the pigs is probably due to digestive disturbance. Once a week give a dose of 2ozs. Epsom salts per pig in a little swill feed. Reduce the daily amount of grain fed somewhat, and, if possible, let the pigs out for part

of the day to graze. Give 1 teaspoon per pig of the following mixture daily in the feed:—Salt, 1 part; air slaked lime, 2 parts; sterile sweet ground bone meal, 2 parts. Wash the skin well with warm soapy water with a little washing soda dissolved in it. Then, after drying, smear lightly with flowers of sulphur, 1 part; lard, 4 parts. Two or three dressings of this applied twice a week should be sufficient.

Mount Hope asks for treatment for worms in pigs.

Reply—The large white worms in pigs can be eliminated by giving one dram (one teaspoonful) of oil of turpentine in 4ozs. of castor oil per 100lbs. live weight (increase or decrease doses according to weight). Starve pig for 12 hours before giving. The droppings should be collected and burnt. Treatment alone is not satisfactory, as re-infestation soon occurs, pigs becoming infested by taking in eggs in their feed. For this reason the piggery should be cleaned out and repaired (especially floors) if necessary. Further, if removed to fresh ground, the pigs will do much better. Young pigs are chiefly affected, and special attention should be paid to them.

Hon. Secretary, Agricultural Bureau, Rendelsham, asks the age at which a sheep is considered full grown?

Reply—A sheep is full grown when the eight permanent incisors are through and in wear. Under Australian conditions this occurs between the ages of $3\frac{1}{2}$ and 4 years.

Shoal Bay Agricultural Bureau reports death of 9 pregnant ewes following drenching with bluestone solution.

Reply—From the information and symptoms supplied the sheep died from a condition known as "toxaemia of pregnancy" (twin lamb disease). This disease is always associated with pregnancy, and generally occurs within five weeks of lambing. Ewes in fat condition are generally affected, but occasionally it occurs in poor conditioned ewes. The cause is not definitely known, but is considered to be due to liver changes, which interfere with liver function and consequent circulation of toxins (poison) in blood, normally removed from blood stream by the liver. Affected sheep show the following symptoms:—Stay apart from other sheep and show muscular twitchings of body, principally confined to head and shoulder regions. They may appear to be blind and stiff in their movements. Death usually occurs within 3-4 days of symptoms being first noticed. On *post mortem* the carcass and organs appear normal, but frequently the ewe is carrying two lambs. The liver presents a pale reddish-yellow appearance, due to presence of excess fat in the tissues. Curative treatment has been tried with various mixtures, but with little success. However, preventive measures can be carried out, and these are as follows:—Limit the food supply by placing in paddocks where feed is scanty in order to make the sheep exercise. If feed is plentiful, and this cannot be carried out, the sheep must be exercised daily. Treatment of affected sheep may be attempted, and consists of giving 4ozs. of Epsom salts dissolved in water and adding 4 tablespoonsful of treacle. Give this drench once, and then twice a day smear on tongue and teeth 1 tablespoon of treacle. The fact that the sheep died following drenching is only a coincidence. It is pointed out that bluestone solution, if given in excessive amounts, is an irritant poison, and sheep so affected would not show the symptoms described by you.

Agricultural Bureau, Truro, reports aged gelding with a ravenous appetite.

Reply—The following course of treatment is suggested:—Starve the animal for 36 hours (this is important), but allow water to drink during this interval. Then give the following drench:—Raw linseed oil, $1\frac{1}{2}$ pints; turpentine, 4 tablespoons. Until the purgative effects of this drench have worked off, feed lightly on bran mash or well damped bran and chaff. Then gradually bring animal back on to its customary feed, and give 1 tablespoon of Fowler's solution of arsenic in damped feed night and morning for a fortnight. A fortnight after the completion of this course of treatment repeat the whole treatment again.

SOME POTENTIALITIES OF SOUTH AUSTRALIA.

[Summary of an address delivered to Mount Gambier Rotary Club by W. J. SPAFFORD, Deputy Director of Agriculture.]

It is more than ordinarily pleasing to speak on the Potentialities of South Australia to an audience of South-Eastern people because of the belief that much of the future progress of the State is dependent upon the development of the South-East, and anyone living in that district must be specially interested in the subject.

South Australia is an agricultural State, and as its progress will depend upon the expansion of its agricultural interests, it is the duty of every citizen to help this agricultural progress whenever opportunity offers. This applies with particular force to the leaders in business and the professions, who should never lose sight of the fact that we are likely to remain an agricultural community. We have no manufacturing advantages in South Australia; there is neither coal, water, nor oil for providing cheap power; the climate experienced over most parts of the State is unsuitable for manufacturing the finer fabrics and other articles of high quality, nor is the water sufficiently plentiful nor good enough; and, perhaps more important still, our population is too small to attract manufacturers. Unless special circumstances exist it is usual to manufacture where the bulk of the articles made are sold locally and the surplus exported, and so it is natural for manufacturers to go where the population is densest. It is true we smelt ores at Port Pirie, and make motor bodies for export, but these are practically the only manufacturings of any kind we do which bring in "new" money. We still make some flour, but this only brings about the same amount of money that would have been received for the wheat, the added value for manufacturing being in the by-products, and if these by-products (bran and pollard) were not available we would need to import concentrated foodstuffs for livestock. Other forms of manufacture, like the making of butter, cheese, wine, etc., are quite essential to enable us to sell the rural product.

PROGRESS ALREADY MADE.

Since the commencement of the State in 1837 we have made considerable agricultural progress. Although it often appears as being very slow, it is gradual and continuous with very few sudden improvements, but despite the fact that the march forward was rarely spectacular and appeared sluggish at times, if we look back a few years we cannot fail to see that a very considerable advance has taken place. The rapid forward progression is very noticeable in a young country like our own because of the absence of local traditions which have so frequently hampered conquerors of any country with an old civilisation, no matter how backward.

Progress made is of snowball growth, and is getting greater and greater as time goes on, largely, of course, because the means of disseminating the knowledge gained is improving all the time. In this connection South Australia has been fortunate in the possession of that wonderful organisation known as the Agricultural Bureau, where many of the keener intellects of the agricultural community meet regularly, discuss their immediate problems, and have brought to their notice the discoveries and improvements made in other parts of the State and, indeed, in other parts of the world.

PRESENT-DAY PRODUCTION.

That the progress has been considerable can be realised by remembering that even in times of low prices our production was worth in 1931-32 £26,973,375, of which agriculture provided £19,048,788 or 70.6 per cent.; factories manufac-

tured goods worth £6,570,939 or 24.4 per cent.; mining gave £648,580 or 2.4 per cent.; and miscellaneous articles such as fish, game, &c., were valued at £705,068 or 2.6 per cent.

These figures show the great preponderance of agricultural production over all others, but perhaps the value of agriculture is more strikingly brought out by an examination of the figures showing the overseas exports from the State. The total value of all overseas exports in 1932 was £12,228,312, of which £10,409,453 was received for agricultural products, which equalled 85.1 per cent. of the total; mining returned £1,633,558 or 13.4 per cent., and other articles only £185,211 or 1.5 per cent. Although the figures show 85.1 per cent. for agricultural exports it is even greater than this, because the bulk of the 1½ million pounds shown for mining belongs to New South Wales as it consists largely of smelted ores from Broken Hill which were treated at Port Pirie and then shipped direct from that port.

SOME OBVIOUS DEVELOPMENTS.

Because the part of agriculture which is practised in most of South Australia is similar to that which has persisted for centuries in other semi-arid countries, and is known as "Mediterranean agriculture," it is to be expected that we will continue to produce in ever-increasing quantities wheat, barley, vines (for wine and drying), olives, figs, almonds, sheep, pigs, dairy cattle, and poultry.

Wheat.—We now crop about 4,000,000 acres each year, and the average yield is about 11bush. per acre, and there seems no reason why we should not crop over 5 million acres when prices become normal, and with a thorough cleaning up of land, better fallowing methods, improved varieties, &c., the yield should be raised to about 18bush. per acre per year.

Barley.—About 300,000 acres are cropped annually for a return of about 18bush. per acre, which yield should easily be increased to 25bush. per acre. The area capable of producing this crop, without reducing the area sown to wheat, is enormous in this State, and when we have developed an extensive export trade for pig products, millions of acres will probably be seeded to barley every year.

Vines.—There are 34,000 acres under wine grapes and about 20,000 acres for other purposes, and these areas can be increased to a very great extent as markets expand.

Olives, Figs, and Almonds.—These fruits do really well in this country, and even if it is only to supply Australian requirements a very great increase in production appears inevitable.

BARLEY

We have large Overseas Representation, and are in constant touch with the World's Markets, and strongly advise Growers, before selling elsewhere, to submit samples to us for valuation.

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F. W. HANCOCK & CO.,

CRANBROOK CHAMBERS, BENTHAM STREET, ADELAIDE.

TELEPHONE: CENTRAL 4855 and 4856.

Sheep.—At present we carry about 7 million sheep, but with the drainage of the South-East, improvements in pastures and feeding, storage and reticulation of water, and closer subdivision of holdings, this number should be doubled in the immediate future. Not only will numbers be increased, but the wool yield will be improved and the production of fat lambs will tend to better financial returns.

Pigs.—About 140,000 pigs are slaughtered annually for home consumption, and a few thousands for export, but if there is to be a great increase in the number of these animals maintained in the State it will be because of the development of an extensive export trade in pig products. These animals are reared so easily in the country, and barley and other grains are grown so readily, that it seems inevitable that in the near future South Australia will become an important exporter of pigs, and then enormous numbers will be reared in the country.

Dairying.—There are now about 130,000 dairy cows in the State, and when the South-East is drained and more of the Adelaide Hills cleared of scrub this number will be greatly augmented.

Poultry.—The great bulk of the 2,200,000 head of poultry are fowls, and because of the success being attained in the export of eggs it can be confidently expected that the marked increase in production which has taken place in recent years will be maintained, and that poultry will become one of our valuable lines of producers of an exportable primary product.

HOW TO BRING ABOUT THE INCREASED PRODUCTION.

The potentialities of the State are very largely dependent upon developing the South-East from an agricultural point of view. The possibilities of increasing production are enormous, as can be realised when it is remembered that there are about 1,000,000 acres of excessively wet land to be drained. At the present time there are about 3,500 effective holdings in the whole of the South-East, which on the average figure for the State will support about 59,000 people, of whom 25,000 live in the South-East. When the district is reclaimed it should mean at least 12,000 effective holdings, which will support about 200,000 persons.

With the reclamation of the wet land of the South-East the most marked increase will, in all probability, be seen with sheep, the flocks of which will contain millions more than at present. Not only will the numbers be increased, but a much higher proportion of fat lambs will be produced than is now the case. Although dairying is an important agricultural activity it will become increasingly so, and because of the luxuriance of the pastures the raising of baby beef is likely to be undertaken on a fairly extensive scale. The increase in dairying and the ease with which heavy crops of barley are grown will lead to multiplying several times over the number of pigs now maintained.

These big improvements can only be brought about by the expenditure of a good deal of money, because the thorough drainage of a large area of land, and the provisions of better transport facilities, are involved.

In other districts of the State the most advancement will probably be with cereal crops, sheep and vines as the principal ones, although there is fair promise of the pig population being increased enormously, and dairying must make some marked progress. The provision of water will have noticeable beneficial effects in the cereal-growing districts, particularly as regards the production from sheep, and the further clearing of good land in the Adelaide Hills will lead to more dairying being practised.

As agricultural advancement is only possible by increasing rural products that can be exported, it is imperative that any forward move in production must be accompanied by an improvement in quality, so an important factor in our progress will be agricultural education of a nature tending to keep country people up to date in methods of production and alive to market requirements. With perishable products to be used for human food strict legislation is required to ensure the articles opening up in good order on the other side of the world after some weeks in cold store.

ACTIVITIES AT ROSEWORTHY AGRICULTURAL COLLEGE, 1933-34.

PART II.—CULTURAL OPERATIONS AND GENERAL HARVEST RETURNS.

[By ALLAN R. CALLAGHAN, D.Phil., B.Sc., (Oxon.); B.Sc.Agr. (Syd.), (Principal), and O. BOWDEN, R.D.A. (Farm Superintendent).]

The total harvest returns, together with the livestock carried for the year, have already been given, and they summate one of the most successful agricultural years in the College history, both as regards "total yields" and "yields per acre." They are the more commendable when it is considered that finishing conditions in October were sharp and severe, with hot drying winds which took a very heavy toll of the thickest crops and reduced yields considerably. It is admitted that seeding and establishment conditions were ideal and no better rainfall distribution could have been desired, consequently all the fallow crops, except one or two which suffered in competition with soursobs, were well and evenly established, maintained excellent colour and growth throughout the growing period, and gave promise of especially good yields, but the season finished severely, and early hopes were greatly modified by the dry hot winds in October.

THE SEASON AND ITS INFLUENCES.

Prior to the commencement of seeding in April all fallowed land was kept in good condition by frequent cultivations, which were made possible and necessary by useful falls during the summer. With an early start of 94 points of rain early in March, stubble land intended for peas, oats, and barley was broken up, the rigid tyne cultivator and skim plough being commissioned to do the work. This early start in the preparation for stubble crops was reflected later in the general health and vigour of the crops, for there can be no doubt that the longer the period of preparation for oats and barley especially, the more nitrogen there is available and the better the colour, growth, and vigour of the crop. The rains in March also caused a good germination of weeds on the fallows and a very valuable cultivation was carried out.

In April, although the rainfall of 1.29 inches was slightly below the average for this month, most of the rain fell during four consecutive days and was very useful. A heavy thunderstorm this month had a splendid consolidating influence on the fallows. Extensive germination of weeds and the vigorous appearance of soursob followed the April rains, thus enhancing the value of fallow cultivations prior to seeding. During the latter end of April and in May ideal conditions for seeding prevailed. Rainfall in May was high at 2.99 inches, and well above the mean of 1.99 inches, but the distribution of the falls was particularly favourable, as good dry conditions for seeding separated three substantial falls. Fine mild conditions prevailed in June which encouraged rapid growth of all the sown crops, and enabled the remainder of the seeding to be carried out without any serious interruptions, and under ideal conditions. Only 74 points were registered in June, the lowest recording since 1914, and considerably below the mean of 2.74 inches for this month, but there was ample soil moisture to encourage steady growth.

From the seasonal notes so far recorded it is evident that seeding conditions were very favourable, and had the rain and weather been ordered, a better and more convenient distribution of rain and fine mild weather could hardly have been

obtained. Following this excellent start, satisfactory rain fell to the extent of 1.84 inches in July and good growth was maintained. Satisfactory precipitations were recorded in both August and September, and all crops promised well. Up till this stage growth had been rather too rapid and crops were very sappy, with an inclination to produce more straw than desirable. Looking back on the season now, it is apparent that this condition of the crops largely aided and abetted the harsh weather of October in taking such serious toll of yields. The rainfall for October was almost an inch below the mean, the recording being 67 points in comparison with the mean for October of 1.66 inches. In addition to the low rainfall the month was hot, especially the last fortnight, when, as though abnormally high temperatures were not enough, particularly dry and trying winds blew from the North. The extreme suddenness of the appearance of summer conditions had a marked influence on the crops, and final yields were considerably below early expectations.

November came around and the harvest was soon in full swing, the season had snapped off, and crops were compelled to finish and fill as much grain as well as possible, under adverse conditions.

The total rainfall recorded for the year was 16.85 inches, which was 0.67 inches below the average, and for the period April to November, defined in these reports as "useful" rainfall, there was a deficiency of 1.55 inches in comparison with the average. As the shortage was during the finishing phases of crop growth during flowering, development of the grain and maturation of the grain, the fact that yields were so high indicates that record crops might well have been harvested with even more average conditions in October.

It is the practice to compute the rainfall for the period April-November inclusive, and call it "Useful Rain," and while this is probably fair and logical for the later districts of the State, the period April-October in many districts similar to that in which the College is situated fulfils the purpose better, for November rains as a rule are too late to be of any use to the crop. This was certainly so last year, as the harvest was well under way before the end of November. For this reason, in comparing the harvest results from wheat for last year with the only other two years in which the average yield for all farm areas was greater than that of last year, the seasonal rainfall as defined by the period April-October is used. Further, this computes the data along the lines generally accepted in such work. The year 1929 is also included in the table, to show that although the actual yields were low, they were high in proportion to the amount of rainfall received during the growing period. The bushel yield obtained per inch of seasonal rainfall last year was a record for the College.

Comparison of Average Yield of Wheat with Seasonal Rainfall for Previous Good Years.

Year.	Total Rainfall.	April-Oct. Rainfall.	Average Yield Per Acre.		Yield Per Inch of Seasonal Rainfall.	
			Bush.	lbs.	Bush.	lbs.
1909	24.05	19.07	25	5	1	19
1920	19.30	14.88	26	57	1	49
1929	13.08	8.24	15	11	1	51
1933	16.85	12.61	24	51	1	58

For the sake of general comparisons with other State data, the following general information on the relationship between rainfall and yields obtained is recorded, and here the "Useful" rainfall, April-November, is of necessity used. Situated in the Central district of the State, it will be seen that the College returns are very much above the average for the district in yields of all cereal grain.

*Yields at Roseworthy College Compared with Average District
Yields for the Year 1933.*

District.	April- November Rainfall.	Average Bushel Yield Per Acre.		
		Wheat.	Barley.	Oats.
Whole State	11.66	9.26	17.09	7.88
Central	14.62	13.85	17.66	13.44
Roseworthy College	12.90	24.85	21.00	29.87
Lower North	11.32	14.79	16.66	16.23
Upper North	8.05	6.61	10.00	11.64
South-Eastern	15.45	16.14	23.34	16.83
Western	11.71	6.21	11.82	5.88
Murray Mallee	8.47	5.42	7.58	5.20
Roseworthy College mean for 28 seasons	14.31	17.11	24.00	23.52

*Distribution of Rainfall at Roseworthy College for the Past Five Years
and for the Years 1909 and 1920.*

Year.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1909	0.75	0.28	1.17	1.91	2.89	1.84	3.80	4.56	1.52	2.55	2.08	0.70	24.05
1920	0.27	0.00	0.86	0.69	1.47	4.44	1.12	3.01	1.62	2.53	1.88	1.41	19.30
1929	0.29	0.36	0.17	0.42	0.93	1.54	1.07	1.62	1.90	0.76	1.49	2.51	13.06
1930	0.02	0.30	0.01	0.89	0.74	0.77	2.50	2.06	1.03	3.21	0.59	0.75	12.87
1931	0.60	0.10	1.01	1.05	2.80	1.70	2.51	1.86	2.25	0.83	0.47	0.00	15.18
1932	0.34	1.24	1.27	3.73	1.91	3.83	1.73	1.95	1.29	2.73	0.11	0.90	21.03
1933	0.99	0.01	0.94	1.29	2.99	0.74	1.84	2.84	2.24	0.67	0.29	2.01	16.85
Means for period 1904-1933	0.66	0.73	0.86	1.06	2.19	2.25	1.97	2.05	2.02	1.74	1.03	0.91	17.47

WHEAT.

Soil Preparation.—All wheat was sown on fallowed land, which had received careful and attentive preparation. The initial ploughing had been difficult because of the wet winter of 1932 and excessive growth of grass on the fields. Late Spring and early summer rains, however, apart from helping in the consolidation of underlayers, encouraged the germination of weeds and enabled two light workings of the fallows with spring tyne implements to be carried out during the summer subsequent to the harrowing down and first cultivation with the rigid tyne. The good rains in March and April of last year were of great help in the final preparation of fallows, and again light cultivations destroyed innumerable weeds and maintained good tilth. On the average the fallows, therefore, received five cultivations prior to a final cultivation before seeding. From this the operations concerned in the soil preparation may be summarised as follows as being representative of average fallow treatment for the year concerned:—

July, 1932—Ploughed to a depth of 3in.

August, 1932—Harrowed down.

September, 1932—Rigid tyne cultivation.

November-December, 1932—Some paddocks spring tyned, others harrowed.

January, 1933—All paddocks again lightly worked with either spring tyne implements or the harrows.

March, 1933—Some paddocks given cultivation with the rigid tynes, others covered with spring tyne implements.

April, 1933—Some paddocks given rigid tyne cultivation, others spring tyned. Seeding commenced on April 20th.

May, 1933—Final pre-seeding cultivations, seeding of paddocks.

June, 1933—Wheat seeding finished on June 10th.

The treatment outlined above undoubtedly called for a lot of work, and the number of times the fallows were covered is rather above the normal requirement, but the nature of the season was such as to make the treatments given quite necessary. Working of the paddocks was carried out soon after actual germination of the weeds and while the soil was in good moist workable condition. In this respect the season made fallow preparation easy and enabled all operations to be carried out under very favourable conditions for the preservation of good soil tilth.

The general result was that the fallows were in excellent heart for the reception of the seed. In one paddock a heavy sward of barley grass had been turned under when ploughed, and ploughing was rather later than normal. As the barley grass had been known to be diseased with Take-all, the precaution was taken to avoid the usual practice of sowing wheat. Consequently this fallow was sown to oats, contrary to usual farm practice. This paddock is marked "Graingers C," and shown in Map 1 (in June issue) to have been sown to oats on fallow in 1933, and as it is unusual procedure, the above explanation is given. Further, it indicates a useful point in management following the observation of Take-all on the barley grass, for the oat crop is rarely affected with Take-all, whereas wheat on this area may have suffered severely, besides carrying the fungus on over another season.

Seeding.—Wheat seeding began on the 22nd April and was completed on June 10th. Throughout, 1½ cwt. of Superphosphate were drilled with the seed. The College system of rotation whereby a paddock is rested as ley land once every three or four years warrants substantial dressings of superphosphate on the crop. The stubble feed the following year is always vigorous, trading as it does on the residual effect of the extra superphosphate added to the crop the previous year. Any farmer who is largely dependent upon stubble fields for livestock feed would be well advised not to spare the application of superphosphate on crop land intended to be rested the following year.

The rate of sowing, through the earlier portion of seeding, was 70 lbs., but for midseason sowing the rate was increased to 75 lbs., while the late seeding of early maturing varieties like King's White and Canberra was still further increased to 80 lbs. These seeding rates are high, but in the agricultural areas of the Central and Lower North districts, unless the fields are known to be free from weeds, competition is liable to be keen on lightly seeded areas. If it were not for the possibility of serious competition, lighter seeding may be possible and give better filled crops, but experiments carried out at College indicate that in most seasons the seeding of 70 lbs. per acre is the most profitable.

Following 70 points of rain in mid-April, the sowing of the field, "Crouchs C," with the variety Ford was begun. The greater portion of this field was known to be badly infested with soursobs, and as some other large fallow paddocks were also monopolised by this weed, it was realised early that sowing of all soursob areas could not be delayed pending the control of the weed. Consequently an effort was made to do the best under the circumstances, the paddock considered to be most badly infested, "Days C," was listed late on the seeding list, to be seeded after the soursobs had been checked by the cultivation, to an early maturing variety, but "Crouchs C" was sown early as soon as sufficient soil moisture was available to assure immediate and regular germination. For this paddock Ford was chosen as a reasonably long seasoned variety, possessing good vigorous growth habits. Germination was very rapid and satisfactory, the wheat grew rapidly, and at the outset gained a lead on the soursobs. This ascendancy was maintained throughout, and in spite of the blanket of soursobs which formed a dense undergrowth on the field, the wheat competed so successfully that the

soursobs, except for a few stray individuals, never flowered, and the wheat crop came through triumphantly with a yield of 26bush. per acre off 56 acres and nearly 3 tons of hay over the remainder.

It is interesting at this stage to compare the treatments and results from two other fields where soursobs were prevalent. "Days C" was sown late, finishing on June 10th, to Waratah. Additional to the treatment given to "Crouchs C" this field was cultivated, spring-tynd, and again cultivated, with the gratifying result that the soursobs were absolutely subdued, and after the wheat had braided, only a few weak soursobs were evident in the field, and their effect upon the resultant crop was negligible. From this field a yield of 26½bush. per acre was harvested off about 80 acres. Another paddock, "Dalys C," received intermediate treatment to those already cited, and was sown mid-season. This paddock was worked in April, at the same time as "Crouchs C" was being sown, but was subsequently cultivated and spring-tynd just prior to seeding on May 17th, to Ford wheat. Here both soursobs and wheat came away simultaneously, and with weather conditions more conducive to soursob growth than to wheat growth, the balance of competition was for some time largely in favour of the soursobs. The crop was thinned out considerably, the yield as a result was considerably lower, at 20½bush. per acre, than those obtained as a result of the paddock treatments previously described. One interesting feature worth noting here in connection with "Dalys C," is that at one stage in July the crop appeared to be beaten by the soursobs, and realising little harm could be done, the area was rib-rolled, and followed by the harrows. The tender soursobs were crushed considerably, yet the wheat suffered no ill-effects, and with opportune frosts following immediately, the soursobs yellowed slightly, lost their ascendancy momentarily, and the wheat plants were given a very needful advantage, with the result that they maintained competition on much more favourable terms than previously.

Without generalising unduly, it seems that to control soursobs early sowing of a vigorous variety, or the late sowing of an early maturing variety, after repeated cultivations, are far more preferable treatments to mid-season seeding. This latter is dangerous, and the most efficacious is undoubtedly to sow late after repeated cultivations, whenever this is possible.

Harvest.—Binders were rushed into commission at the end of October following the sudden appearance of hot dry weather, and by the close of the month, headlands, divisions, and portions of several fields, amounting to about 100 acres, had been cut, representing about 200 tons of hay.

The weather in November was dry and very satisfactory from the point of view of harvest; only 29 points of rain were recorded. Hay-cutting proceeded uninterruptedly, and by the end of November over 300 tons had been carted and stacked. On the 20th November the first wheat was harvested, and by the end of the month both "Crouchs C" and "Dalys A" were completed and the paddocks cleared for stock. Additional to hay and general harvest, some experimental areas were cut with the binder to be threshed for grain with the large threshing machine; this involved a good deal of extra labour. From the threshing a stack of approximately 100 tons of splendid baled straw was obtained. Hay-carting was completed just prior to Christmas concurrently with other harvest operations. Considering the quantity of produce handled the performance reflected great credit on the students, all of whom displayed great enthusiasm and willingness.

The yields obtained from the various fields and individual varieties are given in the following tables. The tables are kept apart so as to distinguish between those sown to large areas from those of small acreage, otherwise they would

be of less value. In fact, it is wrong to assess comparative varietal values from these tables at all, as so many other factors enter into the matter, such as differences in soil, soil preparation, and time of sowing, but they do serve some service in that they indicate the general suitability or otherwise of the particular variety for the district.

Wheat Yields from Farm Areas.

(a) Varieties of which at least 10 Acres were Harvested for Grain.

Variety.	Field.	Area in Acres.	Yield Per Acre.	
			Bush.	lbs.
Sword	Dalys A	43	26	35
Waratah	Days C	80	26	29
Ford	Crouchs C.	56	26	0
Nabawa	Nottles A.	50	25	53
Sultan	Ebsarys	13	23	18
Late Gluyas	No. 3A.	21	21	26
Ford	Dalys C.	40	20	47
Free Gallipoli	Graingers A2	27	15	46

(b) Varieties of which less than 10 Acres were Harvested for Grain.

Ranee 4H.	No. 9	3 $\frac{1}{4}$	35	25
Ranee 4H.	No. 4A.	$\frac{1}{4}$	32	33
Baringa	No. 9	$\frac{1}{4}$	31	47
Dundee	No. 9	$\frac{1}{2}$	27	23
Dan	No. 3A.	$\frac{1}{2}$	27	18
King's White	Ebsarys	5	20	33
Canberra	Ebsarys	3 $\frac{1}{2}$	17	20
Felix	Ebsarys	3	14	44

The varieties sown to large areas are all fairly well known, but some sown to smaller areas are comparatively new. Two separate results given for Ranee 4H indicate that this variety might have a big future under our conditions. The good quality wheat Dundee, from New South Wales, acquitted itself very well. Baringa also gave good returns. This latter is a wheat unlikely to become very popular because of difficulty in stripping; it holds its grain tenaciously except under ideal harvesting conditions. Dundee is a bold-headed variety with distinct possibilities, especially as its grain quality is superior to any varieties now grown to any extent in South Australia.

Until these varieties are given a proper comparative trial with such consistent varieties as Sword and Ford, it would be both unfair and misleading to accept the yields stated as truly indicative of their capacity. Certainly Ranee 4H and Dundee are worth close watching; both will be in the variety trials this year. Of the better known varieties, Sword and Ford undoubtedly suit the lighter soils of the Central and Lower North. They both enhanced their reputations last season, chiefly through their capacity to fill well in spite of bad finishing conditions. The Nabawa in a similar state of maturity to Sword and Ford, when adverse weather set in, suffered far more severely, yielding less and a much less-plump sample of grain. Waratah finished very well, but it was just late enough at heading, because of late seeding, to miss the critical October weather, and it had the benefit of milder less-dry conditions for finishing. There is no doubt, however, that Waratah is a useful variety for late seeding. Of the others, Free Gallipoli was most disappointing, and under low rainfall and shorter seasonal conditions it does not fulfil the promise its early growth gives. Given cooler and moister spring conditions, it yields well, but the environment at College certainly does not suit it. This year only a pure seed area of Free Gallipoli is to be sown.

Wheat Diseases.—The crops were remarkable for their freedom from disease, no serious toll being taken of any of the crops. The season was such that a rust epidemic would have been impossible, as no more unsuitable circumstances could have been possible. Curiously enough, the erstwhile innocuous leaf blight (*Septoria*) was perhaps the worst disease of the year; it was particularly severe on Free Gallipoli, and probably was instrumental in reducing the yield of this variety. Flag smut was not much in evidence, though in one paddock of Ford there was a slight sprinkling of infected plants. Loose smut was noted to a slight extent in Sultan and King's White. As far as is known Take-all and Bunt were entirely absent.

HAY HARVEST.

A total of 140 acres of cereals was harvested for hay; this was made up from 106 acres of wheat and 34 acres of oats. The average yield per acre obtained from the sown areas was 2 tons 4cwts. 19lbs., which is 5cwts. 23lbs. above the mean yield. This average return is high when it is considered that a large quantity of the hay was taken from headlands and divisions. About 40 acres of self-sown material, chiefly Burr medic and cereal, were harvested in "Days A" and "B," a stack of approximately 50 tons of good quality meadow hay being obtained, at an estimated yield of 1 ton 5cwts. per acre.

The cereal hay was of fairly good quality and retained its colour well, but all crops were rather light for the bulk harvested. Some very satisfactory yields were obtained in spite of this, and that of 2 tons 18cwts. from 30 acres of Ford was the most outstanding. Even in this case the crop was bulky enough to give a higher yield had normal weight been present. The rapidity of growth throughout the growing period and general sappiness of the crops when the dry hot weather of October literally scorched them, probably accounts very largely for the comparative lightness of the sheaves.

Hay Yields, 1933.

(a) Wheaten Hay.

Variety.	Field.	Area in Acres.	Yield Per Acre.		
			T.	C.	Q.
Ford	Crouchs C.	26	2	18	18
Miscellaneous	Ebsarys	32	2	11	47
Sword	Dalys A.	8	2	11	17
Sirdar	No. 1.	3	2	11	13
Late Gluyas	No. 3A.	3	2	8	32
Dan	Nottles A.	7	2	0	63
Nabawa					
Waratah					
Ford	Dalys C.	8	1	15	50
Free Gallipoli	Graingers A2	7	1	7	102

(b) Oaten Hay.

Miscellaneous	Graingers C.	31	2	1	76
Early Kherson	No. 15	3	1	3	14

(c) Self Sown Hay.

Self Sown Cereal and Burr Medic	Days A. and B.	40	1	5	0
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Stubble Crops.—Except for one paddock, all oats, barley, and pease were sown to stubble fields, the exception, as already mentioned, being a fallowed area where barley grass affected with Take-all had flourished prior to initial ploughing; this was sown to oats. In all cases the early opening rains enabled the skim plough and cultivators to do good work much earlier than usual, and there

can be no doubt that it pays to begin the working of stubble fields early for the best results. The opening up of the soil, together with the destruction of grass and weeds, enables active nitrification to proceed in the soil while the warmth of Autumn is still available. The initial breaking up of the soil, be it done with plough, skim plough, or cultivator, must be shallow for stubble crops, and nowhere were the paddocks worked to a greater depth than 2in.

Oats.—All oats were sown as early as possible, with the idea of checking excessive growth by feeding off during the winter. This practice is very sound on clean land, and in districts where early working of stubble land is possible, for oats stand feeding off better than any other cereal, as they have greater recovery power. Once they are well rooted practically all varieties of oats can be grazed extensively and still give crop returns where the season is long enough. In the case of the College paddocks last year, No. 15 was sown in April to Early Kherson, and all oat seedings were finished early in May. All varieties were sown at the rate of 50lbs. per acre with 1cwt. of Superphosphate per acre. After a quick establishment they made excellent early growth, and were fed off to the ground during June, after which they were rolled and allowed to grow unchecked for the remainder of the season.

Under the above treatment it is not surprising that the crop in "Grainger's", sown on fallow, eventually proved far superior to that in No. 15. Taking into account the heavy grazings given, and the bad finishing weather, the average yield of 29bush. 35lbs. from 83 acres, including experimental areas, was satisfactory, exceeding the mean yield for the past 28 seasons by 6bush. 14lbs., and being very much above district and State averages as shown in an earlier table.

The following are the results from farm areas:—

Oat Yields from Farm Areas.

Variety.	Field.	Area in Acres.	Yield Per Acre.	
			Bush.	lbs.
Early Kherson	Graingers C.	6	50	36
Algerian	Graingers C.	4	49	33
Sunrise	Graingers C.	7	41	38
New Zealand Cape	Graingers C.	5	32	3
Guyra	Graingers C.	1	24	29
Early Burt	Graingers C.	1	24	25
Early Kherson	No. 15	29	17	22
Lachlan	Graingers C.	3	15	21

The results from Early Kherson and Algerian in comparison with other varieties grown in the same field bear out the opinions held with regard to the general usefulness of these two varieties. Of the early maturing varieties at present in cultivation no oat gives such satisfactory yields of either grain or hay, following winter grazing, as does Early Kherson. It is of vigorous, free-stooling habit, producing an abundance of early feed, yet after grazing, recovers wonderfully well and proceeds to grow as though it had not been checked. For this reason Early Kherson can be recommended as an oat capable of giving an abundance of green feed and standing plenty of grazing. Algerian also has wonderful powers of recovery, but, being a late maturing variety, it has not the early vigour of Early Kherson, consequently it does not produce the same bulk of early feed. For this reason it is not so valuable as a grazing oat. Under the same field conditions it is interesting to note the very poor yield from Lachlan, but this variety has not the same recovery powers possessed by the other oats

represented; a certain recovery after grazing does take place, but the plants never seem to recover the full vigour necessary to produce sufficient panicles of well-filled grain in comparison with a variety like Early Kherson.

Reverting again to Early Kherson, a word on its grain characters should not be out of place. The grain is very small, and many farmers are prejudiced against small-grained oats. This may or may not be a real objection. Certainly Early Kherson is a fairly thin-hulled oat and is therefore of good feeding value, although its size may lead one to suppose that it has not the feeding value of plump oats such as Lachlan or Guyra. Farmers growing Early Kherson for the first time might well bear this in mind, and not let their early prejudice condemn a perfectly good oat variety because it has small grain.

Barley.—The season was not a particularly favourable one for barley culture. Mild moist conditions during the winter and early spring encouraged rather too luxuriant growth. The presence of barley mildew, which was quite bad in places, was indicative of the heavy, dense sappy nature of the crops. All barley progressed well until heading time, and gave excellent promise; indeed, areas of barley cut for ensilage gave phenomenal returns of especially sappy green fodder. Unfortunately, the October weather, which has entered very largely already into the story of this report, had a most exacting influence, and the barley was so severely checked by the abnormal weather that it never really recovered to any great extent. Plants which were heading at the time were so badly affected that they set no grain, and on examination of many plants the flag was quite brittle, breaking into chaff on pressure, yet the normal green foliage colour was retained. The general result was that all barley harvested was badly pinched, and yields were very low and disappointing in comparison with the stands and denseness of crops.

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The farm area under barley was small, the greatest area being included in experiments. In the experimental plots the results of which will be itemised in another report, some of the barley, especially that with heavy dressings of Sulphate of Ammonia, was exceedingly poor. These experimental plots enter into the general average yield, given in the first of these reports as 21bush. 42lbs. from 38 acres; this figure is below the mean yield for barley over the last 28 seasons at College, by 2bush. 34lbs., yet it is substantially above average district yields and average State yield for the year as shown in an earlier table. The rate of seeding for all barley sown on the farm was 1½bush. per acre with lewt. of Superphosphate.

The following shows the yields from the main farm areas. The table includes only about one-third of the area devoted to barley, from which the average is assessed, the remainder being experimental.

Barley Yields from Farm Areas.

Variety.	Field.	Area in Acres.	Yield Per Acre.	
			Bush.	lbs.
Prior	No. 5A.	6½	26	21
Tunisian.....	Plot L.	¾	25	26
Roseworthy Oregon ...	No. 5A.	1½	25	32
Californian.....	Plot E.F.	1½	22	9
Shorthed	No. 5A.	1	20	20

Of the varieties Tunisian is quite new, being imported from Northern Africa. It is a vigorous-growing variety of the feed type and should be useful as a grazing barley, or for ensilage, or as grain for feeding purposes. The grain is too bluish, harsh, and hard to be of value as a malting sample, or, at least, such were the indications on the sample harvested last season. Californian is also comparatively new, but as the grain was badly pinched as a result of the adverse seasonal conditions, it was useless for malting, consequently it is impossible to express any opinions in this connection. It is a vigorous barley, however, and may be quite useful as a general purpose variety on the farm.

Pease.—This crop was not grown to any extent at the College last year, partly because of the shortage of seed, and partly because the general rotational policy of the paddocks had not been finally laid down. Their value in a rotation is not as widely appreciated as might be, especially as very payable returns can be obtained either direct or for feeding on the field or farm. Probably the chief limiting factors to their more general acceptance has been the ravages of grubs in the past, coupled with the fact that late maturing varieties were chiefly used. The more general use of the early maturing White Brunswick variety has led to far more satisfactory results. Certainly the grubs have not been as troublesome in the last few years as formerly. Apart altogether from direct returns, the fact that pease are grown to maturity on the land, and the haulms fed off to stock, has a very appreciable influence for good on the soil, increasing both supplies of nitrogen and organic matter. All pease were sown on stubble land after normal preparation at the rate of 2bush. per acre with 1½cwt. of superphosphate, with the combine.

The small area of 38 acres sown to pease at the College last year gave an average yield of 15bush. 50lbs., which included 16 acres of experimental pease. From the 22 acres sown under normal conditions, however, a yield of 20bush. 53lbs. was

recorded. This year a larger area of pease has been sown, and they will be used in the rotation more extensively in future.

Ensilage (Cropped).—Approximately 70 acres of stubble land, including about 40 acres of an old experimental field hitherto known as the Fence Plots (now discontinued) were prepared with the skim plough and sown early in April to oats (Early Burt) and barley (Roseworthy Oregon) for ensilage. These made extraordinary growth, benefiting from the late Autumn and early Winter rains while growing conditions were ideal. For any other purpose than for ensilage the crop would have been far too rank and tall to finish; as it was, some lodging took place before the binders were put in about mid-September. The fodder was in wonderfully succulent condition for ensilage and that maximum bulk was obtained is borne out by the yields. Both oats and barley were harvested together and ensiled load for load; the main yields were not kept separate, but from the field an average return of 7 tons per acre of green fodder for ensiling was harvested, and from two strips of barley the astounding return of 9½ tons per acre was recorded.

Of the sown cereal harvested for ensilage, 270 tons were chaffed into the overhead silos, and the remainder was stacked in two stacks in the field: one a pole-guided stack, the other an ordinary round stack. The total of sheaved fodder harvested for this purpose was 490 tons, which, together with 240 tons of self-sown fodder ensiled as stack ensilage, brings a total of 730 tons for the year, which easily constitutes a record for the College. Reference to the advisability of taking full advantage of years of plenty has already been referred to in the opening comments to these reports, while full details of the ensilage-making at the College last year are in course of preparation and will receive separate notice later on.

Ensilage (Self-sown).—As already stated, 240 tons of self-sown fodder were stacked during the year. All of this was taken from the field "Days A and B," which in the previous year had been cropped to wheat. With the opening rains in April this paddock was closed to all livestock. A veritable carpet of Burr medic (*Medicago denticulata*) quickly established itself, together with a moderate sprinkling of self-sown cereal and some barley grass. This growth traded on the wonderful growth conditions which prevailed during the Winter, and there can be little doubt that the ultimate luxuriance of the fodder present was due to this, but made possible from the residual effects of superphosphate. The practice of using liberal dressing of superphosphate with wheat that is sown to fields intended to rest the following year as ley or pasture land is undoubtedly sound, and returns in livestock carrying capacity will in normal seasons undoubtedly cover the cost of any extra superphosphate used on the crop, even though direct returns to warrant its use may not be obtained from the crop itself.

By the end of August the field was knee-deep in fodder, and it was decided to cut as much of it as possible for ensilage. A start was made the first week in September, using a mower to which was attached a number of iron rods which delivered the sward in a roll. The fodder was collected from these self-rolled wind rows with sweep-rakes and drawn to the site of the stack. It was then tipped from the rakes, and hauled on to the stack with a grab stacker. This method of handling the loose fodder greatly minimised the work and was economical of labour, time, and energy. Two round stacks, one of 130 tons, the other 110 tons, were built in this fashion from an area of approximately 80 acres. The remainder of the fodder in the field was converted into meadow hay or fed off.

This field attracted great attention throughout the year, and it stands as a striking example of what can be done by the liberal use of Superphosphate.

THE BAKING QUALITY OF AUSTRALIAN WHEATS.

No. 3.—BREEDING WHEATS OF BETTER BAKING QUALITY.

[By E. J. BREAKWELL, B.Sc.Agr. (Syd.), Plant Breeder, Agricultural College, Roseworthy.]

[The urgent need in Australia for wheats of better baking quality has been stressed and the work in cereal chemistry being conducted at the College described in articles published in the last two Journals of the Department of Agriculture. It now remains to outline the applicability of the latter in assisting to attain the former objective and to describe the possibilities of hybridization and selection as means of improving the quality standards of Australian wheats.]

Until recent years, to those pioneer plant breeders who realised the necessity of breeding wheats of good baking quality, the task of selecting with that objective was enormous. Apart from the primitive biting test, there was no simple method by which baking quality could be determined. It was necessary to continue all promising lines until sufficient grain for a baking test was available. Such procedure was both laborious and wasteful, the facilities made the possibilities of success remote, and it is not surprising that opinions expressed the improbability of combining baking quality with yielding ability in varieties bred for Australian conditions. The obvious defect in the earlier methods was the paucity of the number of crossbred lines. Since a large amount of grain is required for a baking test, it was possible to handle only a relatively very limited crossbred population. In addition, it was impracticable to test any large number of lines by baking and therefore the chances of isolating a strain possessing the desirable combination of yield and quality were extremely remote. There is no doubt that this association is not common, but the production of high yielding wheats possessing good quality at least is not impossible; this is shown by such wheats as Dundee, Ford, Canimbla and others.

The plant breeder has been awaiting a test by which he might select for quality in the early generations. Such a test must be both rapid and easy in operation, yet it is not imperative that it should reveal the detailed characteristics of samples from the point of view of quality. It is sufficient for the purpose if it distinguishes accurately between wheats of good, bad and indifferent baking quality. Such, it is claimed, is done by the Pelshenke Test, and by using this test, the plant-breeder is able to classify a large number of early generation crossbred lines into the different groups for quality; such classification would be impossible without it.

HYBRIDIZATION.

The chief method at the disposal of the plant-breeder in breeding wheats for high quality has been that of hybridization. A cross is made between two varieties—usually one possessing high quality and the other of indifferent quality but with good yielding ability. Selection is commenced in the second generation or F₂, and broadly, the aim of the plant-breeder is to isolate a particular type combining the high yielding ability of the one parent and the quality of the other.

Flintiness of the grain and the biting test have, in the past, been the only guides to quality, and these are unsatisfactory; in fact, they may be misleading, engendering false hope. Under such circumstances it was not until the fourth or fifth generation, when sufficient grain became available, that the strain could be tested by means of the baking test.

With the advent of the Pelshenke test, the method can be modified considerably. The scheme to be pursued at the College in the future is one of "bulk" handling—the term "bulk" being used for want of a better. A large number of crosses have been made, and from these, in the second generation, single plant selections will be harvested in the usual manner, though more plants than is customary will be selected.

In the third year three rows will be sown with the grain from each plant and before harvest a number of single plant selections taken from each F₃ line. Part of each line will be cut in bulk and the grain tested for quality by the Pelshenke test. If the figure obtained for a particular strain is satisfactory, then the plants with good grain character selected from that line will be retained and all others rejected. Likewise all single plants selected from lines of inferior quality will be rejected. The chances are that a single plant selection taken from a high quality line will be of good quality itself. To make sure of this, the fourth generation will be treated in exactly the same way, so that in the fifth year, from the large number of selections in the F₂, only those lines possessing satisfactory quality will be retained, and in most cases the factors governing quality should be approaching stability, thereby exhibiting a minimum of variability; in other words, they should be almost fixed for quality. If it is considered necessary, further tests may be used at this stage to verify the quality of the lines.

Yield testing on a small scale will be carried out from the fourth generation onwards, and by the frequent use of checks in the breeding plots, an indication at least of the potential yield of the different lines will be obtained and all those palpably inferior to the standard varieties rejected.

The method can only be successful when large number of lines are handled, otherwise that rare combination of quality and yield would probably escape detection as it has very likely done in the past, when less accurate methods of isolating good quality types were all that were available.

TESTING CROSSBREDS FOR QUALITY.

For the preliminary examination for quality the Pelshenke test is the only one yet devised which is suitable, being rapid and economical in time and material. Between harvest and sowing it is possible to test as many lines as the plant-breeder is able to handle in his plots.

At the College this year, with the aid of student labour, as many as 60 lines were tested in duplicate by the Pelshenke method in a day. Instead of a thermostat, a large tub is used containing a perforated tray which will hold about 50 beakers. The tub is filled with water to about 2 in. above the tray and heated with bunsen burners. Testing is done in the summer months, and by virtue of the large body of water the temperature can be kept very even, and no difficulty was encountered in obtaining a constant test figure for the check samples. The actual technique employed has been described in a previous article and it would be mere repetition to give a further description here.

A few figures are tabulated on next page to illustrate the range in quality which might be expected in a crossbred population. These have been obtained from material already in advanced generations, but which has not been previously selected for quality.

Ford x Carrabin. Fifth Generation.

Line.	Test Figure.	Grain Sample.
1	85	Excellent ; hard, plump, flinty.
2	107	Good ; plump, large, hard.
3	52	Very good but softer.
4	53	Poor ; rejected.
5	45	Soft ; rejected.
6	54	Plump but not hard.
7	51	Poor ; rejected.
8	46	Resembles Ford ; softer ; rejected.
9	57	Plump but not hard.

The test figures for Ford and Carrabin are 65 and 120 respectively.

Nabawa x Canberra. Fourth Generation.

Line.	Test Figure.	Grain Sample.
1	52	Hard but shrivelled ; rather poor ; rejected.
2	60	Good, hard, fairly plump.
3	73	Large, hard, slightly shrivelled.
4	77	Very good, large, hard, rather narrow.
5	52	Very fair, softer.
6	43	Shrivelled ; rejected.

The test figures for Nabawa and Canberra are 45 and 55 respectively.

From a scrutiny of the results it appears quite reasonable to anticipate the evolution of crossbred lines which are either higher or lower than the limits defined by either parent. This is probably due to complementary factors possessed by the parents—a combination of these factors which did not find expression in the parents, results in a line the quality of which may be higher or lower than that of the "high" or "low" parent.

It will be seen from these two examples that there is some association between the hardness of the grain sample and the test figure, but on this year's observations at least, this association was too often absent to be of much practical importance in gauging quality. For example, Line 2 in the cross Nabawa x Canberra appeared harder than Line 1 in the cross Ford x Carrabin, yet the latter obviously has the better quality. This bears out the experience of others.

THE POSSIBILITY OF SELECTING FOR QUALITY WITHIN A VARIETY.

Within the last few years there have been many complaints from leading farmers in South Australia that the supposedly "pure" varieties are showing variation.

Varieties such as Ford, Sword and Nabawa have been criticized from this standpoint. Sword is said to contain at least three types—the purple-strawed, the pinched-grained and the plump or true Sword. Ford has shown a marked range in glume colour, awn length and disease reaction. Plants within a "pure-seed" crop of Nabawa have been noted to vary in height and maturity. Under South Australian conditions at least, it would appear that these and other varieties are not entirely without variation; indeed, they give the impression that they are not fixed in the usual sense of the word or were not truly fixed before they were released for general cultivation.

Morphological variations, such as occur in Sword and Ford, are obvious to the naked eye, and a feature of the pure seed work to be conducted at Roseworthy College will be the selection of the more desirable types from the variable varieties

in an endeavour to fix a superior strain. The purple-strawed type, which often breaks off at the head, and the pinch-grained type, obviously, have a deleterious effect upon a crop of commercial Sword. An effort will be made to fix the true type of Sword. The same applies to Ford, Nabawa, Bencubbin and others.

The conception of a variety as an agricultural unit is such that variability might be expected from even visible characters but not to the extent noticed in crops of Ford, Sword and Nabawa. In fact, the interpretation of a variety, as it is commonly known, is involved, and the following quotation taken from an article written by Dr. A. R. Callaghan for August, 1932, puts the matter in succinct form:—"Technically speaking, a variety should be a pure line, but from a practical viewpoint, provided the plants representing a variety are sufficiently homogeneous to constitute a group which has inherent morphological and physiological characters which make it distinct from any other such group, minor inherent differences between the plants within the variety are permissible." Morphological characters such as colour of glumes, grain character and height obviously vary in some of our South Australian varieties, and this being so, it is highly probable that physiological characters such as capacity for yield and disease resistance and those morphological characters of a qualitative nature, such as baking quality, must also vary. In other words, if variation exists in characters which are visible to the naked eye, it is logical to suppose that it is also present in those which are not so easily discerned; for example, in baking quality.

To determine the extent of this variation, quality studies were made recently at the College on several well-known varieties.

MATERIAL.

It was realised that the selection of suitable varieties upon which to work would be an important factor in the ultimate results.

Sword, Ford, and Nabawa automatically suggest themselves as they show so much variation in other characters and are all extensively grown in the State. On the other hand, as contrasting varieties Gullen, Dundee and Baringa, all promising introductions from New South Wales, were chosen because they appear to be fixed in visible morphological characters, while Florence was taken as representing the older South Australian varieties.

Fifty consecutive single plants of Sword and Ford, a slightly greater number of Nabawa, and 12 consecutive plants of the other varieties, were harvested from the pure seed rows. A large population of Ford was also harvested, but this will be discussed under a separate heading. Plants were threshed in the single plant thresher and the Pelshenke Test was used to assess the baking quality of each single plant. Wherever possible tests were made in duplicate.

RESULTS.

The figures obtained in the tests need hardly be given in detail, but the summarised results are as follows:—

Baringa.—Range of 30 to 39 minutes; mean 35.

Gullen.—Range of 28 to 44 minutes; mean 37.

Both varieties show a limited range in the test figures of the single plants, which is typical of a pure line.

Dundee.—Range of 120 to 190 minutes; mean 165.

Florence.—Range of 55 to 129 minutes; mean 74.

Both Dundee and Florence exhibit considerable variation in the quality of the single plants. The range of Dundee may be insignificant, or, at least, less significant, as the selectivity of the test diminishes as the test figure becomes higher. The figures from Dundee are exceptionally high, probably due to the fact that the twelve plants of this variety were grown in the nursery plots—circumstances of growth which are known to enhance the quality of any variety.

Florence varies significantly, and one sample took 30 minutes longer than any other to break. Incidentally, this sample possessed all the characters of a strong wheat such as high passing power and stronger gluten as determined by the greater expansion of the ball and the longer time taken for disintegration. The variation occurring in this variety cannot be accounted for by experimental error or normal pure line variation.

Nabawa.—Fifty-five single plants of this variety were tested, and of these 53 ranged between 28 and 66 minutes, which might be expected of Nabawa, which has a test figure of 40. The other two samples gave test figures of 90 and 132 minutes (the latter being tested in duplicate), and in doing so exhibited all the characters of a strong wheat.

Sword.—Fifty single plants ranged from 32 to 72 minutes, with a mean of 46 minutes. The distribution was fairly even, though there was a marked tendency for the plants of low quality to predominate. Samples with a test figure of more than 50 minutes generally exhibited all the characters of a wheat of medium strength. It is unlikely that a variation of this magnitude would be shown by a pure line. The variation in the baking quality of single plants of *Sword* appears to be even greater than that exhibited by visible morphological characters, some of which are known to be very variable. It is also interesting to note that the lowest and highest figures for the single plants in this variety, viz., 32 and 72, are similar to the test figures given by the parents of *Sword*, namely, *Sultan* and *Ford* respectively.

Ford.—Fifty plants taken from a pure seed row ranged from 42 to 80 minutes, with a mean of 60. The distribution was remarkably even.

The Possibility of Selection.—The figures obtained lead one to consider the possibility of isolating the highest quality plants with the object of building them up into superior strains. A strain of *Sword* which gave a *Pelshenke* figure of 72 would be vastly different from one with a figure of only 32. If this high quality strain proved to be similar to *Sword* in all other characters and retained its high quality, it would be a first class wheat, not only from the growers' point of view, in which the criterion of value is the capacity for yield, but also from the point of view of the millers, from whom the variety has so far not attracted special notice.

The ultimate success of such an endeavour to isolate strains with superior quality and have them accepted by the farmer would depend upon two things:—

1. Whether the strain would be equal to the commercial variety in yielding ability.
2. Whether the high quality plant would breed true to type.

It has been admitted previously in this paper that high quality is not generally associated with high yield, but one is hopeful that some of the high quality plants of *Nabawa*, *Sword* and *Ford* will give rise to strains which will be equal in yield to the commercial strains. Moreover, with this method of selection for quality within a high yielding variety, it would appear that there is less danger of losing those characters determining yield than there is in selecting within a crossbred population the high quality parent of which is generally low yielding.

Even the elimination of the low quality strains should materially enhance the quality of the variety and should have very little effect upon yield. This method will be resorted to in the event of the high quality strains lacking yielding ability.

The question whether the high quality plants will breed true to type is probably of more importance. It has often been shown that a pure line, i.e., one which is true to type, cannot be altered by selection. Many minor variations which may be seen are known as fluctuating variations. An example is found in a study of the ear size in a crop. Large ears, intermediate-sized ears and small ears are common to every crop. The continuous selection of the large ears from a fixed variety from one generation to another will not produce a variety which will yield

all large ears, nor is it possible to raise the average size of the ears of a pure variety. Thus it may be argued that the plants which show high quality this year would next year produce progeny which tended towards the average quality of the variety. This would be true if the varieties under discussion were pure lines, but work done at the College has given evidence that Ford at least is rather a mixture of pure lines.

INVESTIGATIONS WITH A POPULATION OF FORD.

In 1932, single head selections were taken from a commercial crop of Ford. The seed from these heads was sown in adjoining rows in the hand plots in 1933. Each seed was space planted. The resultant lines, 41 in number, showed great variation in maturity, height, head characters, &c. Ten consecutive single plants were harvested from each line. All single plants of which there was sufficient grain were tested by the Pelshenke test. In all, 350 single plants from the 41 lines were tested.

Some representative results are given:—

Strain 1.	Plant No.	Time.	Strain 2.	Plant No.	Time.
	9	96		8	44
	4	98		5	49
	8	103		7	50
	6	104		4	50
	1	115		9	56
	5	117		2	58
	3	119		1	60
				3	63
				6	63
Mean 107			Mean 55		
Variation 12 11%			Variation 11 20%		
Strain 10.	Plant No.	Time.	Strain 21.	Plant No.	Time.
	8	34		10	98
	6	59		7	100
	5	62		8	100
	9	63		6	112
	10	63		5	116
	2	64		9	136
	1	66		4	140
	4	66		1	145
	7	67		2	151
	3	72			
Mean 62			Mean 122		
Variation 28 45%			Variation 20 24%		
Strain 31.	Plant No.	Time.	Strain 30.	Plant No.	Time.
	8	55		6	63
	7	56		4	65
	1	57		5	68
	4	57		3	69
	5	58		7	71
	10	59		8	71
	9	60		2	75
	2	60		1	77
	3	60		9	79
	6	63		10	80
Mean 58			Mean 72		
Variation 5 9%			Variation 9 15%		

Discussion of Results.—A study of the strains of Ford tested shows that the variety is a mixture as regards quality and the outlook for isolating a high quality line is at least encouraging. It must be remembered that each strain

arises from a single head, selected at random from a normal crop of Ford, and the strains were grown in close proximity to each other and received exactly the same treatment.

Some strains show a considerable range in the quality of the single plants therein. The greatest range is 45 per cent. from the mean, or 34 to 72 minutes. However, 31 out of the 41 strains tested exhibit a range of 20 per cent. or less from the mean, and hence can be regarded as pure lines from the viewpoint of quality at least. The mean figure of the strains is very variable, ranging from 55 to 122 minutes. There are just as many high as low quality strains, which indicates that there is a large population of high quality plants from which to select. If the single heads had been obtained from a pure line in the original selection, the mean figure for the strains could not have been nearly so variable.

It appears reasonable to expect that if all the single plants were sown this year, they would produce strains showing the same variability as their parent strains did last year, after allowing, of course, due consideration for any seasonal variation. For example, Strain 3 varies between 97 and 114 minutes and appears to be fixed; so that any plant selected from it should this year produce progeny exhibiting the same range and the same mean. In other words, it should breed true to type.

The variation in the quality of the single plants of some strains is considerable. Strain 11 ranges from 88 to 143 minutes. It is difficult to account for the occurrence of variations of this magnitude within a strain, and this will not be attempted until additional data are obtained. At present, the most likely explanation appears to be that natural crossing has recently taken place between plants, the quality of which was inherently different. A study of the behaviour of these particular strains in succeeding generations will probably furnish an explanation of the phenomena.

The mean quality figure of a heterozygous crossbred population which was grown in bulk from year to year would not vary to any extent, but if a single plant selection was taken at random or irrespective of inherent quality, as is done in pure seed work, a strain of inferior quality might be produced. Consequently it is imperative to fix a strain for quality before it is even suggested for commercial culture.

In seeking to account for the fact that Baringa and Gullen are not nearly so variable as Ford and Sword, a comparative note on the lines of selection suggests itself.

In modern practice, pure seed production is conducted on the basis of single plant selection. A typical single plant is selected from the variety and the seed is increased from year to year and finally distributed to farmers. Previously, however, a common method has been to clip off a number of typical single heads from a variety and build up for distribution the seed thus obtained. The result is that minor variations, especially the less obvious, which were originally present in the variety, or which might occur naturally from year to year, are largely maintained. Ford and Sword have been evolved by the method of bulking single heads.

With single plant selection the variety, if it has any variation, soon becomes fixed, and this is probably the reason why the New South Wales varieties under review show little or no variability when compared with Sword and Ford, as the individual plants have been the unit of selection there since the time of Farrer.

The range of types existing in Nabawa and Florence is more difficult to explain. If these varieties were not fixed when the College obtained them, then the reason for their variability is the same as that for Sword and Ford. If they were fixed,

then the only explanation is that the method of bulking single heads has perpetuated any slight differences as well as any which may have arisen in the course of time. With single plant selection and subsequent isolation, the chances of perpetuating variations is negligible, for errors in original selection can be corrected in subsequent years when these are grown as separate lines side by side with the selections true to the type desired. The method of single plant selection as opposed to that of bulking a number of typical heads is the one now practised at Roseworthy College. Under such a system a superior strain of any variety once isolated can be perpetuated in its original form far more successfully than by any other method.

From the point of view of work being undertaken on quality, it is rather fortunate that the method employed at Roseworthy in the past has been that of bulking the single heads, for it has given rise to material which lends itself to selection for quality, a selection outside the orbit of past plant breeders, chiefly because there was no suitable test at their disposal.

By way of conclusion, it might be stated that although the foregoing is largely of arbitrary character, based more on inference than fact, there is sufficient evidence available to warrant an optimistic outlook with regard to the possibilities of selecting wheats of satisfactory baking quality from already existent varieties. Although time is required to test out the possibilities, the indications are present and are supported by scientific principles, that many of our varieties lend themselves to selection from the point of view of such abstruse characters as those which contribute to baking quality. It appears that those varieties which have received the least rigorous attention, especially in early selection, present the greatest possibilities for improvement along these lines, and it may prove to be a blessing in disguise that such well-known varieties as Ford and Sword should fall into this category.

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THE IMPORTANT PASTURE PLANTS OF SOUTH AUSTRALIA, CONSIDERED AS TO THEIR INDENTIFICATION AND CHARACTERISTICS.

[By E. M. HUTTON, B.Ag.Sc., Field Officer.]

(Continued from page 1403.)

In the previous portion of this article the *Lolium* and *Phalaris* groups were discussed. As far as South Australia is concerned, *Phalaris tuberosa*, Perennial Rye Grass, and Wimmera Rye Grass are proving to be the outstanding grasses. The groups which are to follow are less important, and the grasses contained in them are either of doubtful value or are of value only under special circumstances.

III.—THE VELDT GRASSES OR EHRHARTAS.

The leaf blade has few hairs, and is produced into two small auricles which bear about a dozen long hairs. The emerging leaf shoot is rolled, and a medium-sized ligule is present. These grasses usually have a purplish colouration, which is either on the leaves or at the auricles.

The seed head is an open panicle, the spikelets being reddish or purplish in colour.

1. PERENNIAL VELDT GRASS (*Ehrharta calycina*).—It is distinguished by its perennial tufted habit, and by the fact that both the ligule and auricles are purple. (See Fig. 6.) The leaves often assume a deep red or purplish tint.

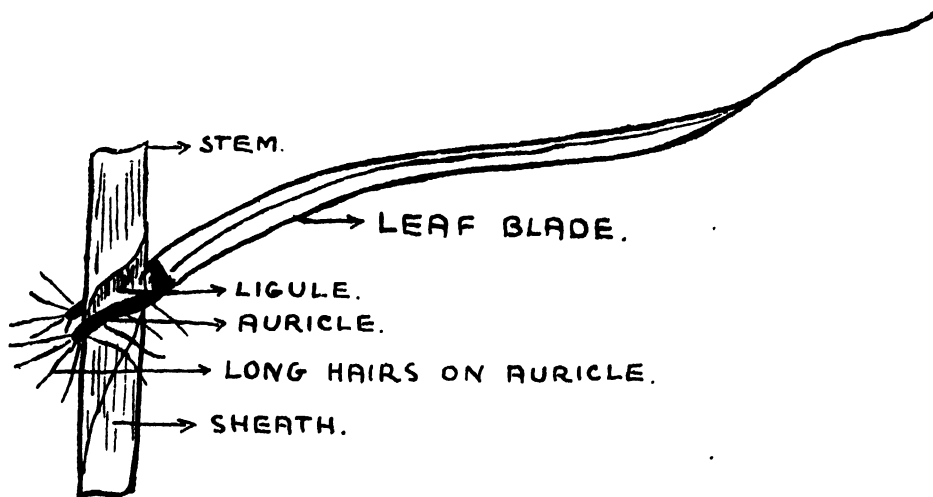


Fig. 6. Showing purple auricles and ligule of Perennial Veldt grass. Note also the long hairs on the auricles.

This grass will provide a bulk of soft succulent feed on the advent of autumn rains. It appears that it is not resistant to grazing.

It grows luxuriantly, and spreads rapidly by seed on poor sandy soils in the higher rainfall areas, e.g., Mount Compass. The grass also shows undoubted drought resistance, and thrives on the lighter soils of the cereal cultivation belt.

This grass has recently engaged the attention of research workers, and seed is procurable only from them.

2. ANNUAL VELDT GRASS (*Ehrhata longiflora*).—Is an erect growing annual, with broad bright green leaves, which show crinkled portions along their edges. The ligule is colourless, and does not become purple. The auricles are colourless in the young stages, and only become purple at flowering. The leaf sheaths are definitely flattened.

This grass grows vigorously in autumn and early winter, and is quickly eaten out under grazing. It appears to thrive especially on the sandy soils of high rainfall districts.

IV.—THE WALLABY GRASSES OR DANTHONIAS.

There is a number of Wallaby grasses, but the common native species of South Australia is mainly *Danthonia semiannularis*.

It grows in the form of perennial tussocks, which will withstand much grazing. Young leaves are soft and narrow, and are covered with numerous short hairs. No auricles are present, but in their place, and extending back to the ligule, are a number of long hairs. (See Fig. 7.) In addition, the leaf blade has two conspicuous parallel lines running down the centre of the upper surface of the leaves.

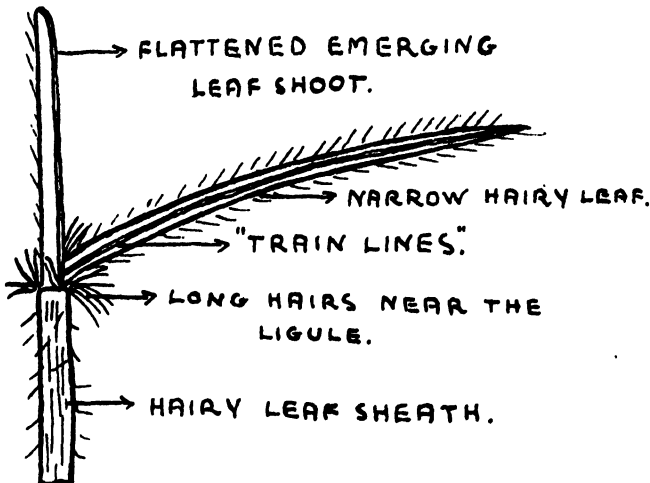


Fig. 7. Showing the parts important in the identification of Wallaby grass.

These can be conveniently called "train lines," as they appear in the Poa grasses, which are to be mentioned later. The emerging leaf shoot is flattened.

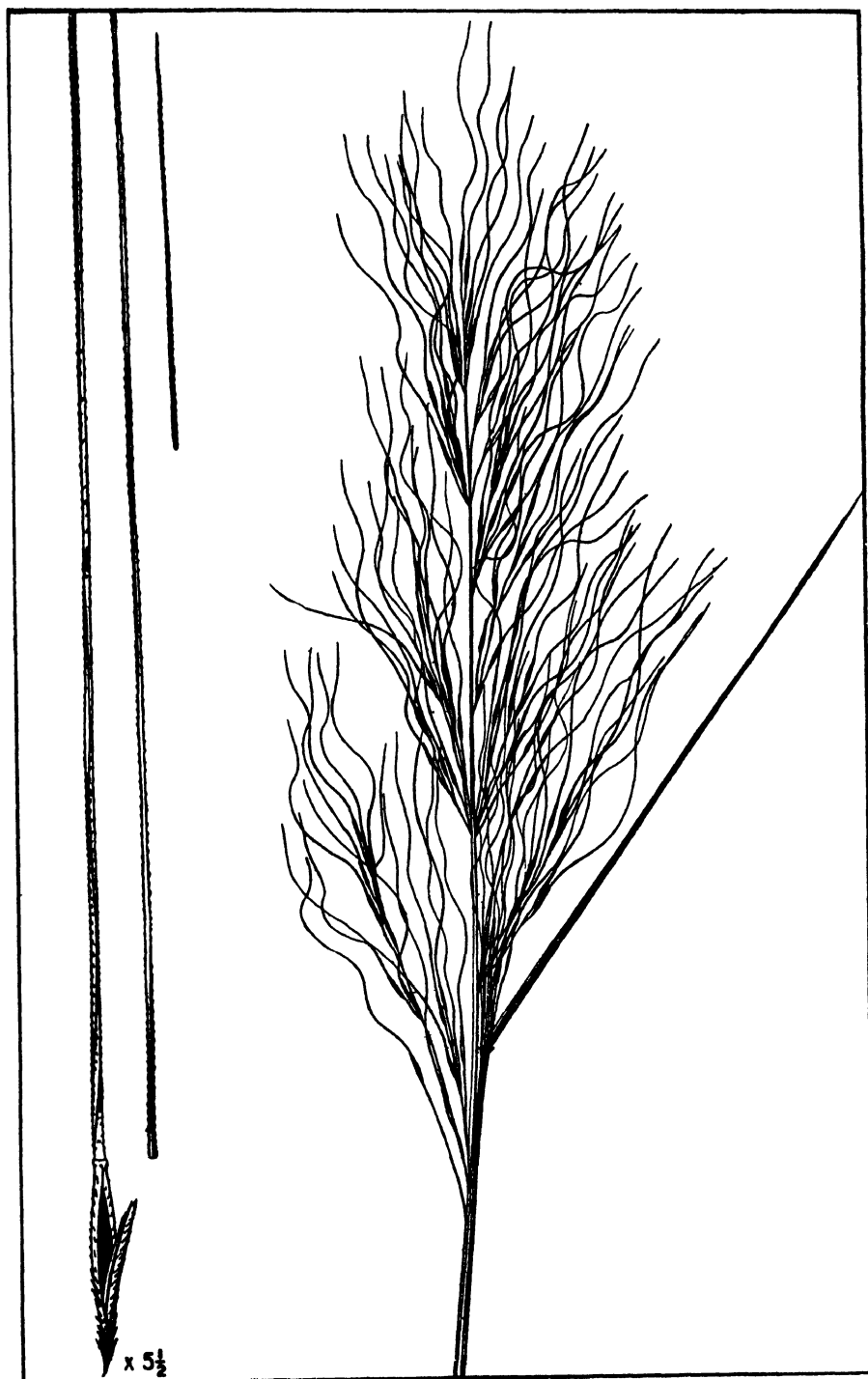
The seed head of the grass is formed from October to December, and is in the form of an open panicle. (See Fig. 8.) Around the seeds there are rings of white glistening hairs, which cause the seeds to cling together when ripe, and which have given the grass the various names Fluffy Top, Silver Top, and White Top. The seed is difficult to harvest and sow because of its fluffy nature.

Wallaby Grass is found on natural unimproved pastures in 8 to 25 inch rainfall country. On the sides of hills, and on hard stony ground it usually dominates. It has a shallow root system, is highly drought resistant, and thrives on very poor soils. With high rainfall or top-dressing with soluble phosphates it is eliminated, because other pasture species respond to a greater extent under these conditions, and thus crowd the Wallaby Grass out.

It produces nutritious fodder through most of the year, and makes its greatest growth in winter. After a summer rain it quickly produces green picking for sheep. In the pastoral areas it is recognised that Wallaby Grass pastures keep the sheep healthy, and produce the highest quality wool. It appears that this grass will always remain the most important species in the large areas of semi-arid pastoral country.



Fig. 8. Wallaby Grass (*Danthonia semiannularis*).
[From Australian Grasses by F. Turner.]

Fig. 9. Spear grass (*Stipa scabra*)

[From the Grasses and Fodder Plants of N.S.W., by E. Breakwell.]

V.—THE SPEAR GRASSES OR STIPAS.

These grasses, like the *Danthonias*, constitute a native group. *Stipa scabra* and *Stipa nitida* are perhaps the commonest spear grasses.

They occur as perennial tussocks which disappear under close grazing. They can be identified by the rolled leaf shoot, prominent hairs near the ligule, and narrow dark-green leaves which are prominently ribbed, and very rough to the touch.

The seed head is in the form of an open panicle. (See Fig. 9.) Each seed is sharply pointed, and supplied with a long bristle or awn. When the bristle becomes moist and then dries, it twists spirally and the seed bores into the soil. In the same way, the skin of animals can be penetrated by the seed.

Spear Grass is often found in association with Wallaby Grass in the semi-arid areas of the State. Spear Grass is also common in saltbush areas. The young growth is palatable to stock, but as the plant matures, the leaves are very coarse and are of low fodder value. The seeds often cause much trouble with sheep, because they penetrate the skin and injure the eyes. Spear grasses are very drought resistant, and will withstand long dry summers.

VI.—KANGAROO GRASS (*Themeda triandra*).

This native grass is worthy of mention. In this species the emerging leaf shoot is flattened, and there are prominent hairs near the ligule. The leaves are broad, and the whole plant is a typical bluish-green colour when young. At maturity Kangaroo Grass assumes a characteristic brown colour.

The seed head is an open panicle, and the spikelets each bear several long, stout, brown and twisted bristles. (See Fig. 10.)

It is an erect perennial, which is drought and fire resistant. However, it is very susceptible to grazing, and thrives only where it is protected from stock. It is frequently seen along railway lines, where it is protected, and in addition receives an occasional scorching.

VII.—THE DACTYLIS GRASSES.

The only one of importance is Cocksfoot (*Dactylis glomerata*). In America it is called Orchard Grass, because it grows in the shade of trees.

It is a tufted perennial with the emerging leaf shoot definitely flattened. Auricles are absent, and a small portion of the leaf blade just behind the ligule is of a cream colour. The rest of the leaf blade is dark bluish-green in colour. The leaf blade is usually broad, with a prominent mid rib. Some varieties are hairless, while others are very hairy. The leaf sheath is strongly flattened in this grass.

The seed head is in the form of an open panicle, and the clusters of spikelets are each supposed to resemble a cock's foot, hence the name. (See Fig. 11.)

Cocksfoot grows mainly in the spring, summer, and autumn, and thus requires a fair summer rainfall, or irrigation during the summer months. It is at its best on heavy, wet soils. In the Gippsland Hills, Victoria, where 40 inches or more of rain is received annually, cocksfoot is highly productive and very resistant to grazing. Where the summer is dry, Cocksfoot is very susceptible to grazing.

It appears that the Murray swamps, portions of the South-East, and probably a few select spots in the Adelaide Hills, are the only parts of South Australia where it will persist.

VIII.—YORKSHIRE FOG (*Holcus lanatus*).

This species can easily be recognised by its very soft and hairy leaves. The emerging leaf shoot is always rolled. Another characteristic feature is the presence of pink veins which run longitudinally on the whitish leaf sheath. When walking over a sward of Fog Grass it feels spongy underfoot.



Fig. 10. Kangaroo Grass (*Themeda triandra*)
[From Australian Grasses by F. Turner

The seed head is in the form of an open panicle, consisting of a large number of small light pink to violet spikelets, which are soft and downy to the feel, due to the numerous small white hairs present.

This grass is also known as "Woolly Holcus" and "Velvet Grass." It is one of the commonest grasses in poor English pastures, and is regarded as a weed there. It is a vigorous perennial which soon forms a mat. Stock have to acquire a liking for it, and it is considered to be of low feeding value. On poor



Fig. 11. Cocksfoot (*Dactylis glomerata*). A. Seed Head. B. Base of leaf blade.
[From Pasture Plants and Pastures of N.Z. by F. W. Hilgendorf.]

wet soils such as are found in the Mount Compass and Meadows districts of South Australia, Yorkshire Fog with Subterranean Clover appears to be promising. Fog Grass produces green summer feed, and thus requires temperate summer conditions.

IX.—THE POA GRASSES.

These are hairless grasses without auricles, and having the emerging leaf shoot flattened. If the leaf blade is examined edge on, the tip will be found to be

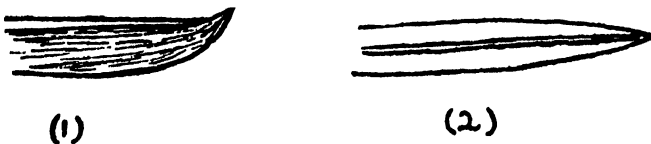


Fig. 12. Showing leaf tip of Annual Meadow grass. (1) The tip viewed edge on. (2) The tip looking down on the upper surface.

boat-shaped. (See Fig. 12.) "Train lines" run down the centre of the upper surface of the leaf blade. (See Fig. 12.)

The seed head is in the form of an open panicle consisting of numerous small spikelets.

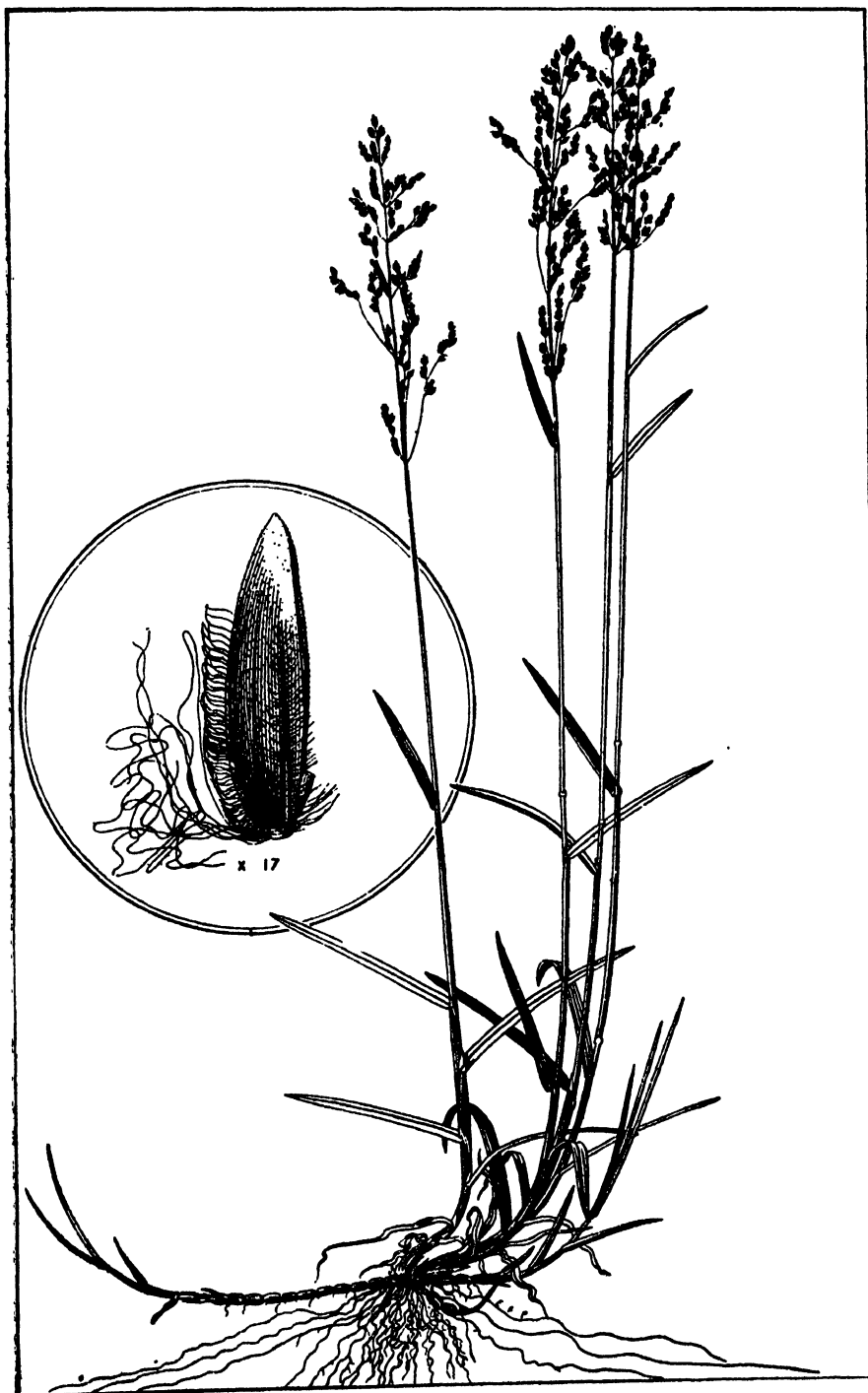


Fig. 13. Kentucky Blue Grass (*Poa pratensis*).
[From The Grasses and Fodder Plants of N.S.W. by E. Breakwell.]

1. KENTUCKY BLUE GRASS (*Poa pratensis*).—It can be distinguished by its fine leaf, and creeping root stem by which it spreads. (See Fig. 13.) In North America it is one of the most important economic species, being used for both pastures and lawns. It has been described as "the standard pasture grass in the humid portions of the United States, where the soil contains plenty of lime." It requires fertile soils, and temperate conditions, *e.g.*, it grows along the road from Robe to Mount Gambier. It produces a thick sward of feed during autumn, winter, and early spring. It dies down in the summer, and grows again with the first rain. Its exact value as far as South Australia is concerned is not known. It may be of use in providing a continuous turf between such grasses as *Phalaris tuberosa*, especially where the pasture is irrigated.

2. BULBOUS BLUE GRASS (*Poa bulbosa*).—It has the general *Poa* characters, and is a tufted perennial with small dark green leaves, and an underground bulb. It occurs particularly in natural *Danthonia* pastures, and helps to give a small quantity of autumn and winter feed.

3. ANNUAL MEADOW GRASS (*Poa annua*).—It has the general *Poa* characters, and is the earliest winter grass to make its appearance on the Adelaide plains. It is a small annual, with fine light green leaves which are often puckered. It is shallow-rooted, and grows only during the cold wet winter months. It usually forms seed heads very early. (See Fig. 14.)

It is often a nuisance on buffalo and couch grass lawns. Although not of high feeding value, it is welcome in natural pastures because of its vigorous winter growth.

4. NATIVE TUSsock GRASS (*Poa Caespitosa*).—It is a wiry, unpalatable, perennial grass, which occurs on fertile soils, *e.g.*, appears on the heavy black plains of the South-East.

X.—THE BROMES.

These are hairy grasses, with rolled leaf shoots, no auricles, and with no prominent hairs near the ligule. The leaf sheath is entire, that is, the sheath is not split right down one side. This is an important means of distinguishing the Bromes from other hairy grasses, *e.g.*, Wild Oats (see Fig. 15). The seed heads are in the form of an open panicle.

1. PRAIRIE GRASS (*Bromus unioloides*).—Can be distinguished from the other Bromes by its more vigorous growth, large green leaves, and its bulky oval sheath, which is whitish and covered with numerous small white hairs.

It does particularly well on rich loamy soils in a good rainfall. It produces a large bulk of succulent, highly nutritive fodder in the winter. It is an annual, but may be a biennial under favorable conditions. It is adapted to cutting, and not grazing. If sown with lucerne it will provide feed when the lucerne is dormant. Unless handled very carefully, it is quickly eaten out by stock.

2. SOFT BROME (*Bromus hordeaceus*) and MADRID BROME (*Bromus madritensis*).—These Bromes have narrow round sheaths. Soft Brome is uniformly hairy on the sheath and leaf blade, while Madrid Brome is more hairy on the leaf blade than on the sheath. In addition, Soft Brome can usually be distinguished by its bitter taste. The spikelets of Madrid Brome bear numerous long bristles, while those of Soft Brome are almost awnless. (See Fig. 16.) These grasses are common on top-dressed natural pastures, where they gradually replace *Danthonia*. Where a perennial grass has not been sown with Subterranean Clover, these grasses soon make their appearance, and indicate increased fertility of the soil.

They are annuals, and have a low feeding value at maturity because of the bulk of inedible seed produced.



Fig. 14. Annual Meadow Grass (*Poa annua*)
 [From *The Grasses and Fodder Plants of N.S.W.* by E. Breakwell.]

XI.—WILD OATS (*Avena fatua* AND *Avena barbata*), BARLEY GRASS (*Hordeum murinum*), AND CAT'S TAIL GRASS (*Koeleria phleoides*).

Although not in the same botanical group, these three annual hairy grasses with rolled leaf shoots can be classed together for the sake of convenience. Like the Bromes, they have no prominent hairs near the ligule, and unlike the Bromes, they have a split leaf sheath. (See Fig. 15.)

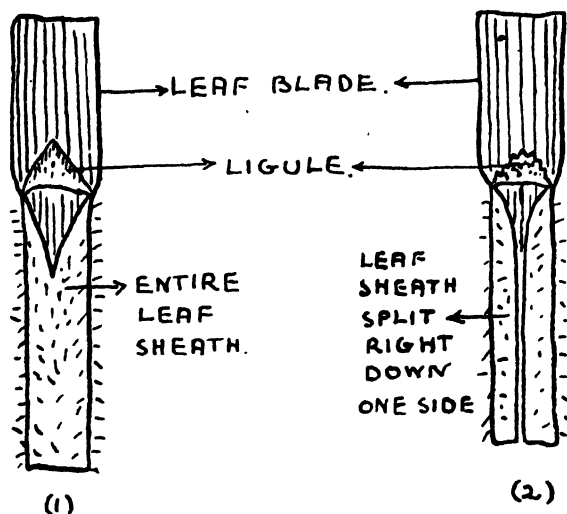


Fig. 15. Showing (1) Entire leaf sheath of the Bromes. (2) Split leaf sheath of Wild Oat.

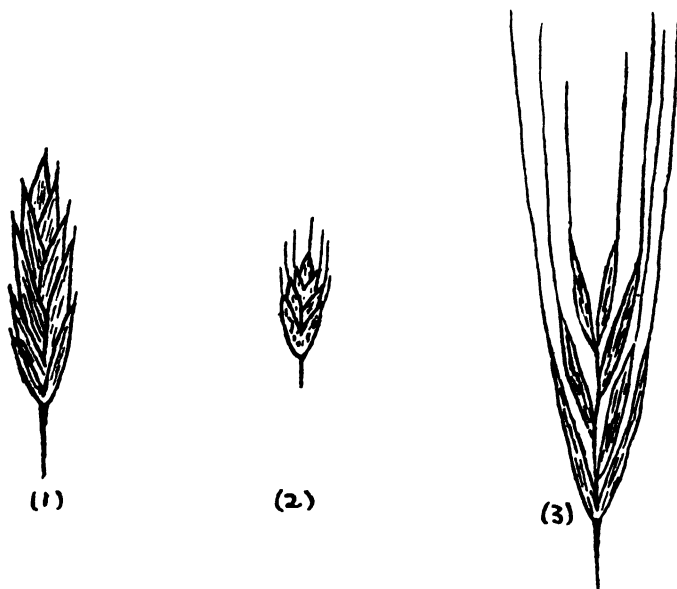


Fig. 16. Showing the spikelets (natural size) of the three most common Bromes. (1) Prairie grass. (2) Soft Brome. (3) Madrid Brome.

1. WILD OAT.—Is not always hairy, hairless forms often being found. It always has a characteristic dark-bluish green colour. It is a common weed in cereal crops, and occurs particularly in the better cereal country. In the pasture year of a rotation, Wild Oats is very useful, because it is leafy, palatable, and a strong winter grower.



Fig. 17. Red Fescue, Chewing's Fescue (*Festuca rubra*).
 [From The Grasses and Fodder Plants of N.S.W. by E. Breakwell.]

2. **BARLEY GRASS** is always hairy, and can be distinguished by its pair of auricles or claspers. Like Wild Oats, it is associated with cereal cultivation. It has a high fodder value in the early stages, but once it flowers it is of no use because of the sharp inedible seed formed, and the low palatability of the stems and leaves.

3. **CAT'S TAIL GRASS.**—The leaf sheaths are covered with long silky hairs. It forms a green compact seed head, which resembles a cat's tail in miniature. The grass is widely spread, and is of little value.

XII.—THE SHIVERY GRASSES, OR BRIZAS.

Large Shivery Grass (*Briza maxima*) and Lesser Shivery Grass (*Briza minor*) are small annuals which occur on cultivated land in winter. They are hairless, with rolled leaf shoots, and are light-bluish green in colour. Young Shivery Grass plants can easily be confused with those of *Phalaris tuberosa*. However, when the young stems are cut near the base the sap of the shivery grasses is colourless, while that of *Phalaris* is always reddish or purplish. *Brizas* are of little grazing value.

XIII.—THE FESCUES OR FESTUCAS.

1. **CHEWING'S FESCUE** (*Festuca rubra* var. *Chewings*), (see Fig. 17), **Hard Fescue** (*Festuca duriuscula*), **Red Fescue** (*Festuca rubra*), and **Sheep's Fescue** (*Festuca ovina*) all possess very fine hairless leaves, and have the emerging leaf shoot flattened. Because of their thin leaves they are well adapted to lawns, golf

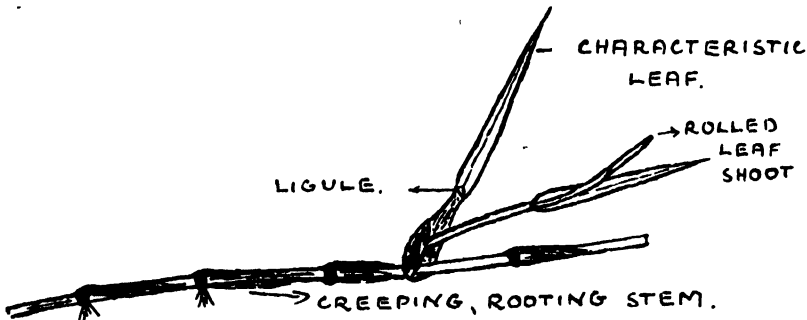


Fig. 18. Showing characteristically-shaped leaf, and creeping stem of Creeping Bent.

links, tennis, bowling and croquet greens. They are valuable perennial pasture grasses on poor soils in New Zealand and Great Britain. In South Australia the fine leaved Fescues do not appear to have any value as pasture grasses.

2. **TALL FESCUE** (*Festuca elatior*) and **Meadow Fescue** (*Festuca pratensis*) are broad-leaved perennials which have done well in damp and marshy situations in Queensland and New South Wales. They are pastured or cut for hay. Like the fine leaved Fescues, they do not appear to be of use in South Australia.

3. **SILVER GRASS** (*Festuca Myuros*).—This is a very common annual grass in natural pastures, particularly those which are top-dressed. It has thin needle-like leaves, thin stem, purple sheath base, no auricles, and characteristic silvery green colour. It has a very low feeding value after flowering.

XIV.—THE BENTS, OR AGROSTIS GRASSES.

In general they are hairless perennial grasses with rolled leaf shoots and characteristically shaped leaves, which are broad at the base and rapidly come to a point at the tip. (See Fig. 18.) The best known Bents are:—

Red top (*Agrostis palustris*), **Creeping bent** (*Agrostis stolonifera*), and **Waipu Brown top** (*Agrostis tenuis*). Waipu Brown Top is often used in lawns, and is promising on the light soils of the "Ninety-mile desert." This group is of no use for South Australian pastures. In the cold wet regions of the world the Bents thrive on poor sour soils.

XV.—A MISCELLANEOUS GROUP OF GRASSES WHICH ARE NOT RELATED BOTANICALLY.

1. WEEPING LOVE GRASS (*Eragrostis curvula*).—It has a rolled leaf shoot, no auricles, and prominent hairs near the ligule. In addition it has fairly coarse leaves, and the seed head is typically an open panicle with small dark-coloured spikelets (see Fig. 3.)

This perennial appears at its best on light sandy soils in good rainfall districts, where it spreads easily from seed. In addition, it possesses undoubted drought resistance. This grass may be of use in semi-arid areas of the State.

2. MANY-FLOWERED MILLET GRASS (*Oryzopsis miliacea*).—It is a hairless perennial, with a rolled leaf shoot, no auricles, and often has hairs near the ligule. It can be recognised by its broad, dark-green leaves and coarse stems. The seed head is in the form of an attractive, open, spreading panicle, with small light-brown spikelets. (See Fig. 19.)



Fig. 19. Many-flowered Millet Grass (*Oryzopsis miliacea*).
[From The Grasses and Fodder Plants of N.S.W. by E. Breakwell.]

This grass has sometimes been called "veldt grass." It is very drought-resistant, and produces green picking for stock during the summer months. The leaves are palatable even when mature. It appears that this grass could be of use in the semi-arid areas of the State. Mr. D. A. Brooks, of Booleroo Centre, has great faith in this grass for his district. It is hard to establish, and would require careful handling to prevent eating out by stock.

3. GOLDEN CROWN GRASS (*Paspalum dilatatum*).—It is a perennial grass with a rolled leaf shoot, no auricles, hairs near the ligule, and strongly flattened leaf sheath. The leaves often show a purplish colouration. It has a characteristic seed head, which consists of three or four spikes arranged along the stem. (See Fig. 20.)

This grass has wide succulent leaves, and requires plenty of moisture and heat for rapid development. It is summer growing, and is dormant in the winter. It has played a very important part in the development of dairying in the coastal areas of New South Wales.

In South Australia *Paspalum* is common as a weed along channels and in Lucerne stands of the Murray Irrigation areas. There seems to be no point in developing it in these areas because better pasture species are available.

4. COUCH GRASS (*Cynodon dactylon*) and KIKUYU GRASS (*Pennisetum clandestinum*) are two perennial grasses with creeping stems. They both have hairs near the ligule, and have flattened emerging leaf shoots. Couch grass has small dark-green leaves, while Kikuyu grass has large light-green leaves.

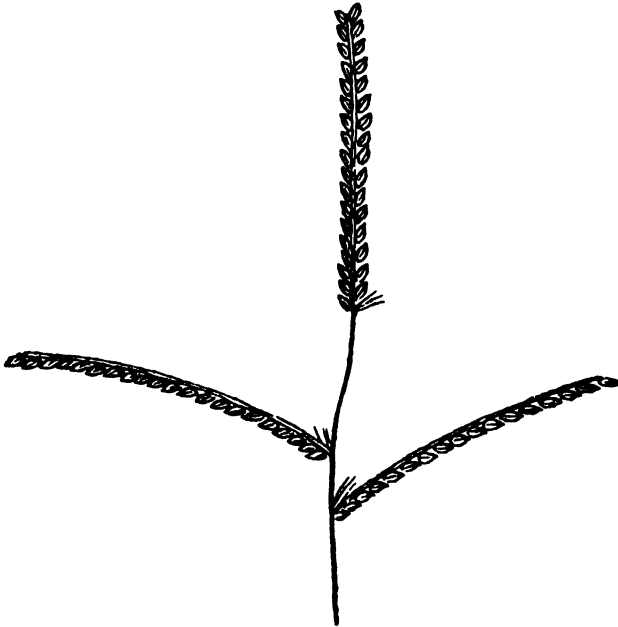


Fig. 20. Showing seed head of Golden Crown Grass.

- (1) Couch grass is valuable as a pasture grass on light soils and river flats under sub-tropical conditions. In South Australia it has been used as a sand-binder, at the same time providing useful feed in summer and early autumn, especially when good summer rains obtained.
- (2) Kikuyu grass is also highly productive under sub-tropical conditions. It is a summer grower, and is dormant during the winter. It shows drought resistance, and may be of use for sandy soils of our higher rainfall districts. It does not form seed here, but readily strikes from rooted cuttings. In New South Wales bracken fern has been controlled by using Kikuyu grass in conjunction with stock. It is being used successfully for lawns in South Australia.

5. WEEPING GRASS OR MEADOW RICE GRASS (*Microlaena stipoides*).—This is a perennial native grass with a rolled leaf shoot, pair of auricles, and hairs near the ligule. It can be recognised by its characteristic dark-bluish coloured leaves, which appear to come from below the soil, because of its underground creeping stems. It is very common in the Adelaide Hills and South-East, and forms a turf. It is persistent under grazing, and provides a small amount of soft succulent feed during the year.

(To be continued.)

REVIEW OF THE 1934 FRUIT DRYING SEASON.

[By F. R. ARNDT, Horticultural Instructor for the River Murray Irrigation Areas of South Australia.]

A Paper read at the Conference of River Murray Branches of the Agricultural Bureau held at Barmera on June 22nd, 1934.

The 1934 fruit drying season, so far as applied to the South Australian Irrigation Areas, has in many respects been a rather unusual one. Climatic conditions during January were hot and dry, but in February were somewhat more temperate in character. March will long be remembered for its record heat wave, but when this had run its course, a month of remarkably cool and dull weather followed, which in its turn was succeeded by a warm and rainless May.



Spreading Sultana Grapes on to Drying Racks.

QUALITY OF FRUIT.

These fluctuations of temperature had a considerable influence upon the quality of fruit and upon drying operations. The warm weather during January had the effect of ripening the fruit somewhat earlier than usual, as sugar tests showed that Currant and Sultana grapes had developed a higher sugar content than was the case for the corresponding period of the previous year. The fruit was also of good colour early in the season, but darkened considerably on the vines as the season advanced, chiefly on account of the hot climatic conditions then prevailing. An additional irrigation during the hottest period—if this could have been worked in—would, no doubt, have enabled the vines to maintain the quality of their fruit for a longer time. Some damage to the fruit from rain, caused by scattered showers, occurred in places, but on the whole little rain fell during the drying period, although in April light showers occurred, and the weather remained cool and dull for the greater part of the month, necessitating the dehydration of much of the fruit.

DIPPING METHODS.

The Cold Potash Dip.—Little fruit that had been processed by the cold potash dip came under the writer's notice during the past season. This dip has never been very popular with South Australian sultana growers, and does not appear to be gaining in favour. This is no doubt greatly due to the fact that to obtain satisfactory results from this process it is necessary to have both first class fruit and good drying weather. Good weather conditions are an essential factor in the successful drying of potash-dipped fruit, as on account of the heavy concentration of potash used in this dip (25lbs. to 50galls. of water), the fruit naturally has a large amount of chemical adhering to it while it is drying on the racks, which during damp weather absorbs a considerable quantity of atmospheric moisture, whereby the drying rate of the fruit is retarded and the colour darkened.

Again, fruit that has been partly damaged on the vines, either by heat or rain, does not produce a satisfactory sample when processed with this dip, for although the unspoilt berries dry out a bright golden colour, those adversely affected by the weather turn a much darker shade when dried, thus giving the finished product a mottled appearance.

Probably the greatest drawback, however, found by growers in the use of this dip is the time taken in the drying of the fruit, which under favourable conditions is usually from two to four days more—and during bad weather often much longer—than is the case with fruit processed by the Standard Mixed Dip. Another factor that does not add to the popularity of this dip is the washing of the fruit when dried, and to save time and expense some growers omit this altogether. This, however, is a mistake, for not only does washing remove much of the surplus chemical from the fruit, but it also has the effect of brightening the colour of the fruit considerably.

Briefly summed up, then, the reason why the Cold Potash Dip has not become more popular with South Australian sultana growers is due to the fact that compared with other dips the fruit takes longer to dry, darkens more on the racks during damp weather conditions, and tends to produce a more mottled sample with fruit that is not of quite first class quality. The general opinion of growers—that to obtain satisfactory results with the Cold Potash Dip it is necessary to have both first class fruit and good drying weather—is in the main a correct one.

THE STANDARD MIXED DIP.

The great bulk of the fruit during the past season was processed by means of the Standard Mixed Dip. This method consists of immersing the fruit at temperatures ranging between 177° and 183° Fahr., in a solution made at the rate of 2½lbs. Carbonate of Potash, 1½pts. of Olive Oil, and sufficient Caustic Soda to slightly crack the fruit.

Where the fruit was of good average quality and processing operations were carried out correctly, this dip generally gave good results, but as was the case with the other dips, the fruit also darkened when weather conditions were unfavorable, but usually not to the same extent as that treated by the Cold Potash Dip.

Towards the end of the season when the weather had become cool and the fruit was no more of first class quality, a number of growers raised the temperature of this dip to 190° Fahr. This temperature produced a somewhat darker but more even coloured sample of dried fruit, than when a lower degree of heat was used in the dip, and generally gave satisfactory results under the conditions then existing.

THE MODIFIED HOT CAUSTIC SODA DIP.

In order to dry the fruit more quickly and to obtain a more even—although darker—colour with partly damaged fruit, some growers reverted to the hot Caustic Soda Dip in the processing of their fruit. Fruit so treated generally

dried to a slightly darker shade under the same conditions than where carbonate of potash was an ingredient of the dip, but the colour obtained was usually of a fairly even nature.

THE BOILING CAUSTIC SODA DIP.

In some instances where weather conditions were unfavourable, the old boiling Caustic Soda Dip was used again. The Gordo was usually the variety of fruit so treated, but small quantities of Sultanas were also processed by this dip. The main object aimed at by the use of this dip—that of quick drying—was often not attained, as the high temperature usually cracked the fruit so severely that a considerable amount of sugar escaped on to the outside of the berries and covered them with a sticky film which retarded drying, and such fruit had often first to be washed before it could be satisfactorily dried.

The Caustic Soda Dip at a temperature of about 200° Fahr. generally gave satisfactory results in the processing of Gordos, and did not render the fruit nearly as sticky as when the boiling dip was used.

REMOVING THE GREEN TINGE FROM THE FRUIT.

Overseas buyers having shown their preference for golden coloured fruit as against that with a greenish tinge, the various packing companies along the River have urged their growers to make every effort to eliminate this later class of fruit.



Double Dip Tank and Draining Boards used in the processing of Sultana Grapes.

To do this successfully, it is first of all necessary that the fruit should not be picked before it is fully ripe. In the series of Sultana Drying Experiments conducted by the writer with officers of the C.S. and I.R. several years ago, it was shown that to obtain a good golden coloured sample of dried fruit, it was necessary that the fresh fruit should not be under 11° to 12° Beaume when picked. Fresh fruit having a sugar content lower than this dries out with a greenish tinge, which, however, may to some extent be removed by bleaching the dried product in the sun.

SUN DRYING ON HESSIANS.

The fruit after its removal from the drying racks is, of course, spread on to hessians placed in the sun to complete the drying process.

With fresh fruit of good colour and sugar content—provided that drying operations have been correctly carried out, but little trouble is experienced, as such fruit will naturally dry to a good golden colour. But with fruit that has the green tinge on it after its removal from the racks, it is often necessary to resort to various expedients to remove this. This may often be done by rolling the fruit in heaps while on the hessians, covering it with the hessian, allowing it to sweat for a couple of hours during the heat of the day, and then spreading it out again.

Should this operation fail to remove the green tinge, the fruit may be sprayed either with clean water or a Light Potash Solution, rolled up in heaps on the hessians and allowed to sweat for several hours, after which it is again spread out. This method will generally help to remove the green tinge from the fruit, but on fruit that was not sufficiently ripe when picked the resulting colour will often be a light brown rather than a golden shade.

One thing, however, that under no circumstances should be omitted is the perfect drying of the fruit before it is boxed, as fruit insufficiently dried and containing a considerable amount of moisture deteriorates in colour and quality after being packed much more quickly than that which has been well dried.

TREATMENT OF FRUIT ATTACKED BY MOULD.

During periods of damp weather, as experienced during the past season, the fruit is at times attacked by mould while it is on the racks, which in the first instance may have developed on rain damaged berries while still on the vines, or have begun its ravages after the fruit had been placed on the racks.

The spread of mould on the racks is often aided by undue shading of the fruit during dull weather, and the first thing to do as soon as it has been discovered is to remove the side curtains (provided that no driving rain is occurring at the time to wet the fruit) and let in as much light and air as possible to check the fungus from doing further damage. Sultanas and Gordos attacked by mould are generally benefited by being sprayed with the Standard Cold Dipping Solution, made up at the rate of 1lb. of Carbonate of Potash to 2galls. of water to which has been added about 1oz. of Olive Oil. To prevent undue concentration of moisture on the fruit, the best time to spray is in the morning after the night dews have departed, which will also give time for the moisture applied by the spray to evaporate before the evening, and so not remain on the fruit during the night.

CONDITIONS NECESSARY FOR SUCCESSFUL DRYING OPERATIONS.

In the writer's opinion the chief factors that govern the successful drying of Sultana grapes in a season like the past one are briefly as follows:—

1. *Sufficient Rack Room.*—Before the drying season commences the grower should see that he has sufficient rack room so that he will not need to fill his racks more than twice, even with a good crop, and with a moderate one only require to use some of them a second time. Of course, sufficient rack room to hold the whole of the crop with one filling would be the ideal condition to attain, but with the present low prices of dried fruit few growers can afford to do this.

2. *Picking of Fruit.*—The fruit should be quite ripe when picked and should register not less than 11° Beaume for an early picking, but 12° Beaume will give a plumper sample of dried fruit.

3. *Separate Pickings.*—Different classes of fruit, such as sun scorched or rain damaged fruit, should either be picked at different times or placed into separate

buckets to that of fruit that is of first class quality, and should be dried partly on the racks.

4. *The Standard Mixed Dip.*—For all general purposes with fruit of average good quality, the Standard Mixed Dip should be used for dipping Sultana grapes at a temperature as nearly as possible to 180° Fahr.; but during cold or moist weather the temperature of the dip may often with advantage be raised up to 190° Fahr.

5. *The Dipping Solution should be Kept Clean.*—Where 500 to 1,000 tins are immersed in a dipping solution of 60galls. to 80galls. per day, the dip should be cleaned daily. A larger dip need not, of course, be cleaned so often for the same quantity of fruit treated as a smaller one. A dirty dip does much to deaden the colour of the fruit.

6. The fruit should be spread thinly on the racks, as the drying process is thereby facilitated. Heavy loading often leads to the development of mould on the fruit, if weather conditions are damp and cloudy.

7. *Shading of Fruit on Racks.*—To prevent the fruit from being darkened by the sun, the sunny sides of the racks should be shaded on hot days when the temperature reaches above 90° Fahr. in the shade. During moderately warm or cool weather—provided that there is no rain—the side curtains of the rack should not be used; this unduly prolongs the drying period, and may even lead to the development of mould with fruit that has been damaged by rain while on the vines.

Finishing off on Hessians.—The fruit should be left on the racks until cured—that is, sufficiently dry to be taken off without being damaged—after which it should be spread thinly on hessians placed in the sun and left there until perfectly dry. It is essential for fruit to be perfectly dry if it is to keep its colour and quality for any length of time, and as it is often many months in store before being sold, it is to the grower's interest to see that his fruit is in that condition before it is delivered to the packing shed.

Roseworthy Agricultural College.

Annual Winter School for Farmers, 1934.

The Annual Winter School for Farmers will be held at Roseworthy Agricultural College from the morning of the 8th August to the morning of the 17th August.

A comprehensive course of lectures and demonstrations is being arranged. The Minister will open the School on the 8th August, and Mr. McCann, the S.A. Trade Commissioner in London, who is at present visiting South Australia will lecture the School. Others lecturing the School include the Director and members of the Walte Institute Staff, Officers of the Department of Agriculture and the Principal and Staff of the College.

Arrangements with outside lecturers are not yet complete.

Conditions for enrolment have been circularised to all branches of the Agricultural Bureau; non-members of the Bureau will be supplied with these on application.

ALLAN R. CALLAGHAN, Principal.

SOME NOTES IN GENERAL ON THE CONSTRUCTION OF BUILDINGS.

[By T. A. MACADAM, Dip. Arch. (Glas.), A.R.A.I.A., Lecturer in Architecture and Building, School of Mines, Adelaide.]

(Continued from June issue, page 1387.)

CEILINGS.

The first portion of these "notes" finished with the ventilation under the floor. Ceilings are considered next, and here we find modern materials have simplified the construction of ceilings. The old lath and plaster ceiling is rarely used now, and fibrous plaster, asbestos, or any of the insulating materials takes its place. All of these materials are made in sheets 3ft. and 4ft. wide, and from 5ft. to 10ft. in length. Each sheet should have centre fixing as well as at the ends and sides. The joints between the sheets are covered by strips of wood, say, 2in. x 1in., which give a panelled effect to the ceiling. These ceiling materials may be coloured or left in their natural state. Small fluted galvanized iron is also used for ceilings, and when coloured gives quite a good appearance.

PLASTERING.

To put plaster on walls and get a smooth and even surface is a plasterer's job, but there may be cases where a fair surface will serve the purpose, and this could be done as follows:—Slake the lime carefully, and then pass it through a fine sieve to keep back any unslaked particles. Form a round basin with sharp sand which has been passed through a fine sieve, and into the basin of sand pour the slaked lime, taking care that no lumps are put into the mix. Next add 1lb. of hair to every 3 cub. ft. of the mixture or in the proportion of 1 bag of hair to every bag of lime. Cow hair may be used, and should be long. Mix the sand, lime, and hair together thoroughly, then rake and leave for 14 days before using. When ready for use, damp the walls which are to be plastered and apply the plaster, $\frac{3}{4}$ in. in thickness, on the walls and bring it to an even surface. This first coat serves as a key to the second coat, which is composed of two parts of sand to one of slaked lime. Before this is applied the first coat should be well wetted and cleaned. The first coat should be firm but not set before the second coat is put on, and should be scratched to form a key for the second coat. Trowel the second coat to as even a surface as is desired.

Where walls have to stand knocks the surface should be cemented and not plastered. Any walls which are likely to get wet should be cemented.

PLUMBING.

Plumbing is a trade which should be done by an experienced man, but there are a few points which the property owner can look after if there are any drains or plumbing fittings.

Drains should be kept clear, and to do so it is advisable to keep as much grease as possible from entering them. Grease should be collected separately and buried. Where there are any fittings such as sinks, &c., the connections below them should be examined and cleaned occasionally. Fittings usually have a screw eye for cleaning purposes. On the drain pipes will be found inspection eyes where the drain can be examined. If new drains are being laid keep them away from tree roots, heavy traffic, and the foundations of any building. A plan of the drainage system should be kept on the property, so that when a choke occurs there will be no delay in finding it.

SEPTIC TANKS.

In some farms septic tanks are installed, and there may be others where the septic tank system of drainage may be installed later. The position of the tank on the site is important, as it must be placed in such a position that the drains leading to it will have a fall of 1ft. in 40ft. Another factor in the placing of the septic tank is the relation it will have to any well or underground tank. Care should be taken to avoid any outlet from the septic tank soaking through the soil towards any underground water supply. A well should be placed, if possible, three times its depth from the outlet of the septic tank.

PAINTING.

This is a job that the farmer can do if he has the tools and materials. He will find it will pay to keep his woodwork and ironwork (not including galvanized iron) well painted, as it lengthens the life of both considerably, in addition to improving the appearance.

Before commencing painting see that the surface to be painted is clean. Mixed paints can be purchased in all tints, and where a small quantity is required it is cheaper to purchase it.

In painting new woodwork begin with a coat of priming, which is a mixture of white lead, red lead, and oil. If the woodwork is inside then the following proportions may be used:—4lbs. of white lead, 2ozs. of red lead, and 2 pints of raw linseed oil. For outside woodwork the proportions are 4lbs. of white lead, 2lbs. of red lead, and 1 pint of boiled oil. The quantities stated will cover about 30 sup. yds. Note that boiled oil is used for outside and raw for inside. This priming coat should be applied to the woodwork as soon as it is exposed to atmospheric conditions. It is only applied to dressed timber, that is, timber with a smooth or "dressed" surface. Flooring boards are an exception.

After the priming coat the next coat of paint consists of the following:—5lbs. white lead, 1 pint of boiled linseed oil (for outside), $\frac{1}{2}$ oz. of driers, and $\frac{1}{2}$ pint of turps. One ounce to 2ozs. of colouring matter such as ochre, umber, etc., should be added for every 10yds. to be painted, depending on the tint required.

For inside woodwork raw oil would take the place of the boiled oil, and the driers would be increased to 1oz.

Each succeeding coat would be similar except that the colouring matter may be varied.

Where woodwork is very exposed, such as on the top of roofs or on top of gables four coats should be given, and every third year it should be repainted. The more frequently paint is applied the easier it is done, and less paint is required.

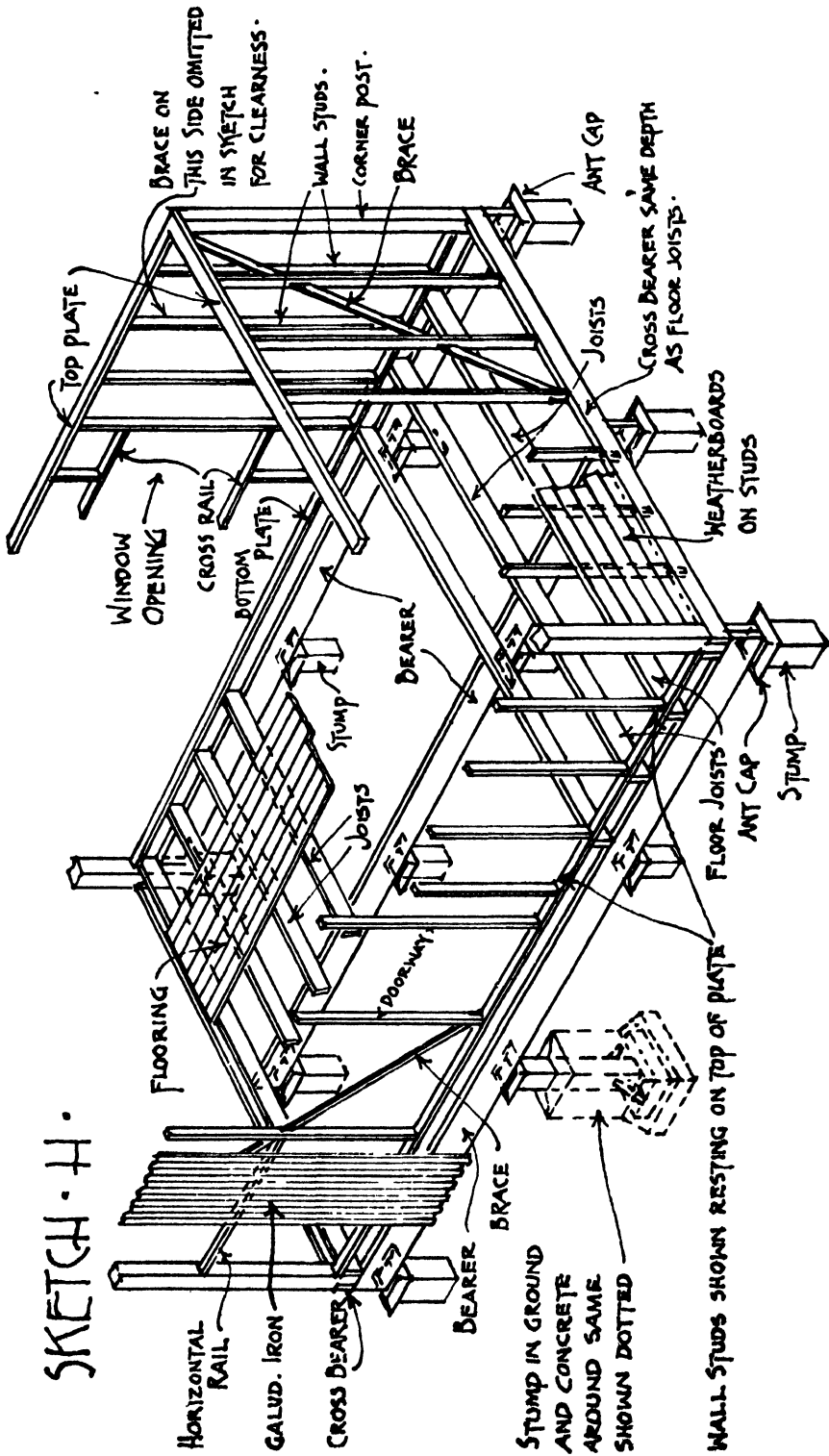
When painting galvanized iron one coat will be found to be sufficient, but galvanized iron should not be painted unless there is a special reason for doing so. Iron roofs are sometimes painted for appearance, and when painted white the temperature inside the roof is lowered. Special white paints are obtainable for roofs.

LIMEWASHING.

As lime washing or whitewash is used by farmers, a method of preparing it is given. Take a clean, watertight barrel and put $\frac{1}{2}$ bush. of fresh lime into it. Slake it by pouring water over it hot and in sufficient quantity to cover it 5in. deep. Stir it briskly until thoroughly slaked. When slaking has been effected, dissolve it in water, add 2lbs. sulphate of zinc and 1lb. of common salt. These will cause the wash to harden and prevent it from cracking.

If cream colour is desired add 4lbs. to 6lbs. of ochre for every bushel of lime. If stone colour is wanted then add 6lbs. to 8lbs. of raw umber and 3lbs. to 4lbs. of lamp black.

SKETCH - H.



Whitewash is improved by adding 1lb. of pure tallow (free from salt) to every bushel of lime.

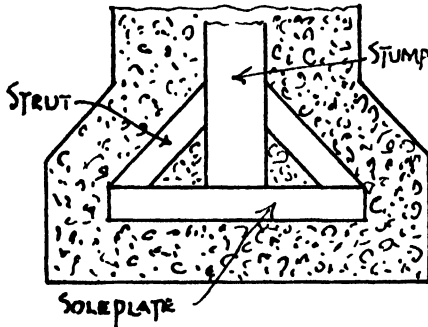
WOOD AND IRON BUILDINGS.

Few farms are without some buildings which are constructed of wood and iron, and as the construction varies considerably from that of the brick or concrete type a few notes may be helpful.

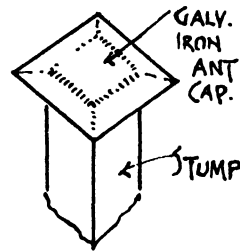
Foundation.

Beginning with what is called the stump type of foundation we have a series of wooden stumps, say, 4in. x 4in. or 6in. x 6in., placed at intervals in the ground to a depth of 18in. to 24in. and projecting above the ground about 12in. to 15in. (see Sketch H). A soleplate about 6in. x 2in. is sometimes fixed to the bottom of the stump, and angle struts put in position as shown in Sketch F.

After digging the hole for the stump wet it before placing a 4in. bed of concrete at the bottom of it. On the concrete set the stumps in position, and surround with 6in. of concrete to above ground level. The concrete protects the timber from damp and white ants in addition to strengthening the stump as a foundation. Stumps are placed at 4ft. or 5ft. centres, and on the top of each stump is



· SKETCH · F ·



· SKETCH · G ·

placed (not fixed) an ant cap, which is a piece of flat galvanised iron turned down at an angle on all sides and projecting beyond the face of the stump about 2in. This is to prevent the white ants from reaching the woodwork above the stumps. Jarrah or any other hardwood should be used for the stumps and all woodwork near the ground. An additional precaution against white ants is to treat the stumps, &c., with a white ant solution.

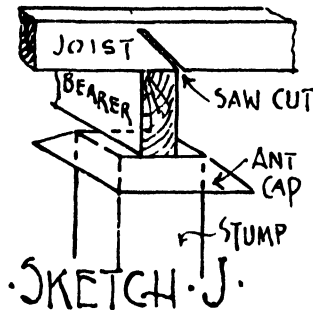
When setting stumps in position see that they are true vertically and horizontally. If cement concrete is used protect it from drying too rapidly.

On top of the ant caps are laid the bearers (see Sketch H). Note that neither the ant caps nor the bearers on top of them are fixed to the stumps as any nail holes would give the ants access to the timber.

Wall Construction.

The corner studs or posts are next placed in position and bolted at the foot to the bearers, and temporarily stayed. Where thick or heavy timbers are joined together they should be bolted, not nailed. The cross bearers at the ends can be set in position, and then the floor joists. It frequently happens that joists have a curve in their length which makes them unsuitable for a floor. To get rid of the curve lay the joist in the position it is going to be fixed, and turn it with its back uppermost. Mark the joist where it bears on the bearer or plate, turn it over,

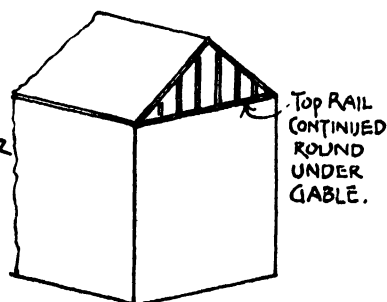
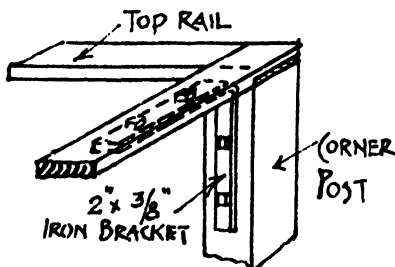
and put a saw cut diagonally to within $\frac{1}{2}$ in. of the top face. See that the saw cut will be over the bearer when fixed, as shown in Sketch J. This method will remove any spring in the joist, and make it more level when fixed. Space the joists at 18 in. centres, and fix them to the bearers with 3 in. rose-headed nails. In Sketch H will be seen the relation of the various timbers. On top of the joists (at the ends) the bottom plate is laid and fixed to the floor joists. This plate extends the full length on the one side and on the other as far as the doorway. At door openings it is omitted to allow the door sill (which is thicker than the plate) being placed level with the floor. The wood sill should be 3 in. jarrah and rounded on the outer edge. On the bottom plate is fixed the wall studs, which



may be 3 in. x 2 in. or 4 in. x 2 in. at 18 in. to 24 in. centres, depending on the material used for covering them. If material is in sheets 3 ft. wide the studs would be at 18 in. centres, and if 4 ft. sheets then 24 in. centres.

At the two ends of the building (see Sketch H) a bearer takes the place of the floor plate, and the studs are cut over it and securely nailed to it. The studs should be continuous from bottom plate to top plate if possible, and should be braced as shown with 3 in. x 1 in. wood braces let flush into wall studs and nailed to same. Where practicable the braces should be fixed at a steep slope. Braces at the corners should continue to top of corner posts.

Where window or door openings occur they should be placed, if possible, so that the minimum number of studs will be cut to make room for them. At the top and bottom of window openings put a cross rail to trim the intermediate studs, and frame the opening.



SKETCH K.

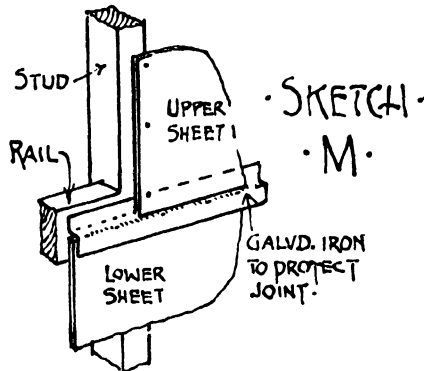
SKETCH L.

In Sketch H portion of the top plate is shown in relation to the corner posts. Where the plates meet on the corner post they should be half checked together and strapped to corner post as shown on Sketch K. The top plate should be continued around the building on all sides and at the same level, as this assists

greatly in tying the walls together at the top (see Sketch L). Where a gable is introduced the woodwork of the gable should not be formed by continuing the wall studs to under side of roof. Stop the wall studs under the top plate, and put fresh studs on top of the plate to form the walling of the gable.

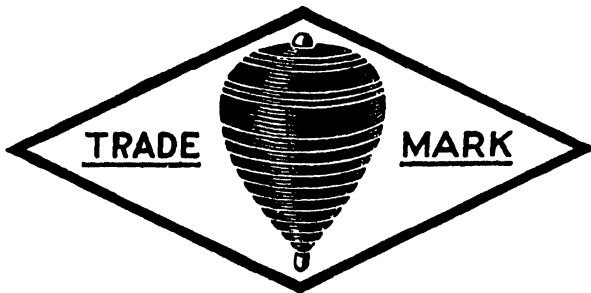
Wall Covering.

In Sketch H portion of the wall studding is shown covered with weatherboards. These should be fixed to the studs with one nail at each stud. Galvanized weather-board iron is also used as an outside wall covering. This has the appearance of



weatherboards when painted. It makes a building warmer in summer, but has the advantage of requiring much less painting than wood. Corrugated galvanized iron is used in a similar manner with the flutes running horizontally or vertically.

TOP SPECIAL SUPER

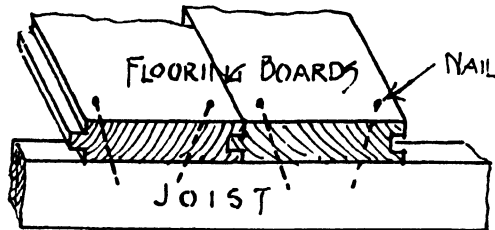


"GIVE IT A SPIN."

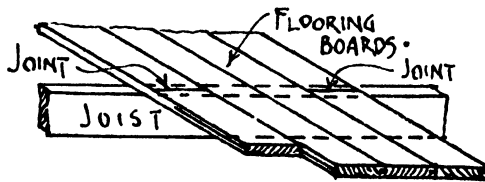
The Adelaide Chemical & Fertilizer Co., Ltd.

When flutes are vertical as shown in Sketch H 3in. x 2in. rails are introduced about every 3ft. in height, depending on the size of the sheets of iron used, and it will be seen in the sketch that every alternate stud may be omitted. Should the inside of the walls be lined then the intermediate studs would have to be retained.

Asbestos sheets are also used for lining the walls outside and inside. When used externally place the sheets vertically. When the sheet is continuous from the bottom of the wall to the top, the sheets have to be joined in the height and a horizontal joint is made, then a strip of galvanised iron should be placed at the joint to prevent the rain which falls on the face of the upper sheet getting inside the sheet below (see Sketch M). A wood cover mould which covers the joint will cover the iron also. Fix the sheets with galvanised clouts. Care has to be exercised when nailing asbestos sheets as the



· SKETCH · P ·



· SKETCH · N ·

material is brittle. A good plan is to drill the holes for the nails. The joints between the sheets should be at the studs or rails so that proper fixing is obtained for the sides and ends of the sheets and for the wood batten which covers the joints. Over all joints is placed a wood batten about 2in. x 1in. and, in addition to covering the joints between the sheets, it gives a panelled effect on the walls.

Flooring.

Laying the flooring boards is a simple operation, and needs little comment. Lay the first flooring board at door opening with the groove facing the room. Trim this board to the line of wall if room is not square. Nail to the joists with 1½in. oval steel brads 1½in. long or rose-headed nails. Nail on the angle as shown on Sketch P and about 1in. from the edge. Lay the next three boards and cramp them into position. A crowbar will be found useful for cramping. When cramped up tight nail the boards and proceed with the next three boards. Where boards have to be joined in their length the joining should take place over a joist as shown in Sketch N. Jarrah flooring boards are from 3½in. to 4in. wide and ¾in. in thickness.

(To be continued.)

LAKE ALBERT AND JERVOIS HERD TESTING ASSOCIATION (formerly Lake Albert).

RESULTS OF BUTTERFAT TESTS FOR MAY, 1934.

Herd No.	Average No. of Cows in Herd.	A. N. Cows Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during May.	Per Cow during May.	Per Cow December to May.	Per Herd during May.	Per Cow during May.	Per Cow December to May.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
6/B ..	18-10	10-97	6,099½	336-98	2,215-58	295-51	16-33	113-19	4-84
6/C ..	21	9-97	5,641	268-62	2,794-41	240-07	11-43	119-75	4-26
6/H ..	23-48	13-97	10,546½	449-17	2,131-54	554-10	23-60	110-69	5-25
6/Y ..	15	11-55	3,338½	222-57	2,648-01	158-41	10-56	117-38	4-74
6/II ..	22	20-58	12,029	546-77	4,277-29	506-13	23-01	184-04	4-21
6/LL ..	25-13	16-71	9,114	362-67	3,042-20	333-69	13-28	117-26	3-66
6/OO ..	17-87	13-74	7,132	399-10	3,829-48	337-39	18-88	178-94	4-78
6/PP ..	14-32	9-65	5,439½	379-85	3,220-57	278-91	19-48	162-16	5-13
6/RR ..	30	23-74	17,648	588-41	4,652-53	752-75	25-01	194-30	4-26
6/TT ..	20	17-32	12,175½	608-78	4,175-61	537-20	26-86	186-37	4-41
6/XX ..	24	18-16	8,060	335-83	3,696-70	347-85	14-49	163-63	4-32
6/ZZ ..	26-52	23-42	13,441½	538-96	3,565-29	640-41	25-71	170-87	4-73
6/BBB ..	25	17-81	12,423½	496-04	3,736-96	563-12	22-52	167-89	4-53
6/CCC ..	21	16-65	8,362	398-19	3,067-91	381-04	18-14	135-85	4-54
6/DDD ..	21-48	18-71	10,656	490-09	3,901-73	445-43	20-74	164-82	4-18
6/EEE ..	27-74	18-74	16,279	586-84	4,252-04	710-12	25-60	176-48	4-36
6/FFF ..	23-71	18-94	12,842	541-62	4,307-83	546-82	23-06	182-51	4-26
6/GGG ..	24-90	20-03	13,032	523-37	4,583-46	460-27	18-48	175-16	3-53
6/HHH ..	17	13-87	6,912	406-59	3,371-37	336-60	19-80	160-95	4-87
6/III ..	24-61	23-68	15,404	625-92	4,596-22	657-70	26-72	192-02	4-27
6/JJJ ..	25	18-23	11,951	478-04	3,349-79	548-43	21-94	161-88	4-59
6/KKK ..	38-71	32-71	25,491	658-51	4,392-47	978-25	25-27	171-70	3-84
6/LLL ..	21-13	16-65	9,864	467-09	3,047-77	486-29	23-03	142-88	4-88
6/MMM ..	9-10	6-10	5,906½	648-96	—	205-89	22-63	—	3-49
Means	22-37	17-16	10,824-46	483-96	3,676-03	470-93	21-06	160-40	4-35

SOUTHERN DISTRICTS HERD TESTING ASSOCIATION

RESULTS OF BUTTERFAT TESTS FOR MAY, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during May.	Per Cow during May.	Per Cow March to May.	Per Herd during May.	Per Cow during May.	Per Cow March to May.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
9/A ..	26	24-90	14,254	548-23	1,466-42	800-86	30-80	79-63	5-62
9/B ..	14-03	13-06	6,080½	433-38	1,204-33	274-49	19-56	56-42	4-51
9/C ..	11-06	5-32	2,573	232-63	721-96	116-67	10-55	33-58	4-53
9/D ..	26-42	25-23	15,674½	593-28	1,527-34	840-22	31-80	79-21	5-36
9/E ..	13	12-61	6,233	479-46	1,421-57	307-80	23-68	64-38	4-94
9/F ..	18	10-29	6,227½	302-16	696-50	269-68	13-17	29-51	4-33
9/G ..	33	26-03	13,144½	398-32	1,226-24	702-78	21-30	64-33	5-35
9/H ..	19	16-87	14,854½	781-82	1,401-94	635-91	33-47	61-65	4-28
9/I ..	36	17	7,099	197-19	538-91	290-32	8-06	22-15	4-09
9/J ..	55-55	37-32	14,391½	225-86	753-12	617-38	9-65	33-32	4-29
9/K ..	22	17-84	5,533	251-50	732-09	280-43	12-75	38-92	5-07
9/L ..	26	13-74	8,435½	306-58	759-90	321-02	11-68	28-56	3-81
9/M ..	16	1	201½	12-59	36-94	8-79	—	1-72	4-36
9/N ..	31	27	14,444	465-07	1,123-44	565-74	18-22	43-52	3-92
9/O ..	21	11-55	5,634	268-28	810-16	276-20	13-15	38-24	4-90
9/P ..	53-13	32-19	15,308	288-06	675-30	714-28	13-43	31-89	4-66
9/Q ..	15	15	7,502	500-13	842-13	348-20	23-21	40-06	4-64
9/R ..	9	5	1,534½	170-50	346-72	78-63	8-74	18-98	5-13
9/S ..	12	8	4,448½	370-71	—	189-20	15-77	—	4-25
9/T ..	10	9	4,557	455-70	—	200-07	20-01	—	4-39
9/U ..	15	13-74	6,559½	437-30	—	369-96	24-66	—	5-64
Means	22-96	16-32	8,318-55	362-23	943-72	390-89	17-02	44-18	4-70

NARRUNG HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR MAY, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during May.	Per Cow during May.	Per Cow October to May.	Per Herd during May.	Per Cow during May.	Per Cow October to May.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
5/C ..	34-16	24-77	14,351	420-11	3,738-15	722-81	21-16	189-77	5-04
5/D ..	35-84	21-39	10,744½	299-79	3,269-45	559-82	15-62	177-54	5-21
5/E ..	36	24-55	12,320½	342-24	3,209-42	640-71	17-80	169-20	5-20
5/F ..	36	25-94	18,067	501-86	4,938-40	888-80	24-69	235-86	4-92
5/R ..	61	40-29	15,018	246-17	2,676-25	668-96	10-97	114-18	4-44
5/S ..	13-23	12-65	6,531	493-64	3,923-90	315-76	23-87	190-46	4-83
5/Fr ..	17-03	2-90	1,030½	60-51	3,801-50	56-42	3-31	187-93	5-47
5/Gg ..	16-52	13-10	4,216½	255-23	2,829-71	208-96	12-65	138-51	4-96
5/Kk ..	19	14-94	9,728½	512-03	4,250-67	482-23	25-38	200-34	4-96
5/Nn ..	19	13-29	6,817½	358-82	3,448-95	324-25	17-07	168-45	4-76
5/Qo ..	15	8-35	3,920	261-37	2,840-19	202-14	13-48	143-81	5-16
5/Rr ..	23	20-55	6,450½	280-46	2,386-69	348-46	15-15	128-46	5-40
5/Ss ..	17	7-06	2,124	124-94	2,658-52	126-20	7-42	132-52	5-94
5/Tt ..	12	9-23	4,339½	361-62	4,681-06	249-76	20-81	234-37	5-76
5/Vv ..	17-52	10-94	8,114½	463-15	2,881-28	355-98	20-32	190-48	4-39
5/Ww ..	23	18	9,238	401-65	3,069-49	415-59	18-07	141-85	4-50
5/Xx ..	20	9-77	4,898½	244-93	3,179-36	221-16	11-06	154-94	4-51
5/Yy ..	13-42	8-58	3,922	292-25	2,909-28	212-21	15-81	146-07	5-41
					Nov.-May			Nov. May	
5/Zz ..	29	18	6,247	215-19	3,190-14	251-72	8-66	121-32	4-03
5/AAA ..	19	11-45	4,392½	231-18	2,568-32	224-91	11-84	129-58	5-12
5/BBB ..	16	11-65	4,468½	279-28	2,302-67	234-30	14-64	117-14	5-24
					Jan. May			Jan. May	
5 Cco	13	6-26	3,182½	244-81	746-88	131-43	10-11	37-39	4-18
Means	22-19	15-17	7,278-32	316-62	3,289-16	356-48	15-51	159-12	4-90

THE HILLS HERD TESTING ASSOCIATION.

RESULTS OF BUTTERFAT TESTS FOR MAY, 1934.

Herd No.	Average No. of Cows in Herd.	Average No. of Cows in Milk.	Milk.			Butterfat.			Average Test.
			Per Herd during May.	Per Cow during May.	Per Cow July to May.	Per Herd during May.	Per Cow during May.	Per Cow July to May.	
			Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	%
7/E ..	30-87	24-23	14,632	473-99	5,342-73	582-48	18-87	209-91	3-98
7/H ..	7	6-39	3,272½	467-50	5,817-51	156-54	22-36	273-77	4-78
7/L ..	35-87	28-32	13,851½	386-16	5,449-43	655-81	18-23	251-76	4-73
7/P ..	28-03	18-52	13,229	471-95	6,153-21	662-53	23-64	292-17	5-01
7/T ..	16	6	3,022½	188-91	4,014-63	187-28	8-58	175-70	4-54
7/Y ..	28	21-65	9,781	349-32	4,892-66	417-90	14-93	212-86	4-27
7/AA ..	12	8-84	3,543½	294-48	4,749-58	152-36	12-66	207-80	4-30
7/KK ..	23	16-13	10,996½	478-11	7,244-63	438-48	19-06	297-91	3-99
7/MM ..	39	22-19	10,652	273-13	5,886-44	408-25	10-47	228-38	3-83
7/PP ..	19-10	17-16	8,726	456-86	5,908-53	489-07	25-61	299-20	5-60
7/TT ..	17-03	13-68	9,455½	555-22	6,369-60	414-58	24-84	265-27	4-38
7/UU ..	22	14-84	8,607½	391-25	4,300-97	384-12	17-46	196-05	4-46
7/VV ..	20	16-13	8,246½	412-33	7,088-88	369-02	18-45	320-40	4-47
7/XX ..	19-58	17-58	11,159½	569-94	6,942-39	584-76	29-87	365-28	5-24
7/YY ..	25	19-48	6,788½	269-54	3,452-06	307-18	12-29	153-08	4-56
7/BBB ..	72-42	55-71	28,098	888-04	5,325-30	1,811-12	18-10	241-84	4-67
7/CCC ..	24	16-87	8,505½	354-39	5,309-91	360-60	15-03	236-40	4-24
7/DDD ..	13	12-26	6,349	488-38	5,736-20	306-47	23-57	271-28	4-83
7/EEE ..	11	7-45	4,854½	441-31	4,855-02	242-58	22-05	237-62	5-00
					Oct.-May			Oct.-May	
7/FFF ..	19	18-68	9,283	488-58	3,625-17	438-82	23-10	163-74	4-73
					Nov.-May			Nov. May	
7/GGG ..	17	6	1,860	109-41	1,955-52	84-55	4-97	92-15	4-55
Means	23-76	17-55	9,279-24	390-59	5,448-55	424-02	17-85	242-42	4-57

DEPARTMENT OF AGRICULTURE.

Bulls that are purchased under regulations of the Dairy Cattle Improvement Act, and upon which Government pays a subsidy, are available, for two years after purchase, to serve a certain number of outside cows.

The following list, compiled by the Department of Agriculture, shows the names of such bulls and of the people who own them, and indicates also the months until which the respective owners will be prepared to make the services available.

As will be noticed, the distribution of subsidised bulls is now fairly general throughout the State; hence, many of those persons, who in the past have found it difficult to get the use of a good bull, should not have much similar trouble in the future. And here let it be stated that everyone of these subsidised animals is a registered pure-bred and from a dam of proved productivity under Government official test.

The maximum service fee is 10s. per cow.

For the information of cowkeepers, it is pointed out that, although the addresses as given in the following list are those to which application should be made for the services of the bulls, the bulls themselves may, in a few instances, be located elsewhere.

Departmental Ref. No.	Breed.	Bull.	Owner.	Address.	Date when Subsidy Conditions Cease.
779	Friesian	Glenowie King Sylvia	R. C. McHugh	Burnside	July, 1934
899	Friesian	Murray Glen Netherland King	A. B. Press	North Adelaide	Sept., 1934
900	"	Glen Murray Pietje Pontiac	Boys' Reformatory	Magill	Oct., 1934
910	Jersey	Para Vale Milkmaid 2nd ...	F. P. Smith	Blackwood	Sept., 1934
922	"	Eudunda Damsel's Lord ...	D. Fitzgerald	Edwardstown	Sept., 1934
927	"	Brinkworth Myra's Repulse	R. and J. R. Goldsack ..	Glen Osmond	Sept., 1934
1098	"	Glen Ewin Columbine's Masterman	J. C. Hagger	North Kensington	Aug., 1935
1104	"	Sweethaven Butterboy	M. B. Wright	Northfield	Sept., 1935
1181	"	Hampden Jane's Aristocrat	J. A. Bishop	Oaklands	Sept., 1935
1188	"	Burniea Darkie	W. Harnden	Kersbrook	Sept., 1935
790	"	Scrubview Duke	M. H. Modystack	Wilmington	Aug., 1934
800	"	Hampden Olive's Aristocrat	H. Masters	Balaklava	May, 1934
806	"	Eudunda Damsel's Lad ...	A. H. Marshall	Eudunda	Aug., 1934
817	"	Roseworthy Chancellor ...	Hicks Bros.	Clare	Aug., 1934
850	A.I.S.	Sunnysbrook Flirt's Victor	H. E. Krig	Willaston	Aug., 1934
856	"	Klama Royal	J. P. Smith & Son	Tarowlee	Sept., 1934
865	Jersey	Brinkworth Repose	C. A. Ottens	Brinkworth	July, 1934
866	Friesian	Barina Matador Rocket ...	F. W. Kotz	Erin Downs	July, 1934
869	Jersey	Para Glen Flashlight	C. E. Mellors	Gawler	July, 1934
874	"	Para Wirra Prince 2nd	A. H. Young	Owen	Aug., 1934
882	A.I.S.	Dunleith Lieutenant	E. A. Kelly & Son	Smithfield	Sept., 1934
883	"	Strathoarn Haylo 2nd	L. J. Carman	Undalya	Sept., 1934
884	"	Strathoarn Bloom's Searchlight	R. J. James	Riverton	Sept., 1934
885	"	Rivoli Hero	A. H. Frost	Lewiston	Sept., 1934
886	"	Liberton Sutala	J. McCormick	Yongala	Sept., 1934
98	Friesian	Glenowie Netherland Butterboy	L. B. Dean	Morgan	Sept., 1934
894	"	Anama Netherland Joker ...	E. J. H. Hoepner	Brinkworth	Sept., 1934
897	"	Anama Pontiac Mars	B. H. Hampel	Kybunga	Sept., 1934
905	Jersey	Pembroke Mischief	F. H. S. Hunt	Sandy Creek	Sept., 1934
917	"	Burniea Echo	D. A. Agnew	Stansbury	Sept., 1934
918	"	Sweet Haven Mercedes Lord	W. G. Johncock	Narriby	Sept., 1934
920	"	Eudunda Glory's Star	M. S. Ferme	Wandearah West	Sept., 1934
928	"	Wooroora Cream Chief	H. B. Scholz	Nurlootpa	Sept., 1934
924	"	Wooroora Trumpeter	J. S. Miller	Auburn	Sept., 1934
930	"	Fernden Bullseye Combination	A. W. F. Pitzner	Eudunda	Sept., 1934
931	"	Cudlee Creek Masterpiece ...	T. W. Roennfeldt	Greenock	Sept., 1934
938	"	Tuela Senator	R. A. A. Thiele	Julia	Aug., 1934
934	Ayrshire	Angle Farm Richard	A. H. Hewlett	Reeves Plains	Sept., 1934
935	Jersey	Banyule Pylon	W. M. Fletcher	Lewiston	Sept., 1934
936	A.I.S.	The Bluff, The Banker	W. J. Harding	Yongala	April, 1935
946	Friesian	Balaklava Griselda Beets ..	P. T. Bowker	Laura	Oct., 1934
949	Jersey	Eudunda Flavia's Chief	J. J. O'Sullivan	Tarlee	Oct., 1934
950	A.I.S.	Strathoarn Bloom's Cupid	L. F. Rowe	Craddock	Oct., 1934
951	"	Northfield Blossom's Lime-light	M. B. Saint	Saddleworth	Oct., 1934
952	Ayrshire	Angle Farm Maxwell	D. Sellick	Templers	Oct., 1934

PURE-BRED BULLS—continued.

Depart- mental Ref. No.	Breed.	Bull.	Owner.	Address.	Date when Subsidy Conditions Cease.
953	Ayrshire	Angle Farm Martin	J. P. Orchard	Salisbury	Oct., 1934
955	Jersey	Hampden Carlissa's Lad	J. F. Provis	Balakiava	Oct., 1934
959	"	Pella Silver Lining	H. P. Semmler	Lyndoch	Dec., 1934
960	"	Pella Graceful Lad	H. Mader	Eudunda	Dec., 1934
975	A.I.S.	Klama Wizard	T. E. Richardson	Hill Town	Jan., 1935
994	Jersey	Para Wirra Don	E. W. L. Dawkins	Willaston	Feb., 1935
995	"	Delma Mercedes Duke	A. M. Lodge	Adrossan	Nov., 1934
990	Friesian	Barina Konigen Lad	T. S. Bishop	Melrose	May, 1935
996	A.I.S.	Klama Felix	R. K. Bertram	Coobowie	Feb., 1935
1004	Jersey	Morella Belle's Chief II.	F. J. Young	Alford	Feb., 1935
1011	"	Brinkworth Jewel's Star	K. S. A. Dolling	Snowtown	June, 1935
1017	"	Hampden Mayflower's Aristocrat	C. E. Mayger	Kapunda	July, 1935
1019	"	Hampden Brown Chief	G. A. Noll	Canowie Belt	Mar., 1935
1041	A.I.S.	River Glen Flower's Royal 2nd	W. G. Fidge	Bute	May, 1935
1043	Jersey	Tuela Doctor	B. F. Jenkins	Salisbury	May, 1935
1045	"	Tuela Rajah	L. W. Hansen	Farrell's Flat	May, 1935
1046	"	Tuela Pharaoh	A. G. Schunke	Manoora	May, 1935
1056	"	Ferden Double Combina- tion	C. Denholm	Lyndoch	June, 1935
1057	"	Oakhill Master King	D. T. Angus	Clare	June, 1935
1074	"	Oakhill Lord Carlos	T. P. I. Anson	Steelton	June, 1935
1102	"	Para Vale Prince III.	Chapman Bros.	Hoyleton	July, 1935
1107	Friesian	Anama Netherland Laddie	W. D. Price	Kadina	Sept., 1935
1112	"	Murray Glen Echo Beets	C. Cooper	Moonta	Sept., 1935
1117	A.I.S.	Klama Redman	J. Matheson	Snowtown	Sept., 1935
1127	Jersey	Sweet Haven Mercedes' Chief	F. Coleman	Saddleworth	Sept., 1935
1141	"	Morella Dandy	W. H. Thomas	Tarlee	Sept., 1935
1143	"	Morella Princella's Chief 2nd	H. C. Underwood	Balakiava	Sept., 1935
1150	"	Eudunda Presto	F. N. Gameau	Two Wells	Sept., 1935
1152	"	Para Wirra Dulcie Pylon 2nd	P. O'Shaughnessy	Crystal Brook	Sept., 1935
1153	"	Para Wirra Millie's Pylon 2nd	E. A. Young	Port Broughton	Nov., 1935
1154	"	Auldearn Damsel's Chief	M. P. Humphry	Leighton	Sept. 1935
1156	"	Hamley Admiral	W. E. Blatchford	Mintaro	Sept., 1935
1175	A.I.S.	Sunnybrook Royal's Heir	T. Halliday	Gawler	Dec., 1935
1179	Jersey	Black Oak Peter Pan	S. D. Crosby	Kadina	Feb., 1936
1180	"	Para Wirra Pretty Noble	E. J. Hansen	Eudunda	Dec., 1935
1183	"	Hampden Juanita's Gam- boge	P. O. Schutz	Eudunda	Dec., 1935
1190	"	Hampden Guitar's Noble	W. G. H. Wolthe	Eudunda	Feb., 1936
1197	"	Wooroora Pearl's Beau	Loffer Bros.	Morgan	Feb., 1936
1199	"	Tuela Daniel	C. Garrard	Farrell's Flat	Dec., 1935
1201	"	Auldearn Combination	C. L. Lynch	Kooronga	Dec., 1935
1202	"	Para Wirra Pride 2nd	Agricultural College	Roseworthy	Dec., 1935
1208	"	Auldearn Lily's Warrior	O. J. Sampson	Kooronga	Mar., 1936
1209	Ayrshire	Angle Farm Magnet	R. H. Bagster	Salisbury	Jan., 1936
1213	Jersey	Greenoaks Firefly's Duke	G. D. Oster	Balakiava	Feb., 1936
1218	Friesian	Anama Netherland Jahl	L. W. Sluggett	Seven Hills	Mar., 1936
1227	A.I.S.	Northfield Princess's Royal	A. L. McEwin	Blyth	Mar., 1936
1235	Jersey	Hampden Cunning Lad	L. W. Frost	Saddleworth	April, 1936
1237	"	Wooroora June's Knight	A. C. Michalk	Eudunda	April, 1936
1238	"	Wooroora Princess Jester	P. A. Schubert	Greenock	April, 1936
1244	"	Eudunda Rex	P. J. Kerin	Fords	April, 1936
1247	"	Hampden Carnation's Oxford	W. S. McAuliffe	Eudunda	June, 1936
1248	Friesian	Barina Matador Niger	G. H. S. Schunke	Mintaro	May, 1936
828	"	Burnlea Aliek	S. J. Cox	Strathalbyn	Aug., 1934
861	"	Anama Netherland Paul	K. Lawson	Padthaway	Aug., 1934
876	Ayrshire	Holly Green Queen's Jamie	T. S. Paternoster	Nairne	Aug., 1934
880	Jersey	Lallawa Chieftain 3rd	J. G. Krueger	Sedan	Aug., 1934
881	A.I.S.	The Bluff Waratah's Lime- light 2nd	F. H. Rowe	Peake	Sept., 1934
887	"	Sunnybrook Primrose's Pride	H. J. Jagger	Inman Valley	Sept., 1934
888	"	Klama Pilot	J. B. Kerber	Woodside	Sept., 1934
891	Friesian	Glenowie Netherland Duke	E. G. Magor	Myppolonga	Sept., 1934
896	"	Anama Netherland Dutch- man	S. D. Stoddart	Mundalia	Sept., 1934
904	Jersey	Hamley Alpha Prince	A. B. Herrmann	Mount Torrens	Sept., 1934
911	"	Para Vale Pilot	G. W. Woolley	Mt. Barker Junction	Sept., 1934
912	"	Delma Ballarion	W. H. Roper	Strathalbyn	Sept., 1934
913	"	Oakhill Lord Lotus 3rd	A. B. Hartmann	Palmer	Sept., 1934
914	"	Kangaroo Flat Prince	B. McGhiebeck	Millbrook	Sept., 1934
921	"	Eudunda Boderick	A. A. Sickerdick	Tweedvale	Sept., 1934
922	"	Morella Digger	A. Anderson	Menangle	Sept., 1934
927	Ayrshire	Denbigh Advance	J. M. Robinson	Meadows	Oct., 1934
928	Friesian	Murray Glen Sylvia Griselda	E. Guelshmin	Jervois	Oct., 1934
934	"	Glen Murray King Pontiac	E. Williams	Cooke's Plains	Oct., 1934
937	"	Willowvale Knight Posch	D. Thomson	Long Flat	June, 1935
938	"	Willowvale Model Posch	C. Bowley	Mypponga	Jan., 1935

PURE-BRED BULLS—continued.

Departmental Ref. No.	Breed.	Bull.	Owner.	Address.	Date when Subsidy Conditions Cease.
969	Friesian	Willowvale Snow Posch ..	W. R. Evans	Long Flat	June, 1935
972	Jersey	Ontario Marcus	T. H. Rayson	Native Valley	Nov., 1934
973	Ayrshire	Talmont Jamie	F. M. Green	North Gumeracha	Nov., 1934
980	Jersey	Alinda Noble Combination ..	W. A. Mueller	Ambleside	Jan., 1935
981	"	Alinda Eminent Boy	A. M. Frahn	Mannum	April, 1935
982	"	Alinda Lady's Lad	S. S. Rathjen	Mannum	April, 1935
1001	"	Woorora Rossalind's ..	K. M. Bowen	Flaxley	Feb., 1935
		Orlando			
1020	"	Eudunda Whoopee	J. Hickey	Jervois	Mar., 1935
1022	"	Ontario Eclipse	A. M. Carruthers	Narrung	May, 1935
1023	"	Ontario Mak	J. Hobbs	Cherry Gardens	June, 1935
1024	"	Ontario Prince	C. C. Spencer	Clarendon	June, 1935
1026	"	Crofton Sultan	C. Weidenhofer	Ponde	Aug., 1935
1028	"	Crofton Tallman	J. Rodda	Ambleside	April, 1935
1029	"	River Glen Red Night	E. S. W. Wise	Jervois	May, 1935
1031	"	Para Wirra Daniel	H. J. Helmenmann	Walkerie	Mar., 1935
1033	"	Fernden High Commander ..	L. H. Powell	Parilla	June, 1935
1042	"	Clarendon Eyre Eminent's ..	G. R. Nicholls	Pinnaroo	Sept., 1935
		Brigadeer			
1054	"	Timbungalong Excelsior ..	A. Kelly	Milang	June, 1935
1075	"	Channel View McEwin's ..	Point McLeay Mission ..	Point McLeay	June, 1935
		Dawn			
1078	A.I.S.	Strathearn Admiral	L. P. Peach and C. S. E. ..	Tepko	July, 1935
		Paech			
1079	Jersey	Retford Skipper	V. T. Bartlett	Murray Bridge	Sept., 1935
1080	"	Cudlee Creek Flashlight ..	T. M. Smee	Charleston	June, 1935
1096	"	Cudlee Creek Jazz Boy 2nd ..	H. O. Hannaford	Belair	July, 1935
1110	Friesian	Glen Murray Netherland ..	J. O. Kernick	Lameroo	Sept., 1935
		King			
1116	A.I.S.	Klama Dasher	H. B. Kuchel	Murray Bridge	Sept., 1935
1122	Jersey	Gum Hill Defender	R. J. Stone	Bull's Creek	Sept., 1935
1123	"	Gum Hill Lord Grey	L. C. Mann	Milang	Sept., 1935
1124	"	Pembroke Playmate	M. N. Phillips	Strathalbyn	Sept., 1935
1125	"	Pembroke Duak	J. M. Yelland	Milang	Sept., 1935
1126	"	Glandore Neat Lad	W. L. McDonald	Mount Barker	Sept., 1935
1128	"	Alinda Skipper	W. S. Yelland	Milang	Sept., 1935
1130	"	Hampton Blonde's Oxford ..	E. L. Goode	Narrung	Sept., 1935
1132	"	Scrub View Victor	D. Mundie	Gumeracha	Sept., 1935
1135	"	Lanacoona Don	W. D. Whittam	Ashbourne	Sept., 1935
1136	"	Burnlea Twinkler	J. R. Chapman	Yumali	Sept., 1935
1145	"	Alexandra Dora's Signal ..	H. S. Stanton	Strathalbyn	Sept., 1935
1147	"	Delma Bellboy	H. J. Edwards	Mount Barker	Sept., 1935
1149	"	Eudunda Karini	S. A. Bone	Pinnaroo	Sept., 1935
1160	"	Mira Chana Noble 2nd.	H. A. L. Maidment	Goolwa	Oct., 1935
1163	"	Lanacoona Pelledes	E. M. Hodges	Lameroo	Nov., 1935
1170	A.I.S.	Long Flat Mayflower's ..	R. E. Shankland	Jervois	Oct., 1935
		Limelight			
1171	Friesian	Glen Murray Dauphin	C. R. Collins	Wall Flat	Nov., 1935
1176	Jersey	Pembroke Treasure	M. M. Limbert	Coonalpyn	Dec., 1935
1187	"	Hampton Mayfern's	E. F. Schutz	Eden Valley	Dec., 1935
		Gamboge			
1191	"	Pella Gamboge Knight	L. H. Burt	Coonalpyn	Dec., 1935
1193	A.I.S.	Strathearn Kingston	E. W. Semler	Springton	Dec., 1935
1205	Friesian	Anama Netherland Black ..	R. Ellis	Wanbi	Jan., 1936
		Prince			
1214	Jersey	Alinda Bridegroom	Gepp Bros.	Montacute	Feb., 1936
1215	"	Crofton Sentinel	J. Bates	Macclesfield	Feb., 1936
1216	"	Crofton Lord Starbright ..	R. H. Williams	Mount Lofly	Mar., 1936
1220	"	River Glen Flower's Royal ..	M. Cowan	Murray Bridge	Mar., 1936
		Srd			
863	A.I.S.	Ilawarra Bonnie	A. C. Bigham	Mount Gambier	July, 1934
1872	Jersey	Para Wirra Pansy's Pylon ..	J. M. Wray	Hynam	July, 1934
1877	"	Gambler Major Twinkler ..	W. F. Koop	Glencoe East	Aug., 1934
1878	"	Gambler Rose Chief	C. R. Davis	O.B. Flat	Aug., 1934
879	"	Selsey Royal	C. R. Kerr	Compton	Aug., 1934
895	Friesian	Anama Alcatraz Rex	J. S. McElroy	Lochaber	Sept., 1934
898	"	Anama Netherland King 4th ..	H. L. Miles	Hynam	Sept., 1934
908	Jersey	Pembroke Majestic	F. W. Staude	Naracoorte	Sept., 1935
947	Ayrshire	Kyby Ivan	H. J. S. Clark	Moorak	Sept., 1934
948	"	Kyby Bonnie Prince	M. Glynn	Kybybolite	Oct., 1934
974	Jersey	Gambler Star Bene	C. Hitchcock	Moorak	Dec., 1934
995	Red Poll	Victoria Captain	J. L. Hoggarth	Kalangadoo	Feb., 1935
1043	Ayrshire	Kyby Oliver	G. D. Stuckey	Rendelsham	May, 1935
1119	A.I.S.	River Glen Mascot	M. Gliders	Beachport	Sept., 1935
1153	Jersey	Rivoli Prince	J. H. Williams	Naracoorte	Sept., 1935
1166	Ayrshire	Gowrie Park Imperator ..	L. S. Davie	Kybybolite	Sept., 1935
1187	"	Kyby Gesture	H. W. Holland	Millicent	Oct., 1935
1198	"	Kyby Gallant	A. W. Kilsby	Yahl	Oct., 1935
1217	Red Poll	Victoria Lustre	J. V. Angus	Kalangadoo	Jan., 1936
1016	"	Hampton Winsome Boy	H. E. Davies	Uram	Mar., 1935
1018	"	Hampton Starbright Signal ..	J. T. Sparrow	Curramulka	Mar., 1935
1169	Jersey	Tue La Velle Lathmore ..	W. and F. A. Agnew ..	Curramulka	Oct., 1935
		Chief			
754	"	Morella Bill	H. L. Bruce	Kimba	July, 1934
781	"	Glen Valley Watchman	C. F. Jericho	Butler	July, 1934

PURE-BRED BULLS—continued

Departmental Ref. No.	Breed.	Bull.			Date when Sul. ly Conditions Cease.
848	Jersey	Lanacoona Silver Noble ..	I. R. Preiss	Cfve	Aug., 1934
849	A.I.S.	Sunnybrook Boronia's James	F. W. A. Du Bois	Wudinna	July, 1934
908	Jersey	Glandore Neat Boy	G. M. McKechnie	Tumby Bay	Sept., 1934
910	"	Burnlea Dandy	A. R. Butler	Ungarra	Sept., 1934
942	Ayrshire	Angle Farm Boy	C. J. Partington	Lipson	Mar., 1935
964	"	Hampden Blonde's Count	W. Doudle	Coulta	Jan., 1935
966	"	Delma Gipsy's King	E. R. Elson	Cleve	Nov., 1934
985	Jersey	Pembroke Sylvan	J. H. Octoman	Lipson	Feb., 1935
1030	"	Fernden Bell's Combination	J. Newell	White's Flat	May, 1935
1101	"	Black Oak Pretty Mike ...	G. T. Frost	Alford	Aug., 1935
1108	Friesian	Anama Pontiac Crystal ...	J. L. Simms	Cummins	Sept., 1935
1109	"	Glen Murray Olda's Crusader	W. V. Jacobs	Edillille	Sept., 1935
1111	"	Glen Murray Netherland Duke	P. T. Vanstone	Cummins	Sept., 1935
1151	Jersey	Eudunda Pathfinder	D. Forbes	Cleve	Sept., 1935

EXPERIMENTAL FEEDING TESTS CONDUCTED AT PARAFIELD POULTRY STATION.

[By C. F. ANDERSON, Poultry Expert.]

A series of feeding tests are being conducted at Parafield Poultry Station with a view to ascertaining if suitable foods which are obtainable on the majority of our farms can be satisfactorily fed to poultry. The tests are each of 50 White Leghorn pullets, and commenced on April 1st, 1933.

The feeding is as follows:—

No. 1 Test.—Morning—Wet mash composed of 1 part crushed barley, 2 parts wholemeal (by weight), $\frac{1}{2}$ lb. meat meal, 50 per cent. chaffed greenfeed.

Midday—1oz. wheat per bird.

Night—1oz. wheat per bird.

No. 2 Test.—Dry mash composed of same proportions as No. 1 Test.

Midday—Greenfeed.

Evening—Wheat.

No. 3 Test.—Morning—Wet mash composed of 1 part bran, 2 parts pollard (by weight), $\frac{1}{2}$ lb. meat meal, 50 per cent. chaffed greenfeed.

Midday—1oz. wheat per bird.

Night—1oz. wheat per bird.

No. 4 Test.—Morning—Wet mash composed of 1 part bran, 2 parts wholemeal (by weight), $\frac{1}{2}$ lb. meat meal, 50 per cent. chaffed greenfeed.

Midday—1oz. wheat per bird.

Night—1oz. wheat per bird.

No. 5 Test.—Morning—1 $\frac{1}{2}$ ozs. wheat per bird.

Evening—1 $\frac{1}{2}$ ozs. wheat per bird.

Greenfeed in season.

The following are the numbers of eggs laid by each pen from April 1st, 1933, to May 31st, 1934.

Definite conclusions, however, cannot be given at this juncture with regard to the various methods of feeding. It is necessary for the tests to complete the 24 months before any satisfactory opinions can be formed.

	No. Eggs Laid April 1st, 1933, to May 31st, 1934.	No. Eggs Laid Month of June, 1934.	Total Eggs Laid April 1st, 1933, to June 30th, 1934.
No. 1 test	7,963	366	8,329
No. 2 test	7,437	344	7,781
No. 3 test	6,971	407	7,378
No. 4 test	8,405	344	8,749
No. 5 test	3,552	203	3,752

OFFICIAL POULTRY TEST EGG-LAYING COMPETITION, 1934-35.

CONDUCTED AT PARAFIELD POULTRY STATION.

ONLY FIRST GRADE EGGS RECORDED.

SECTION 1.—WET MASH.

Class No. 1.—White Leghorns.

Competitor.	Bird No.	First Grade Eggs Progressive Totals to July 7th, 1934.	Competitor.	Bird No.	First Grade Eggs Progressive Totals to July 7th, 1934.
A. J. Hill, Sunraysia Poultry Farm Greensborough, Victoria	1	52	C. Guthridge, Yundi	49	36
	2	52		50	54
	3	21 125		51	36 126
	4	—		52	7
	5	48		53	37
	6	39 87		54	38 82
		212			208
A. H. Matthews, Bridgewater	7	56	S. Lambert, Echunga	55	42
	8	51		56	28
	9	42 149		57	dead 70
	10	50		58	27
	11	52		59	1
	12	38 140		60	25 53
		289			123
G. W. T. Symes, Echunga	13	33	A. Young, Bridgewater	61	56
	14	26		62	51
	15	36 95		63	19 126
	16	20		64	57
	17	36		65	18
	18	41 97		66	44 119
		192			245
E. B. Gliddon, Yundi	19	50	D. J. Foxwell, Echunga	67	42
	20	30		68	26
	21	3 83		69	39 107
	22	—		70	16
	23	84		71	41
	24	25 59		72	30 87
		142			194
T. Cleaver, Bridgewater	25	49	J. C. Normandale, Yundi	73	16
	26	18		74	32
	27	48 115		75	28 76
	28	53		76	57
	29	37		77	52
	30	40 130		78	52 161
		245			237
J. E. Assender, Echunga	31	33	L. W. Sando, Echunga	79	54
	32	38		80	35
	33	12 88		81	19 108
	34	25		82	58
	35	43		83	59
	36	22 90		84	11 128
		173			236
S. Hill, Bridgewater	37	40	J. O. Marshall, Yundi	85	53
	38	49		86	64
	39	67 156		87	48 165
	40	56		88	6
	41	13		89	37
	42	31 100		90	6 49
		256			214
W. Restall, Echunga	43	59	Murray Powell, Jupiter Creek	91	40
	44	51		92	47
	45	39 149		93	53 140
	46	18		94	32
	47	24		95	37
	48	49 91		96	31 100
		240			240

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to July 7th, 1934	Competitor.	Bird No.	First Grade Eggs. Progressive Totals to July 7th, 1934.
S. Bridge, Yundi	97	54	H. F. Mulrson, Yundi	151	29
	98	52		152	52
	99	48 154		153	16 97
	100	9		154	36
	101	dead		155	55
	102	48 52		156	21 112
		206			209
C. T. Rodger, Echunga	103	33	K Pennack, Pooraka	157	3
	104	25		158	44
	105	48 106		159	41 88
	106	27		160	55
	107	42		161	57
	108	9 78		162	26 138
		184			226
R. H. Smith, Yundi	109	16	C. A. L. Sandstrom, Yundi	163	39
	110	12		164	29
	111	54 82		165	52 120
	112	13		166	41
	113	45		167	43
	114	10 68		168	15 99
		150			219
Willow Bend Stud Poultry Farm, North Walkerville	115	28	G. A. Bielby, Pooraka	169	25
	116	35		170	25
	117	46 109		171	51 101
	118	—		172	54
	119	32		173	47
	120	31 63		174	52 158
		172			254
C. MacDonald, Echunga	121	4	W. M. Field, Yundi	175	19
	122	42		176	25
	123	59 105		177	50 94
	124	55		178	22
	125	38		179	14
	126	56 149		180	47 83
		254			177
T. R. Smart Yundi	127	54	T. Duhring, Mallala	181	54
	128	34		182	52
	129	54 142		183	38 144
	130	40		184	59
	131	dead		185	31
	132	59 99		186	53 143
		241			287
Raymoor Poultry Farm, William Street, Kilkenny	133	36	W. B. Hedger, Yundi	187	64
	134	16		188	—
	135	28 80		189	15 79
	136	50		190	46
	137	42		191	60
	138	38 130		192	— 106
		210			185
B. R. Whittington, Yundi	139	15	A. & H. Gurr, Bradbury	193	37
	140	56		194	43
	141	64 135		195	42 122
	142	19		196	48
	143	88		197	54
	144	32 89		198	31 133
		224			255
W. A. Hazel, 11, Bonetta Street, Rosedale	145	—	J. V. McGinnis, Yundi	199	31
	146	58		200	39
	147	34 92		201	40 110
	148	18		202	26
	149	32		203	—
	150	36 86		204	7 33
		178			143

EGG-LAYING COMPETITION—Continued.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to July 7th, 1934.	Competitor.	Bird No.	First Grade Eggs. Progressive Totals to July 7th, 1934.
A. G. Dawes, 230, Portrush Road, Glenunga Gardens	205	45	W. R. Williams, 28, Avenue Road, Frewville	259	62
	206	29		260	41
	207	49		261	5
	208	43		262	59
	209	—		263	44
	210	40		264	56
		92			159
		215			267
W. C. Jones, Yundi	211	5	R. W. McAllister, Yundi	265	40
	212	53		266	17
	213	40		267	33
	214	58		268	16
	215	42		269	47
	216	15		270	40
		115			103
		222			198
Langmaid & Bettison, Parafield, Salisbury	217	22	G. W. Sykes, Yundi	271	39
	218	20		272	44
	219	9		273	31
	220	18		274	52
	221	40		275	24
	222	21		276	33
		79			109
		130			223
A. Jarvis, Yundi	223	41	A. P. Uriwin, Balaklava	277	39
	224	39		278	30
	225	38		279	40
		118			109
	226	43	A. V. Dupen, Melton Street, Glenelg	280	19
	227	35		281	59
	228	46		282	7
		124			85
		242	F. F. Welford, Ludgate Circus, Colonel Light Gardens	283	38
S. Eyles, Clarendon	229	19		284	61
	230	13		285	22
	231	44			121
	232	42	Thomas & Elson, Clifton Street, Hawthorn	286	26
	233	42		287	20
	234	30		288	42
		114			88
		190	J. H. Dowling, Glossop, River Murray	289	41
Woodbury Poultry Farm, Stirling East	235	41		290	43
	236	13		291	45
	237	23			128
	238	—	E. Pape, Wynarka	292	—
	239	16		293	13
	240	19		294	17
		35			30
		112	L. S. Ekers, Mount Jagged Farm Mount Compass	295	37
V. F. Gameau, Findon Road, Woodville	241	46		296	36
	242	5		297	36
	243	23			109
	244	10	V. E. Williams, 57, Fairford Terrace, Semaphore Park	298	23
	245	23		299	37
	246	26		300	56
		59			116
		133	L. R. Badcock, 77, Findon Road, Woodville	301	24
Geo. Lomax, Yundi	247	28		302	46
	248	18		303	45
	249	28			115
	250	26	H. L. Bastin, Southern Cross Poultry Farm, Pooraka	253	19
	251	—		254	53
	252	33		255	44
		59		256	18
		133		257	11
		183		258	23
		168			52

EGG-LAYING COMPETITION—Continued.

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to July 7th, 1934.	Competitor.	Bird No.	First Grade Eggs. Progressive Totals to July 7th, 1934.
W. H. A. Hodgson, Commercial Road, Salisbury.	304 305 306	42 32 54	V. F. Gameau, Findon Road, Woodville (Minorcas)	328 329 330	9 33 36
		128			78
Gallagher & Aslin, Pooraka	307 308 309	60 45 34	A. Heysman, Government Road, Eden Hills (Cuckoo Leghorns)	331 332 333	21 52 42
		139			115
R. C. Crittenden, William Street, Kilkenny North	310 311 312	40 13 23	Langmaid & Bettison, Parafield, Salisbury (Black Minorcas)	471 472 473	6 29 43
		76			78
C. H. Lines, Junr., Gladstone	313 314 315	37 43 37	Total Class No. 2.		366
		117	Class No. 3.—Black Orpingtons.		
A. J. Monkhouse Woodside	316 317 318	47 13 22		334 335 336	52 55 62
		82	H. J. Mills, 108, Edward Street Edwardstown	337 338 339	169 38 49 73
B. Cooke, Kanmantoo	319 320 321	64 64 59			160
		187			329
Gallagher & Aslin, Pooraka	464 465 466	38 45 39		340 341 342	63 2 38
		122	A. G. Dawes Portrush Road, Glenunga Gardens	343 344 345	103 23 52 48
The above birds are White Leghorns, and together with Nos. 307 and 309, will constitute a team in this class.					128
					231
W. C. Slape, Magill	467 468 469	18 30 28		346 347 348	61 42 24
		76	Willow Bend Stud Poultry Farm, North Walkerville	349 350 351	127 45 25 2
Willow Bend Stud Poultry Farm, North Walkerville	474 475 476 477 478 479	67 7 29 9 64 60			72
		138			199
		236		352 353 354	20 32 47
Total Class 1. . .		11,512	H. L. Bastin, Southern Cross Poultry Farm, Pooraka	355 356 357	99 23 60 39
Class 2.—Any Other Light Breeds.					122
M. O. & C. A. Roberts, Torrens Road, Kilkenny (Minorcas)	322 323 324	19 5 1		358 359 360	41 42 23
		25	A. C. Byrne, 114, Rose Terrace, Wayville West	361 362 363	106 31 18 34
G. Frieby Smith, Fulham (Minorcas)	325 326 327	19 29 22			88
		70			189
			W. R. Williams, 28, Avenue Road, Frewville	364 365 366	38 54 60
					152
			O. H. Lines, jun. Gladstone	367 368 369	39 4 —
					43

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive to July 7th, 1934.	Totals	Competitor.	Bird No.	First Grade Eggs. Progressive to July 7th, 1934.	Totals
J. H. Dowling, Glossop, River Murray	370 371 372	— 12 2	14	E. F. Snow, 18, Mt. Barker Road, Glen Osmond (Rhode Island Reds.)	400 401 402	28 9 59	96
F. F. Welford, Ludgate Circus, Colonel Light Gardens	373 374 375	41 46 52	139	W. R. Williams, Avenue Road, Kewville (Rhode Island Reds.)	403 404 405	8 30 37	75
Mrs. M. Specht, Holder Avenue, Richmond	376 377 378	61 21 52	134	Woodbury Poultry Farm, Stirling East (Rhode Island Reds.)	406 407 408	38 69 60	167
W. Rentoul Christie, Claremont Avenue, Mitcham	379 380 381	21 34 —	55	V. F. Gameau, Findon Road Woodville (Rhode Island Reds.)	409 410 411	33 7 14	54
G. Frisby Smith, Fulham House, Fulham	382 383 384	36 33 24	93	K. Pennack, Pooraka (Barnevelders.)	412 413 414	53 18 56	127
B. Cooke, Kamantoo	385 386 387	60 62 63	185	G. W. Lindsay, Torrens Road Kilkenny (Langshans.)	461 462 463	27 25 36	88
Willow Bend Stud Poultry Farm, North Walkerville	480 481 482 483 484 485	60 26 36 50 57 39	122 146 268	Total Class No. 4.		1,128	
F. F. Welford, Ludgate Circus, Colonel Light Gardens	458 459 460	63 38 76	177	<i>Class No. 5—White Leghorns.</i>			
The above birds are Black Orpingtons and, together with Nos. 373-375, will constitute a team in Class No. 3.					415 416 417 418 419 420	17 38 13 49 51 49	68 149 217
Total Class No. 3.		2,433		A. O. Dawkins, Gawler	421 422 423	24 6 47	77
<i>Class No. 4.—Any other Heavy Breed.</i>				A. V. Dupen, Melton Street, Glenelg	424 425 426	68 87 44	144
A. G. Dawes, Portrush Road, Glenunga Gardens (Rhode Island Reds.)	388 389 390 391 392 393	21 60 21 33 65 44	102 142 244	A. J. Monkhouse, Woodside			
A. G. Dawes, Portrush Road, Glenunga Gardens (Rhode Island Reds.)	394 395 396 397 398 399	21 54 62 51 28 61	137 140 277	Total Class No. 5.		438	
<i>Class No. 7.—Black Orpingtons.</i>					427 428 429 430 431 432	1 4 12 26 42 24	17 92 109
				G. Frisby Smith, Fulham House, Fulham	433 434 435	37 30 68	135
				Total Class No. 7.		244	

EGG-LAYING COMPETITION—*Continued.*

Competitor.	Bird No.	First Grade Eggs. Progressive Totals to July 7th, 1934.	Competitor.	Bird No.	First Grade Eggs. Progressive Totals to July 7th, 1934.
<i>Home Project Utility Section.—Wet Mash.</i>			Kevin Angus, Mallala School	449	40
John Plummer, Virginia School	436	30	Alwin Scott, Wellington Road School	450	48
Dudley Harper, Murray Bridge School	437	31	Jack Dietman, Wellington Road School	451	47
Jack Beauchamp, Murray Bridge School	438	9	Milton Smith, Salisbury School	452	61
Jack Beauchamp, Murray Bridge School	439	12	Owen Robinson, Ascot Park School	453	7
George Bielby, Abattoirs School	440	dead	Paul Mundy, Urrbrae High School	454	38
Eric Pratt, Abattoirs School	441	48	Max Couche, Thebarton School	455	56
Stanley Pratt, Abattoirs School	442	35	Robert Swift, Murray Bridge School	456	57
Mervyn Steer, Sturt School	443	55	Bruce Dooland, Thebarton Central School	457	23
Donald Welford, Westbourne Park School	444	27	Ian Slee, Two Wells School	470	24
E. Zbierski, Gawler School	445	54	Total		811
J. McInerney, Gawler School	446	37	All birds in this section are White Leghorns, with the exception of 455 (Rhode Island Red) and 444, 456, and 457 (Black Orpingtons).		
F. Martin, Gawler School	447	42			
Darcy Coleman, Mallala School	448	35			

DEPARTMENT OF AGRICULTURE.

SINGLE TEST EGG-LAYING COMPETITION, 1934-35.

Conducted at the Parafield Poultry Station.

LEADING SCORES TO WEEK ENDING JULY 7TH, 1934.—FIRST GRADE EGGS ONLY.

SECTION 1.—WET MASH.

Class 1.—White Leghorns.

<i>Singles—</i>	Eggs Laid.	Bird Nos.
Willow Bend Stud Poultry Farm	67	474
S. Hill	67	39
<i>Trios—</i>		
B. Cooke	187	319-321
J. O. Marshall	165	85-87
J. C. Normandale	161	76-78
<i>Teams—</i>		
A. H. Matthews	289	7-12
T. Duhring	287	181-186
W. R. Williams	267	259-264

*Class 2.—Any other Light Breed.**Singles—*

A. Heaysman (Cuckoo Leghorn)	52	332
Langmaid & Bettison (Minorca)	43	473
A. Heaysman (Cuckoo Leghorn)	42	333

Trios—

A. Heaysman (Cuckoo Leghorn)	115	331-333
V. F. Gameau (Minorcas)	78	328-330
Langmaid & Bettison (Minorcas, black) ..	78	471-473

Class 3.—Black Orpingtons.

F. F. Welford	76	460
H. J. Mills	73	339

Trios—

B. Cooke	185	385-387
F. F. Welford	177	458-460
H. J. Mills	169	334-336

Teams—

H. J. Mills	329	334-339
F. F. Welford	316	373-375
Willow Bend Stud Poultry Farm	268	and 458-460 480-485

*Class 4.—Any other Heavy Breeds**Singles—*

Woodbury Poultry Farm (Rhode Island Red)	69	407
A. G. Dawes (Rhode Island Red)	65	492
A. G. Dawes (Rhode Island Red)	62	496

Trios—

Woodbury Poultry Farm (Rhode Island Red)	167	406-408
A. G. Dawes (Rhode Island Red)	142	391-393
A. G. Dawes (Rhode Island Red)	140	397-399

Teams—

A. G. Dawes (Rhode Island Red)	277	394-399
A. G. Dawes (Rhode Island Red)	244	388-393

SECTION 2—DRY MASH.

Class 5.—White Leghorns.

A. J. Monkhouse	63	424
A. O. Dawkins	51	419

Trios—

A. O. Dawkins	149	418-420
A. J. Monkhouse	144	424-426

Teams—

A. O. Dawkins	217	415-420
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*Class 7.—Black Orpingtons.**Singles—*

G. Frisby Smith	68	435
A. C. Byrne	42	431

Trios—

G. Frisby Smith	135	433-435
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HOME PROJECT UTILITY SECTION.

Name.	School.	Breed.	Eggs Laid.	Bird No.
Milton Smith, Salisbury		(White Leghorn)	61	452
Robert Swift, Murray Bridge		(Black Orpington)	57	456
Max Couche, Thebarton		(Rhode Island Red)	56	455
Mervyn Steer, Sturt		(White Leghorn)	55	443
E. Zbierski, Gawler		(White Leghorn)	54	445

PAPERS READ AT CONFERENCES.

POULTRY KEEPING IN CONJUNCTION WITH A FRUIT BLOCK.

[W. MACGILLIVRAY, Barmera.]

River Murray Conference, Barmera, June 22nd, 1934.

It is with some trepidation that one advocates any form of industry in these years of depression, quotas, and restrictions, but as the depression seems to be equal in all primary as well as secondary industries we at least have a level to work on. Possibly the most prosperous of all primary industries in Australia to-day is the production of dried fruit, and this has been made possible by the organisation within the industry itself. The egg industry has also a certain amount of organisation, but unfortunately not so complete as that of the dried fruits. New South Wales had until recently a compulsory pool covering the areas which were the chief egg producers in that State, and they are now running a voluntary pool with a considerable amount of success. Their organisation means that the New South Wales poultryman obtains between 5d. and 6d. a dozen more for his eggs than does the poultryman in South Australia.

At the present time most of the commercial eggs in this State are produced in suburban areas round Adelaide, on highly priced building allotments, with their attendant high rates and taxes, &c. At different times I have made tours of these poultry yards and could not help but admire the skill and attention given by the owners to keep their flocks in good condition in such restricted spaces where neither air or sunlight could have free access.

Recently I had the pleasure of showing one of Adelaide's leading poultrymen round the Berri and Barmera districts, and he was so impressed with the ideal conditions for poultry keeping around here that he said if we took up the industry seriously the poultrymen in Adelaide could not compete with us. I mention this because a number of people seem to think that in order to make poultry keeping a success it is necessary to be in or near Adelaide.

As this paper is intended to take poultry keeping in conjunction with fruit growing, the first heavy overhead expenses of the commercial poultry-keeper would not have to be met, namely, several hundred pounds for land, with its attendant high taxation charges; this would be borne by the fruit block in any case. An ample supply of greenfeed is essential to keep the flock in health and well up in egg production, and this every blocker can get in its very best form, in the shape of lucerne, in practically unlimited quantities, incidentally greatly reducing the cost of feeding, and should a cow be kept, the skim milk fed in the wet mash will further reduce feeding costs, and greatly aid egg production. When carting lucerne, leaf accumulates on the bottom of the trolley and also around the haystack. This should all be carefully bagged as the most valuable part of the hay, and can be fed to the birds in their mash should greenfeed be scarce at any time.

The foregoing are some of the obvious advantages a fruitgrower would have on taking up poultry keeping, but the most important of all is apt to be overlooked, and that is the wonderful winter climate with its attendant sunshine. There is nothing like sunshine for keeping flocks in healthy, vigorous condition, and conversely there is nothing like dull wet weather for spreading disease and reducing egg production. You, who know the Adelaide winter climate, as well as our local one, can readily see what this means to the poultry keeper, for it is in winter his eggs command the top price of the year.

CHOICE OF BREEDS.

Should a fruit grower decide to take up poultry keeping for egg production, his choice of a breed is fairly limited. For all practical purposes there are only

[Papers Read at Conferences.]

two breeds of fowls worth considering, namely, the White Leghorn and Black Orpingtons or Australorps, as they are now more suitably known. I have tried out fairly extensively White Leghorns, Australorps, Rhode Island Reds, and in a more limited way Light Sussex, but in my opinion there is only one fowl, and that is the Australorp. Under certain conditions the White Leghorn may lay a few more eggs than the Australorp; for instance, when kept under intensive conditions, although the records of the leading egg-laying trials do not prove this.

It may meet the case to say that both breeds are excellent layers, and look for any difference in other directions. Where the Australorps have a definite lead is in their docility. A 6ft. netting placed about 9in. in the ground is sufficient to keep an Australorp within bounds, but I am not prepared to say what height is required to keep a Leghorn, for if the fence is too high for them to fly over, they climb up the netting and get over that way.

As 50 per cent. of the chickens hatched are cockerels, they have an important bearing on the rearing costs of chickens. In White Leghorns it is generally admitted that it pays best to destroy the cockerels as soon as the sex can be distinguished. On the other hand, I forwarded a crate of 24 Australorp cockerels to the Adelaide markets, in time for the Christmas market, which brought £6 4s. 10d., the highest birds bringing 5s. 7d. each. After deducting commission, rail, and cartage, the net proceeds were £5 1s. 4d., which must be considered highly satisfactory for five months old cockerels.

Having chosen the breed, the greatest care must be taken to see that a good strain of that breed is chosen—layers of full-sized eggs fit for export, anything else being a glut on the market. Having got suitable birds, feed and tend them well, for it can as truly be said of poultry as of larger stock, that half their breeding is what goes down their throat.

A block with a patch of orange trees, which can be conveniently fenced off for poultry is very suitable, for whilst the trees provide shade for the poultry, the droppings of the birds are of great benefit to the trees. It is not suggested that a man whose time is fully occupied with his block should take up poultry keeping, but it is worthy of serious consideration by those who have, perhaps, a family growing up and no apparent opening for them in life. I am fully convinced that nowhere can poultry keeping be more profitably undertaken than in conjunction with a Murray fruit block.

SOME ASPECTS OF VINEYARD MANURING.

[O. WESTE, Renmark.]

The subject of vineyard and orchard manuring is a very big one which covers a range difficult to deal with in a short paper, but it is a subject nevertheless about which the practical grower usually gropes in the dark, works by rule of thumb, and is liable to jump at hasty conclusions with results obtained. When we have plants to deal with where the bud and bunch determination is developed more than a year previous to harvesting it is necessary to cover many years' observations before arriving at any conclusions relative to manuring and its relationship to crop returns.

Those who have spent many years growing fruit have been through a phase of indecision regarding the need for organic matter during the early part of our experience. While the vines were young and vigorous, and still bearing good crops, we believed that the process would last indefinitely. But it will not. Just as soils vary in type, they vary in fertility, so that it will take some soils longer than others to lose their original fertility, and when crops begin to go back, we are forced to the conclusion that perhaps after all there is something more needed to produce successive payable crops than to simply irrigate and cultivate. In every producing country in the world growers have experienced the

[Papers Read at Conferences.]

exploitation of their rich soils and have learned the lesson of the fallacy of taking yearly crops without putting anything back in the way of organic matter. We find reference in Sir John Russell's book, "Soil Conditions and Plant Growth," as follows:—

"The crowding of population into cities, and enormous cheapening of transport rates, led during the nineteenth century to the adoption in new countries, particularly in North America, of what is perhaps the most wasteful method of farming known: continuous arable cultivation without periodical spells of leguminous and grass crops.

"The organic matter was rapidly oxidised away, leaching and erosion increased considerably when the cover of vegetation was removed, while the compound particles that had slowly been forming through the ages soon broke down. Nothing was returned to the soil, the grain and other portable products were sold, and the straw burned.

"The result has been a rate of exhaustion unparalleled in older countries, and wholly beyond the farmers' power to remedy, consequently he left the land and moved on."

Then again we find the same story in those exceptionally fertile Queensland sugarcane areas composed of alluvial volcanic soil which seemed inexhaustible, and after years of what is termed by Mr. R. A. Boyle as "mining" of the soils, necessary plant foods had to be applied to restore their lost fertility. And so it goes on from place to place until we come nearer home, and find that our shallow River soils in the course of time become exhausted, and yield unpayable crops, unless they are supplied with necessary chemical plant foods and organic matter.

Taking our River soils generally in these localities, on chemical analysis, they have shown themselves particularly low in phosphoric acid and nitrogen, and relatively high in potash. Mr. J. K. Taylor in Bulletin No. 42 of the C.S. & I.R. on "Soil Survey of Block 'E' and Chaffey Areas," in summarising the soil requirements said: "The inference is, that phosphatic and nitrogenous fertilisers are essential for maintaining and improving the fertility of both the good and poor types of soils, there is ample potash present, and the heavy applications of gypsum customary, would assist in the liberation of available potash."

VINE MANURING.

Owing to the indefinite and often contradictory nature of experiments in vine manuring, covering many countries, it seems necessary for each grower to be his own experimenter to a certain extent, keeping in mind the necessity for a proper balance of the three major soil requirements, viz., nitrogen, phosphoric acid, and potash.

To get some understanding of these three necessities we may quote Professor Perold, of the Stellenbosch University, in his book, "A Treatise on Viticulture," quoted as follows:—"Nitrogen promotes particularly the vine's vigour. A great development of shoots and leaves of a dark-green colour must be attributed especially to nitrogen. Weakened vines should therefore get a preponderating nitrogen dressing, whilst very vigorous vines that are not sufficiently productive require little or no nitrogen, but a heavy phosphate and potash dressing to render them productive.

"An excess nitrogen nutrition results in grapes that are rich in nitrogen, fairly soft and susceptible to disease, and with low keeping qualities. Wine made from such grapes is especially susceptible to bacterial disease. Vines that grow too vigorously owing to excessive or one-sided dressings of nitrogen are especially susceptible to all kinds of diseases and pests.

"Phosphoric acid helps to neutralise the evil effect of an excessive nitrogen dressing. It encourages the production of grapes and better setting of berries; it also promotes the better ripening of grapes and wood which takes place sooner and more completely, so that grapes at maturity will be sweeter than they would

[Papers Read at Conferences.]

otherwise have been. Hence we can say that it raises the quality of the grapes and wine.

"This accounts for the very heavy dressings of phosphates in the wine districts of France which produce wine of very high quality."

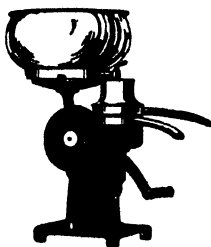
We also have another authority who makes a strong point with phosphoric acid in relation to wine making. Dr. Paul Wagner, of Dorumstadt, says:—"It is the phosphoric acid which forms the good wines, and regulates production by the prevention of coulure; it also makes wine more resistant to disease."

Professor Perold says of potash: "Potash plays an important part in the formation of carbohydrates, hence potash stands in the same relation to the carbohydrates as phosphoric acid stands to the proteins."

Considering our cultural practices in relationship to the balancing of our soils, I wonder if we pay due regard to the characteristics of our vines, to find out what is deficient and what is plentiful. For several years past our crops have been increasing—owing to better cultural practices—yet the quality of our currants has deteriorated. A possible explanation of this may be due to the fact that the growing of leguminous cover crops has increased the nitrogen content of the soil, without being adequately balanced by sufficient phosphates or perhaps potash.

An outstanding instance of a badly balanced soil came to my notice quite recently, when a Block "E" grower complained about his Sultanas drying at 900 tins to the ton, his currants being chiefly skin and water, without any body. Vines grew so rampant that he had difficulty in keeping them in check.

His method of treatment consisted of planting yearly cover crops of legumes, supplemented by dressing of about 3cwts. of sulphate of ammonia. He did not use sulphates because he believed that, as up to 10cwts. of superphosphate per acre had been applied at the Berri Experimental Orchard with negative results, this manure was not necessary.

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[Papers Read at Conferences.]

In this instance there appears to be an excess of nitrogen, and taking into consideration the low phosphate content of our soils generally, there seems to be a very great need for heavy dressings of phosphates to create a balance in this case.

In his book on "Fertilisers for the Orchard and Garden," Mr. R. A. Boyle says:—"The mere act of replenishing one element may cause another automatically to become deficient. For example, there may be a shortage of nitrogen in a certain soil, but as a result of increased growth, due to added nitrogen, there may be insufficient phosphate to maintain this extra growth and so a phosphate deficiency results. The application of nitrogen and phosphate may, in turn, expose a relative scarcity of potash when only with a mixed fertiliser having nitrogen, phosphate, and potash content suitably balanced to suit all conditions, may efficient production be attained."

Although our soils show a comparatively high potash content which can be made available by applications of gypsum, we are not sure whether enough is available to balance the heavier dressings of both sulphate of ammonia and phosphates applied in recent years by many growers.

COVER CROPS.

By far the most important soil requirement in our arid regions is organic matter, for only by the aid of organic matter can we increase its bacterial activity. My practice in this respect is to plant every other row with peas and every other row with beans, so that every row of vines carries a cover crop.

Peas are usually ready to plough under in July and the beans are matured by September. I find no difficulty in ploughing the currant cuttings in with the peas by throwing them on top of the growing crop, but the peas in sultana rows are ploughed in before pruning, and prunings placed in a deep furrow down the centre of the row. All this helps to make organic matter, and it is pleasing to note the gradual spread of this practice in the last few years, first advocated by Mr. Vaillaire.

It is almost impossible to lay down a hard and fast rule for orchard manuring, but the least we can do is to consider the applications and methods of those who have increased their tonnages by the following treatment. When planting leguminous cover crops, apply 2 to 3cwts. super with the seed, supplementing this with a further dressing of super before bud burst, to make the total yearly amount up to 4 to 5cwts. per acre for every ton of dried fruit harvested. At first sight, this might appear excessive and above the absorbing capacity of the vine, nevertheless this has met with such success that it cannot be ignored.

In the event of cover crops maturing later in the season—in which case the breaking down and nitrification may be incomplete by the time the new season's rootlets are seeking nutriment—it would be necessary to give a dressing of artificial nitrogen, always keeping in mind the need for keeping a soil balanced with the major requirements: nitrogen, phosphate, and potash. Although there are many other minor requirements to balance a soil, these are generally in sufficient quantity to cause us no trouble.

Among the so-called minor requirements is sulphur, but as experiments are now in progress in these areas by the Waite Institute, it may be some little time before definite data is made available, but having isolated the bacteria which converts the sulphur into sulphuric acid, these experiments have already proved encouraging enough to proceed upon practical lines.

Experiments which have been carried out at the Merbein Experimental Station under Mr. A. V. Lyon have shown the influence on the size of bunch and quality of the fruit relative to the size of the cane, and as the size of the cane depends entirely on the amount of nutriment the vine gets between bud burst and setting time, it is of the utmost importance to get all manures in place before bud burst, ~~that we~~ ^{then we} can be assured of the vine getting the maximum benefit from our efforts.

ANNUAL WINTER SCHOOL FOR FARMERS, 1934.

The Annual Winter School for Farmers will be held at Roseworthy Agricultural College from the morning of August 8th to the morning of August 17th. In the following curriculum, which has been arranged for the School, the morning sessions, unless otherwise indicated, will be devoted to lectures, the afternoon sessions to outdoor demonstrations conducted on the Farm and accompanied by lecturettes on the subject, while the evening sessions will be devoted as far as possible to illustrated lectures of a general nature.

Conditions for enrolment have been circularised to all Branches of the Agricultural Bureau; non-members of the Bureau are eligible to join the School, and will be supplied with particulars on application.

Rural producers living in the environs of the College are cordially invited to attend any or all of these lectures or demonstrations. Meals can be obtained at 1s. 6d. each, provided the Housemaster is advised a short time beforehand.

CURRICULUM.

Wednesday, August 8th.

10.30 a.m.	Opening of the School	Hon. A. P. Blesing (Minister of Agriculture)
1 to 4 p.m.	Inspection of College Farm	Mr. O. Bowden
7.30 p.m.	Export Markets and their Requirements	Mr. C. F. McCann (S.A. Trades Commissioner in London)

Thursday, August 9th.

8 to 9.30 a.m.	The Care of the Cow on the Farm	Mr. R. Baker
10 to 11.30 a.m.	Cereal Varieties and where to grow them ..	Mr. R. C. Scott
1 to 4 p.m.	Conformation in Relation to Utility in Horses	Mr. C. T. McKenna and Mr. R. Nott
7.30 p.m.	Petroleum from Well to You (a Talkie)	Mr. B. V. Crewe

Friday, August 10th.

8 to 9.30 a.m.	Rotational Systems and Livestock Relationships	Dr. A. R. Callaghan
10 to 11.30 a.m.	Breeding Wheats for the Farmer	Mr. E. J. Breakwell
1 to 4 p.m.	Ensilage on the Farm ?	Dr. A. R. Callaghan and Mr. O. Bowden
7.30 p.m.	Measuring Soil Fertility	Mr. J. K. Taylor

Saturday, August 11th.

8 to 10 a.m.	Pruning Demonstration, Vines and Fruit Trees	Mr. J. L. Williams
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Monday, August 13th.

10 to 11.30 a.m.	Chemistry in Agriculture	Mr. A. R. Hickinbotham
1 to 4 p.m.	Wool Classing and its Importance to the Small Grower	Mr. A. H. Codrington
7.30 p.m.	Factors Affecting the Production of Wheat ..	Prof. A. E. V. Richardson

Tuesday, August 14th.

8 to 9.30 a.m.	Poultry Keeping as a Farm Sideline	Mr. F. W. Gilbert
10 to 11.30 a.m.	Conformation in Relation to Utility in Dairy Cattle	Mr. H. B. Barlow
1 to 4 p.m.	Agricultural Machinery and its Repair	Mr. A. J. A. Koch and Mr. H. R. Nourse
7.30 p.m.	Pasture Development in South Australia	Mr. H. C. Trumble

Wednesday, August 15th.

8 to 9.30 a.m.	Costs in Relation to Farm Records	Mr. W. H. Cowper
10 to 11.30 a.m.	Lucerne Growing in South Australia	Mr. W. J. Spafford
1 to 4 p.m.	Sheep Management and Fat Lamb Production	Mr. W. J. Dawkins and Mr. S. E. Whicker
7.30 p.m.	Some Principles of Breeding	Dr. A. R. Callaghan

Thursday, August 16th.

8 to 9.30 a.m.	Weeds as they Affect the Farmer	Mr. G. H. F. Clarke
10 to 11.30 a.m.	Ailments of the Horse and their Treatment ..	Mr. R. Nott
1 to 4 p.m.	Pigs on the Farm and Bacon Curing	Mr. R. Baker
7.30 p.m.	Social	

ALLAN R. CALLAGHAN, *Principal.*

IMPORTANT WEEDS OF SOUTH AUSTRALIA.

[By G. H. CLARKE, B.Sc., Botanist at the Roseworthy Agricultural College.]

No. 7.—NUT-GRASS.

Cyperus rotundus, L.

Nut-grass is a weed of home gardens, public parks, market gardens, and other situations where rich soil and abundant water supply combine in offering conditions especially favourable to the growth of this plant. Strictly speaking, it is not a grass at all, but belongs to the closely related family of sedges, which differ from true grasses in a number of important characters. Strangely enough, Nut-grass is a native of Australia as well as of most other temperate and tropical countries of the world. It grows in Central Australia and in the Northern parts of this State, forming part of the native vegetation of those areas; but in the South, where it is most troublesome as a weed, it is probably an introduction. So far the true Nut-grass does not appear to be a serious pest of wheat land, or even of pastures, in this State, except in a few situations. But certain grass-like members of the Iris family (*Iridaceae*) are sometimes mistaken for Nut-grass, and to these, in certain districts, the name is wrongly applied. Such, for example, are the two species of "Onion-grass," namely, *Romulea rosea*, Eckl., and *Romulea columnae*, S. et M., and an extremely common one-leaved variety of *Moraea xerospatha*, MacO. All three have narrow grass-like leaves, and each produces a tough underground bulb-like enlargement termed a corm. These corms are sometimes mistaken for the so-called "nuts" or tubers of the true Nut-grass, formed as localised swellings of the underground stems or rhizomes. These Iridaceous plants may be readily distinguished from *Cyperus rotundus* by their flowers which, though few in number, are relatively large and conspicuously coloured, violet or blue, whereas the flowers of *Cyperus* are more like those of true grasses, that is to say, they are small and inconspicuous, and are grouped together in slender cone-like inflorescences termed spikelets.

Botanical Names.—*Cyperus* is the Latin form of *kuperos*, or *kypeiros*, names applied by the Greeks to some species of sedge; *rotundus* means "round," and is in allusion to the rounded tubers or swellings of the underground stems.

The Sedge Family.—The *Cyperaceae* or Sedge family comprises nearly three thousand species of grass-like herbs inhabiting chiefly marshy situations in most parts of the world. They are mostly perennials with either tufted or creeping underground stems which terminate in solid, often angular, aerial stems with two or three ranks of long narrow leaves. The plants are of coarser texture than grasses, from which they differ also in having the sheathing bases of the leaves entire instead of being split lengthwise on the side away from the blade, and the stems solid and uniform, and sometimes compressed or angular, instead of hollow and swollen at the nodes, as is usual among grasses. Apart from these differences, and certain others in the structural details of the flowers and spikelets, the grasses and sedges together form a very natural group of plants. They resemble each other closely in general habit, notwithstanding the differences mentioned; but it is in the structure and arrangement of the flowers that the close relationship between the two families is most clearly revealed.

By the term "inflorescence" is meant an arrangement of flowers, and in most cases it is one of single flowers. In short, the unit of an inflorescence is usually a single flower. But in grasses and sedges the units are not single flowers but spikelets: that is, they are minor inflorescences made up of one, two, or more flowers borne on a slender axis together with protecting bracts, arranged

so as to form compact structures. The individual flowers are small and wind-pollinated. Each is situated in the axil of a bract called a glume, there being usually two or more empty glumes at the base of each spikelet. In both grasses and sedges the spikelets may be arranged in a great variety of different ways so as to form major inflorescences of many different kinds.

The Genus.—*Cyperus* is a large genus and comprises about four hundred species distributed throughout the tropical and subtropical regions of the world, the species becoming less numerous in temperate zones. It is distinguished from other genera of sedges by having spikelets with numerous bisexual flowers arranged in two opposite rows together with the subtending glumes, the spikelets themselves being grouped in heads or umbels with an involucre of leafy bracts at the base. The involucre bracts are sometimes long, on which account certain species, grown for ornament, are often referred to as "Umbrella-grasses" or "Umbrella-sedges."

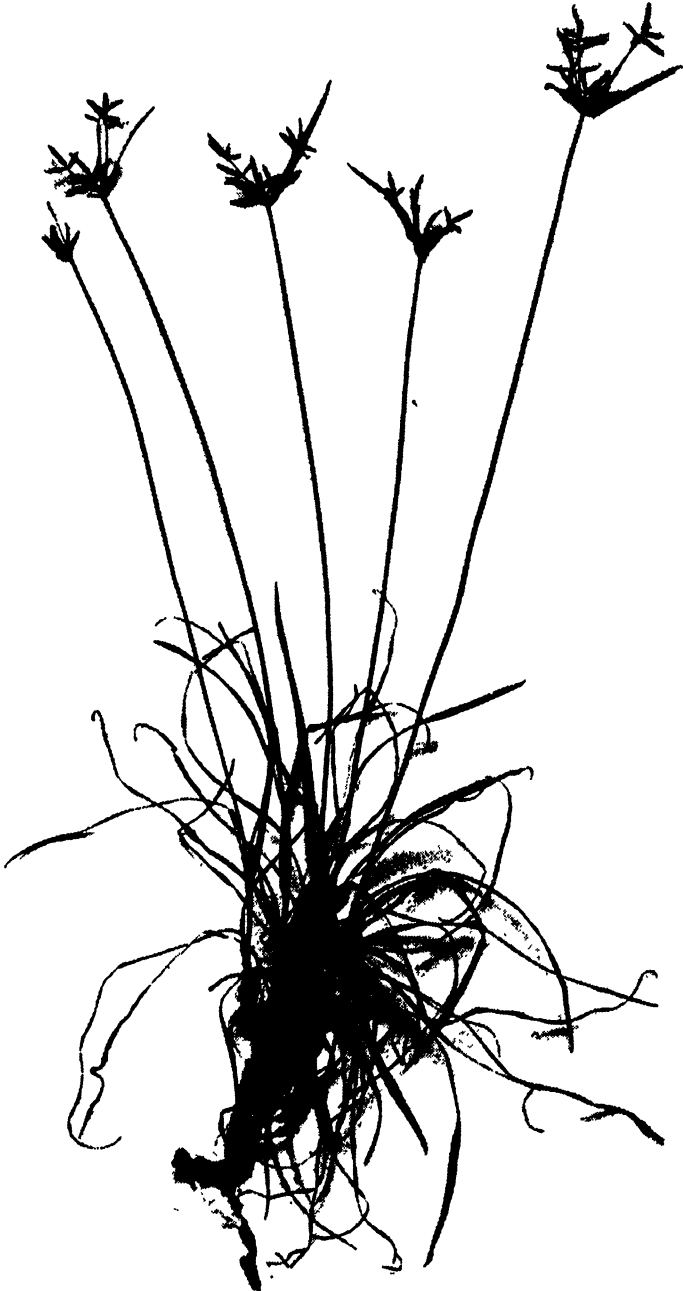
One species, *Cyperus papyrus*, L., was the source of the papyrus or writing paper of the Egyptians, the stems being cut into thin strips and pressed together while still wet. Of the sixty-five species in Australia, some nineteen occur in this State, and from these *C. rotundus* is distinguished by the umbellate arrangement of the spikelets, the axes of which are winged, due to the persistent bases of the glumes, the three-cleft styles of the flowers, the slender aerial stems three-angled above, and by the extensive system of underground stems swollen here and there into rounded tubers.

Description of Cyperus rotundus.—Rhizome creeping or stoloniferous, swelling here and there into tunicated tubers, the scales when worn away leaving annular scars or zones. Stems rather slender, usually 1 to 1½ feet high, but sometimes short, triquetrous towards the top. Leaves rather narrow, much shorter than the stem, the sheaths often long and loose. Spikelets usually 6 to 10 together in clusters or short spikes in an umbel of few rays, the outer ones sometimes slender and 2 or 3 inches long but more frequently the umbel rather dense and sometimes almost contracted into a compound cluster. Involucre bracts few, 1 or 2 longer than the inflorescence. Spikelets usually of a rich brown, linear, acute, compressed but not very flat, usually about ½ inch long and rather more than one-twelfth inch broad, with 12 to 20 flowers, but varying to a much greater length, the rhachis slightly flexuose and bordered by rather broad hyaline wings either persistent or at length deciduous. Glumes imbricate, not very broad, obtuse or rather acute, more or less distinctly several-nerved, with a prominent keel usually green. Stamens 3. Style 3-cleft. Nut obovoid, 3-angled, less than half the length of the glume. Period of flowering: December-May.

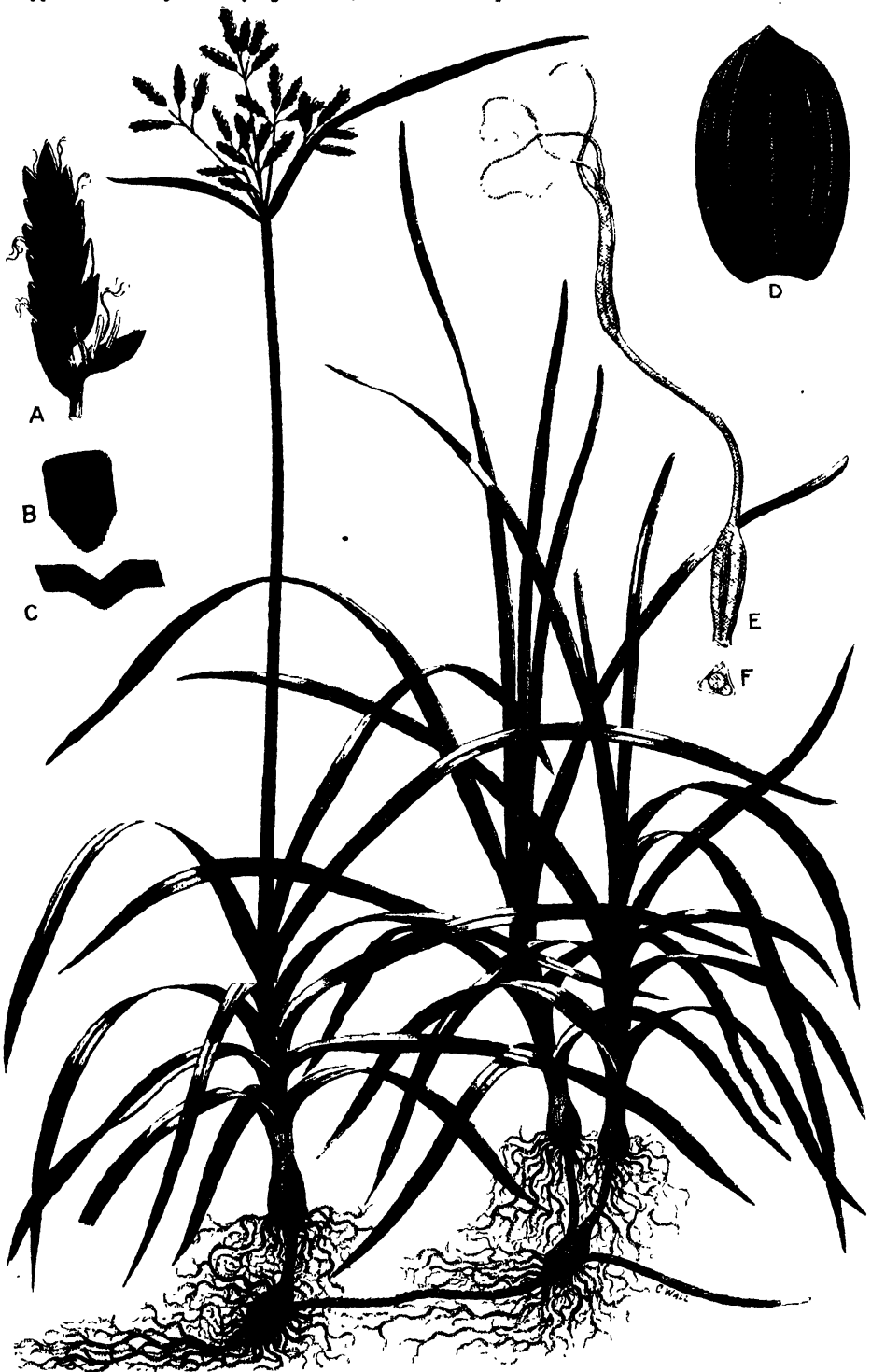
Properties.—Though not poisonous, Nut-grass is not of much value as food for stock owing to the toughness of its aerial parts, but stock are said to eat it readily enough, more particularly the tubers, which are said to be greatly relished by pigs. The tubers are edible, and have been used as human food by the aborigines in various parts of Australia.

The plant owes its reputation as a weed to a very deep-rooted habit and an extraordinary tenacity of life, which makes it one of the most difficult weeds to exterminate. Given favourable conditions, the roots extend down to considerable depths in the soil. A case is on record where they were reported to be 30 feet below the surface of the ground. The roots and underground stems may be so dense as to choke out other plants; they may penetrate the roots and tubers of other plants, and may push their way through asphalt. Hoeing and cultivation are not of much use as methods of eradication since new aerial shoots are formed by the tubers and fragments left behind in the soil.

Eradication.—It is not an easy task to get rid of Nut-grass, though its spread can be greatly retarded by preventing the maturing of seed above ground. The treatment should aim, firstly, to prevent seeding, and, secondly, to exhaust the underground parts. The growth of the aerial shoots takes place, in the first instance, at the expense of food reserves stored in the tubers; during the later stages of growth, however, the passage of food substances is in the reverse direction, new tubers being formed underground to store the surplus food built up by



Nutgrass. Photograph of single plant showing the general habit (see coloured plate opposite).



NUT GRASS (*Cyperus rotundus* L.)

A.—Spikelet. B.—Transverse section of flowering stem. C.—Transverse section of leaf.
D.—Spikelet-scale. E.—Fruit not fully ripe. F.—Transverse section of fruit. (All enlarged).

the leaves. Hence it is a matter of great importance to attack the weed during its early stages of growth, before the seeds have developed. During the early summer the aerial parts should be destroyed, and, by frequent stirring of the ground, the tubers should be stimulated to produce as many new shoots as possible. These in turn should be destroyed before they have had a chance to form seed, the process being repeated as often as is necessary. By such means the underground parts are debilitated and, if not actually killed, are at any rate rendered less capable of producing a vigorous growth the following year. After such treatment a thick sowing of some suitable winter crop may succeed in choking out the Nut-grass.

The use of chemical sprays such as arsenite of soda or sodium chlorate is not recommended except on garden paths, &c., where residual effect does not seriously matter. Repeated applications are necessary to ensure successful results.

In garden beds it is seldom possible to get rid of the weed by digging or hoeing unless great industry and perseverance are shown and due regard is paid to the principles mentioned. A method which has been used successfully is to cover the affected ground with manure to a depth of a foot or more and leave it for a couple of years. By this means light is excluded and the fermentation process helps to prevent the growth of the weed below it.

(The writer's thanks are due to Miss C. M. Eardley, B.Sc., of the Waite Agricultural Research Institute, for supplying material from which the accompanying illustrations were prepared.)

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

CHAMPIONSHIP PRUNING COMPETITIONS.—RIVER MURRAY.

The Championships of the Annual Pruning Competitions arranged for Branches of the Agricultural Bureau situated along the River Murray were held in the Government Experimental Orchard, Berri, on Thursday, July 5th.

RESULTS.

Judges: Messrs. E. Leishman and F. R. Arndt (Department of Agriculture) and L. Chapple.

TREE SECTION.

Competitor.	Branch.	Apricot.	Peach.	Pear.	Total.
A. Wedd	Mypolonga	86	92	87	265
W. Harris	Berri	86	87	87	260
W. Rout	Berri	87	85	84	256
C. Curtis	Waikerie	84	85	87	256
H. M. Perkins	Berri	82	86	88	256
L. W. King	Moorook	85	80	83	248
W. Vogt	Mypolonga	81	82	83	246
R. Loxton	Moorook	85	81	80	246
C. Boehm	Waikerie	82	79	84	245
G. Elliott	Waikerie	81	78	85	244
C. Rowly	Mypolonga	83	80	80	243
E. A. Liddicoat	Moorook	83	80	79	242

VINES.

Competitor.	Branch.	Gordo.	Currant.	Sultana.	Total.
H. M. Perkins	Berri	88	93	106	287
G. Elliott	Waikerie	88	91	104	283
C. Boehm	Waikerie	88	89	105	282
W. Harris	Berri	88	89	104	282
J. T. Robertson	Berri	84	90	102	276
A. Wedd	Mypolonga	87	87	102	276
M. L. Penny	Barmera	84	91	100	275
W. Perry	Waikerie	81	89	105	275
R. Loxton	Moorook	81	87	106	274
S. Loxton	Moorook	78	89	104	271
W. Vogt	Mypolonga	82	88	100	270
L. W. King	Moorook	78	88	100	267
J. Simpson	Barmera	81	87	98	264

Trophies were donated by the Royal Agricultural and Horticultural Society, Dried Fruits Board, Adelaide Chemical Co., and Wallaroo-Mt. Lyell Fertilizer Co.



The Judges—Messrs L. Chapple, E. Leishman and F. E. Arndt.

LANGDON PARSONS'S TROPHY.

This trophy was donated in 1933 by Mr. H. Langdon Parsons, and is to be awarded to the competitor in local competitions who secures the highest aggregate points over the three years 1933, 1934, and 1935. Last year the trophy was held by Mr. E. A. Liddicoat, of Moorook. This year Mr. H. M. Perkins, of Berri will hold the cup.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

RIVER MURRAY CONFERENCE.

The River Murray Conference was held at Barmera this year on June 22nd, and attracted a large number of members from Moorook, Rameo, Waikerie, Barmera, Cobdogla, Monash, Berri, Renmark, and Block E.

Mr. H. B. Williams presided, and there were also present:—Messrs. J. B. Murdoch (Advisory Board of Agriculture), Professor Perkins (Director of Agriculture), Geo. Quinn, R. Fowler, N. S. Fotheringham, F. R. Arndt, and H. H. Orchard (of the Horticultural Branch), C. F. Anderson (Poultry Expert), H. C. Pritchard (General Secretary) and J. K. Taylor (Council of Scientific and Industrial Research). Mr. O. W. Till acted as Local Secretary.

An attractive display of wines was tabled by the Berri Distillery, and trade boxes of sultanas and oranges were exhibited by the Barmera Co-operative Packing Company.

Mr. J. B. Murdoch delivered the opening address.

Papers were read by Mr. O. Weste (Renmark), "Vineyard Manuring"; Mr. N. S. Fotheringham (Berri), "Insect Pests in Irrigated Areas"; Mr. F. R. Arndt, "Review of the 1934 Drying Season"; and Mr. W. McGillivray (Barmera), "Poultry Keeping." Messrs. W. R. Lewis, F. R. Arndt, and N. S. Fotheringham reported on "the conditions and results of the sultana vine in connection with the six years' pruning," and in the evening Mr. J. K. Taylor addressed the Conference on "Progress of Irrigation Research in the Horticultural Areas of the River Murray," with special reference to soil problems.

The following resolutions were carried:—

"That legislation be passed compelling vendors of dusts as fungicides or germicides to brand the bags with both the analysis and the trueness of the contents."

"That the egg industry be placed on a business-like footing, and that the Government create an egg pool."

"That the next Conference be held at Moorook."

EYRE'S PENINSULA (WEST) CONFERENCE.

The Mudamuckla Branch was responsible for the Ceduna Conference this year on July 4th. The Conference was well attended by members of neighbouring Branches, and the proceedings were formally opened by Mr. P. J. Bailly, of the Advisory Board of Agriculture. Mr. W. H. Watson presided, and there were also present:—Miss E. Campbell (Education Department), Professor Perkins, Messrs. H. B. Barlow (Chief Dairy Instructor), C. F. Anderson (Poultry Expert), A. H. Robin (Stock and Brands Department), W. H. Brownrigg (Agricultural Instructor), and H. C. Pritchard (General Secretary). Mr. A. R. Maguire undertook the duties of Local Secretary.

Papers were read by Mr. J. W. Blumson (Laura Bay) on "Wheat Growing in County Way"; Mr. C. W. Bergmann (O'Loughlin), "Wheats Best Suited to the District"; Mr. A. C. Watson (Mudamuckla), "Operations on the Farm from Seeding to Seeding"; Mr. A. R. Maguire, "Sheep on the Farm"; Mr. L. B. Hughes (Goode), "Rabbit Destruction"; Mr. E. Morcombe, "Social Side of Farm Life"; Mr. C. Halahan, "Bookkeeping on the Farm"; and Mr. T. R. Zippell (Mudamuckla), "The Vegetable Garden."

Resolutions were carried as follows:—

"That the next Conference be held at Ceduna, under the auspices of the Goode Branch."

"That Parliament continue to permit the Agricultural Department to issue delegates with free fares to attend the Adelaide Congress meetings."

"That the wild dog tax be written off."

"That members for the district be asked to move for a reduction in the motor tax and drivers' licence."

“That the registration of bulls be abolished in County Way.”

“That more information be given in the rainfall tables published in the *Journal*.”

During the lunch adjournment a visit was made to the new butter factory, and in the afternoon Mr. Barlow addressed the meeting on “Dairy Cattle Suitable for the District.” The evening session was devoted to replies by Mr. Robin to numerous questions dealing with ailments of livestock.

WOMEN'S SESSION.

This was the first occasion on which a Conference of members of Women's Branches has been held on the western portion of Eyre's Peninsula. The attendance was much greater than was anticipated. Mrs. D. F. Morrison (Laura Bay) presided, and papers were submitted by Mrs. W. Pfeiffer (O'Loughlin) on “Jam Making”; Miss L. Kloeden (O'Loughlin), “The Uses of Cold Meats”; Mrs. W. E. Bowell (Laura Bay), “The Danger of Flies in the Home”; Mrs. D. Fagan (Goode), “Soup Making”; and Miss R. E. Blumson (Laura Bay), “Dairying.” Miss E. Campbell gave an address and demonstration on “The Uses of Hessian in the Home.”

Messrs. P. J. Baily, H. B. Barlow, C. F. Anderson, and W. H. Brownrigg attended the Women's Conference at various times to discuss dairying and poultry subjects.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Advisory Board was held on Wednesday, June 27th, there being present Messrs. A. J. Cooke (Chairman), H. N. Wicks, A. L. McEwin, P. J. Baily, Geo. Jeffrey, F. Coleman, A. M. Dawkins, Prof. A. E. V. Richardson, Prof. A. J. Perkins, and H. C. Pritchard (Secretary). An apology was received from Mr. A. J. A. Koch.

Trade Commissioner.—Mr. C. F. G. McCann (Trade Commissioner), attended the meeting at the invitation of the Board, and gave a comprehensive description of the market prospects for Australian produce in England, and of the manner in which our produce was sold overseas.

Conferences.—The Secretary reported that Conferences would be held at Wilmington on July 18th and Karoonda on July 31st.

New Branches.—Conditional approval was given to the formation of Women's Branches at Truro and Monarto South.

Life Member.—Mr. W. A. Crossman (Wareowie) was approved as a Life Member of the Agricultural Bureau.

New Members.—The following names were added to the rolls of existing Branches:—Bute—W. N. Trengrove, A. J. Drewett, Mervyn Green, Eric R. Paterson, J. A. Trengrove, Ralph Trengrove, Colin O'Loughlin, Eric J. Commons, C. R. Warren, Michael Devitt, Wendt Sluggett, Harold E. W. Sluggett, E. J. Axford; Monarto South—E. Rolland; Yandiah—Clarence Giddings; Warrambo Women's—Miss C. N. Chilman; number of new Members, 18; present number of Members, 7,865; present number of Branches, 337.

Retirement of Members.—In accordance with the constitution of the Board the following members retired on June 30th:—Messrs. F. Coleman, A. M. Dawkins, H. N. Wicks, A. J. Cooke, P. J. Baily. All were eligible for re-appointment by the Honourable Minister.

Several items were discussed in Committee.

DAIRY AND FARM PRODUCE MARKETS.

Messrs. A. W. SANDFORD & Co., LIMITED, reported on July 2nd, 1934:—

BUTTER.—Values for butter in the local market have continued on an even keel throughout June, but the production has been very disappointing. Unfortunately, good general rains have not yet fallen, and therefore the country, generally speaking, is in very backward condition, and in most parts hand feeding of stock is necessary. Some few tons of butter have been exported from week to week, but this was only of first and second grade, all the choicest produced being required for local trade. London market is still ruling at low prices, from 71s. to 82s. per cwt. There has not been anything decided in regard to whether this State will go into the "All Australia Plan," but some action will be necessary soon after Parliament meets. Present quotations are:—Choicest creamery fresh butter, in bulk, 1s. 3½d. per pound. Prints and delivery extra (these prices are subject to stabilization levies). Store and collectors' lots, 6½d. to 7½d. per pound at store door, according to quality.

CHEESE.—Advices from the South-Eastern factories indicate that the supplies of milk are now increasing and consequently cheese consignments are showing better tonnage each week. Values showed some improvement towards the latter end of June, and at present the range is:—Large and medium, 8½d. to 8¾d. per pound; loaf, 8¾d. to 9½d. per pound; semi-matured and matured, 8½d. to 9½d. per pound.

EGGS.—Supplies are now increasing each week and some of the packing floors have commenced grading and packing for export. However, it is yet early for large quantities to go forward, and the maximum shipments are not usually sent forward until October or November. However, values are maintaining well for this season of the year, and the outlook for a satisfactory season seems bright. Values are as follows:—Ordinary country eggs, hen or duck, 8d. per dozen; selected fresh eggs, of export quality, 1½ozs. and over, 9d. to 10d. per dozen.

BACON.—The turnover in bacon throughout the month of June was well maintained, but this was only to be expected as the consumption of bacon is usually much greater than in the hotter months of the year. Factories marketed, from week to week, quantities necessary to meet trade requirements and values have continued steady. Best quality sides, 9½d. to 9¾d.; middles, 10½d. to 11d.; rolls, 8d. to 8½d.; hams, 11d. to 11½d.; cooked, 1s. 2d. to 1s. 2½d. per pound; lard prints, 6½d. per pound.

ALMONDS.—Only limited quantities of almonds were sent forward to the open markets, but these were readily cleared from week to week at quotations. Most of the shell lines were purchased by crackers, and as the kernels were required for both local and interstate trade there was an excellent demand ruling throughout and rates were satisfactory. Softshells and Brandis, 8½d. to 9d. per pound; hardshells, 5½d. per pound; kernels, 1s. 11d. to 2s. per pound.

HONEY.—Sales of honey continued somewhat slow as the orders from interstate buyers were disappointing. Local buyers purchased from week to week, but very few sales of parcel lots were negotiated. Values continued steady. Prime quality clear extracted in liquid condition, 3½d. to 4d. per pound; lower grades, 2d. to 2½d. per pound.

BEESWAX.—Ready sales were made of all consignments sent forward to the open markets and quotations remained without any alteration. 1s. 4d. to 1s. 4½d. per pound, according to quality.

LIVE POULTRY.—Sales are held every Tuesday, Thursday, and Friday, and our sale rooms are the best equipped in the State. Large attendances of buyers were recorded at each of our sales, and representative catalogues were submitted. Values for some classes were well maintained but poor quality sorts fluctuated somewhat. We advise consigning. Crates loaned on application. Prices were as follows —Prime roosters, 3s. 4d. to 4s. 3d.; nice conditioned cockerels, 2s. 9d. to 3s. 3d.; fair conditioned cockerels, 2s. 3d. to 2s. 8d.; chickens, lower; heavyweight hens, 2s. 4d. to 3s. 1d.; medium hens, 1s. 9d. to 2s. 3d.; light hens, 1s. 6d. to 1s. 8d.; couple of pens of weedy sorts, lower; prime young Muscovy drakes, 3s. 3d. to 4s. 3d.; young Muscovy ducks, 2s. 3d. to 2s. 10d.; ordinary ducks, 1s. 6d. to 2s. 4d.; ducklings, lower; geese, 2s. to 3s.; goslings, lower; turkeys, good to prime condition, 8½d. to 11d. per pound live weight; turkeys, fair condition, 6½d. to 8d. per pound live weight; turkeys, poor and crooked breasted, lower; pigeons, 5d. to 5½d. each.

POTATOES.—New season's, 9s. per cwt.

ONIONS.—Brown Spanish, 6s. 6d. per cwt.

IMPORTS AND EXPORTS OF FRUITS, PLANTS, ETC. APRIL AND MAY, 1934.

IMPORTS.

Interstate.

	April.	May.		April.	May.
Apples (bushels)	330	713	Melons (bags)	2	1
Apple Custard (bushels) ..	—	28½	Mixed Vegetables (bag) ...	—	1
Bananas (bushels)	11,102½	16,259½	Onions (bags)	1,823	279
Citrus—			Potatoes (bags)	16,286	20,062
Grape Fruit (bushels) ..	—	7	Swedes (bags)	73	114
Lemons (bushels)	3	—	Bulbs (packages)	43	83
Oranges (bushels)	3	9	Plants (packages)	61	137
Figs (bushel)	½	—	Roots, Grass (packages) ..	—	2
Passion Fruit (bushels) ...	361½	375	Seeds (packages)	70	36
Peaches (bushels)	2	—	Trees, Fruit (packages) ...	—	31
Pears (bushels)	5	—	Wine Casks (No.)	2,246	2,811
Pineapples (bushels)	833½	324½			
Quinces (bushels)	—	2	<i>Fumigated—</i>		
Tomatoes (bushels)	105	4	Wine casks (No.)	1	26
Ginger (bushel)	½	—			
Nuts—			<i>Rejected—</i>		
Chestnuts (bag)	1	—	Bananas (bushels)	1½	1½
Cocoanuts (bags)	1	2	Passion Fruit (bushel) .	—	½
Peanuts (bags)	83	220	Pineapples (bushels) ...	—	3
Peanut Kernels (bags) ..	—	31	Potatoes (bags)	54	67
Beans (bushels)	52	—	Plants (packages)	2	1
Carrots (bags)	10	—	Second-hand cases (No.)	6	—
Cucumbers (bushel)	1	—			

Oversea.

(State Law.)

Wine casks (No.)	573	961	<i>Fumigated—Wine casks (No.)</i>	40	23
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Federal Quarantine Act.

	Packages.	lbs.	Packages.	lbs.
Seeds, &c.	5,210	844,126	4,833	891,393
Canes	180	—	94	—
Chests, Coconut	320	—	237	—
Chests, Tea	439	—	1,289	—
Timber	178,212	2,924,153 sup. ft.	153,468	5,753,897 sup. ft.

EXPORTS.

Federal Commerce Act.

	April	May.		April.	May.
	Packages.			Packages.	
China..... Citrus—			Netherlands, Apples	2,042	1,847
Oranges	—	60	East	120	50
Pears	—	90	Indies	—	3
Egypt..... Apples	525	—	New	—	2
England... Apples	77,888	48,136	Zealand	—	16
Grapes	300	—	Palestine .. Apples	103	—
Pears	15,249	869	Scotland .. Apples	—	5,069
Quinces	2	—	Singapore . Apples	87	52
Germany... Apples	65,248	40,390			
Holland.... Apples	750	—	Citrus—		
India..... Apples	2,368	5,134	Lemons	24	12
Citrus—			Peaches	22	—
Lemons	—	10	Pears	56	50
Oranges	—	74	Potatoes	15	—
Grapes	114	66	Other vegetables	40	76
Peaches	14	5	Straits	—	15
Pears	30	100	Settlements	—	5
Vegetables	39	171			

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of June, 1934, also the average precipitation for June, and the average annual rainfall.

Station.	For June, 1934.	Av'ge. for June.	Av'ge. Annual Rain-fall.
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FAR NORTH AND UPPER NORTH.

Oodnadatta	—	0.61	4.69
Marree	0.05	0.7	5.93
Farina	0.12	0.85	6.48
Copley	0.27	1.05	7.93
Beltana	0.09	1.07	8.63
Blinman	0.26	1.59	11.92
Hookina	0.70	1.76	11.46
Hawker	0.77	1.89	12.31
Wilson	0.87	1.78	11.82
Gordon	0.30	1.46	10.59
Quorn	0.46	1.80	13.29
Port Augusta	0.22	1.16	9.46
Bruce	0.36	1.34	9.95
Hammond	0.19	1.39	11.27
Wilmington	0.74	2.42	17.43
Willowie	0.42	1.63	12.28
Melrose	1.53	3.30	22.94
Boooleroo Centre	0.94	2.15	15.23
Port Germein ...	0.89	1.52	12.55
Wirrabara	1.12	2.70	19.34
Appila	0.65	1.79	14.66
Craddock	0.55	1.56	10.83
Carrieton	0.54	1.65	12.29
Johnburg	0.44	1.31	10.59
Eurelia	0.77	1.67	12.85
Orroroo	2.16	1.74	13.23
Nackara	0.27	1.37	11.18
Black Rock	0.21	1.57	12.43
Oodlawirra	0.58	1.34	11.67
Peterborough....	0.65	1.59	13.27
Yongala	0.71	1.82	14.47

NORTH-EAST.

Yunta	0.16	0.98	8.54
Waukaranga	0.21	1.03	7.97
Mannahill	0.15	0.90	8.21
Cockburn	0.09	0.95	7.98
Broken Hill, N.S.W.	0.13	1.16	9.57

LOWER NORTH.

Port Pirie	0.87	1.74	13.26
Port Broughton..	1.33	2.02	13.92
Bute	1.08	2.28	15.49
Laura	0.74	2.41	17.99
Caltowie	0.88	2.06	16.75
Jamestown	0.63	2.30	17.75
Gladstone	0.72	2.08	16.33
Crystal Brook ...	0.64	2.16	15.82
Georgetown	0.89	2.44	18.41
Narridy	0.69	2.17	15.88
Redhill	1.07	2.39	16.61
Spalding	1.30	2.54	18.99
Gulnare	1.04	2.56	18.71
Yaaka	1.78	2.11	15.40
Koolunga	1.10	2.12	15.43
Snowtown	1.42	2.23	15.71

LOWER NORTH—continued.

Brinkworth	1.49	2.28	15.83
Blyth	1.13	2.22	16.80
Clare	1.59	3.37	24.56
Mintaro	1.27	3.34	23.47
Watervale	1.36	3.75	26.91
Auburn	1.52	3.13	24.00
Hoyleton	0.72	2.23	17.35
Balaklava	1.08	1.91	15.49
Port Wakefield ..	1.29	1.63	12.96
Terowie	0.89	1.54	13.40
Yarcowie	0.99	1.66	13.63
Hallett	0.81	2.14	16.48
Mount Bryan....	0.87	2.27	16.81
Koorunga	0.95	2.38	17.92
Farrell's Flat ...	1.11	2.54	18.68

WEST OF MURRAY RANGE.

Manoora	2.23	2.45	18.93
Saddleworth	1.72	2.49	19.61
Marrabel	1.45	2.69	19.94
Riverton	1.20	2.74	20.81
Tarlee	1.08	2.33	18.13
Stockport	1.12	2.25	16.97
Hamley Bridge ...	1.06	2.26	16.61
Kapunda	1.31	2.48	19.82
Freeling	1.12	2.41	17.88
Greenock	1.37	2.89	21.57
Truro	1.08	2.72	19.95
Stockwell	1.11	2.80	20.17
Nuriootpa	1.39	2.93	20.72
Angaston	0.96	3.18	22.47
Tanunda	1.12	3.21	22.03
Lyndoch	0.86	3.59	23.46
Williamstown ...	0.94	4.69	27.77

ADELAIDE PLAINS.

Owen	0.74	1.55	14.53
Mallala	0.87	2.31	16.59
Roseworthy	1.29	2.45	17.39
Gawler	0.88	2.61	18.97
Two Wells	1.14	2.30	15.75
Virginia	0.93	2.51	17.18
Smithfield	0.89	2.60	17.65
Salisbury	0.87	2.76	18.59
Adelaide	1.03	3.11	21.15
Glen Osmond....	1.07	4.27	26.03
Magill	0.98	4.05	25.60

MOUNT LOFTY RANGES.

Teatree Gully ...	1.22	4.45	27.33
Stirling West ...	1.76	8.07	47.05
Ursidla	1.48	7.54	44.19
Clarendon	1.07	5.25	32.89
Morphett Vale ..	0.92	3.44	22.68
Noarlunga	0.74	3.16	20.41
Willunga	1.28	3.97	26.03
Aldinga	0.98	3.25	20.28

RAINFALL—continued.

Station.	For June, 1934.	Av'ge. for June.	Av'ge. Annual Rain-fall.	Station.	For June, 1934.	Av'ge. for June.	Av'ge. Annual Rain-fall.
MOUNT LOFTY RANGES—continued.				WEST OF SPENCER'S GULF—continued.			
Myponga	1.36	4.82	29.68	Arno Bay	1.90	1.59	12.63
Normanville	0.52	3.29	20.73	Rudall	1.22	1.52	13.12
Yankalilla	1.08	3.83	22.90	Cleve	1.89	1.93	14.79
Mount Pleasant ..	1.14	4.25	27.24	Cowell	1.54	1.26	11.12
Birdwood	0.97	4.73	29.24	Miltalie	1.68	1.68	13.64
Gumeracha	1.22	5.36	33.44	Darke's Peak ...	1.52	2.24	15.23
Millbrook Res....	1.55	5.38	34.82	Kimba	0.81	1.53	11.84
Tweedvale	1.26	6.14	35.97				
Woodside	1.28	5.26	32.30	YORKE PENINSULA.			
Ambleside	1.25	5.62	34.90	Wallaroo	1.57	2.07	13.99
Nairne	1.56	4.21	28.17	Kadina	1.52	2.27	15.69
Mount Barker ..	1.51	4.54	31.97	Moonta	1.56	2.21	15.10
Echunga	1.83	5.26	33.26	Paskeville	1.37	2.33	15.52
Macleasfield	1.65	4.47	30.44	Maitland	1.44	3.05	19.97
Meadows	1.73	5.54	36.21	Ardrossan	0.96	2.03	13.98
Strathalbyn	1.44	2.52	19.32	Port Victoria ...	1.33	2.30	15.49
				Curramulka	1.06	2.77	17.95
MURRAY FLATS AND VALLEY				Minlaton	1.22	2.81	17.85
Meninnie	0.95	2.66	18.42	Port Vincent ...	1.14	2.33	14.50
Milang	1.19	2.12	14.97	Brentwood	1.25	2.35	15.58
Langhorne's Ck. .	1.32	1.92	14.90	Stansbury	0.67	2.51	16.84
Wellington	1.11	1.92	14.70	Warooka	1.26	2.70	17.53
Tallem Bend	1.08	1.81	15.08	Yorketown	1.32	2.62	16.94
Murray Bridge ..	0.96	1.66	13.64	Edithburgh	0.88	2.40	16.49
Callington	1.14	1.97	15.22				
Mannum	0.77	1.37	11.53	SOUTH AND SOUTH-EAST.			
Palmer	0.85	1.97	15.55	Cape Borda	2.75	4.61	24.86
Sedan	0.68	1.59	12.11	Kingscote	1.05	3.02	19.16
Swan Reach	0.78	1.23	10.62	Penneshaw	1.24	2.81	19.02
Blanchetown ...	0.65	1.20	11.03	Victor Harbour ..	1.47	3.20	21.42
Eudunda	1.53	2.26	17.18	Port Elliot	1.45	2.84	19.95
Sutherlands	0.75	1.39	10.88	Goolwa	1.30	2.45	17.87
Morgan	0.60	1.00	9.21	Copeville	1.08	1.38	11.57
Waikerie	0.92	1.16	9.70	Meribah	0.43	1.21	11.46
Overland Corner	0.99	1.13	10.37	Alawoona	0.24	1.32	10.29
Loxton	0.54	1.24	11.65	Mindarie	0.68	1.48	12.22
Berri	0.80	1.08	10.32	Sandalwood	0.57	1.77	13.73
Renmark	0.61	1.12	10.49	Karoonda	0.66	1.75	14.48
				Pinnaroo	0.42	1.70	14.57
WEST OF SPENCER'S GULF				Parilla	0.47	1.75	14.01
Eucla	3.55	1.08	9.98	Lameroo	0.51	1.97	16.10
Nullarbor	3.60	1.32	8.84	Parrakie	0.54	1.73	14.64
Fowler's Bay ...	2.27	2.18	11.93	Geranium	0.56	1.95	16.53
Penong	1.72	1.91	12.23	Peake	0.49	1.94	16.13
Koonibba	1.68	1.78	12.11	Cooke's Plains ..	1.04	2.04	15.43
Denial Bay	1.39	1.78	11.52	Coomandook	0.97	2.29	17.20
Ceduna	1.57	1.55	10.16	Coonalpyn	0.75	2.35	17.53
Smoky Bay	1.16	1.82	10.51	Tintinara	0.66	2.56	18.73
Wirrulla	1.56	1.73	10.50	Keith	0.47	2.26	17.96
Streaky Bay	2.59	2.83	14.88	Bordertown	0.42	2.57	19.26
Chandada	1.08	—	—	Wolseley	0.57	2.42	18.52
Minnipa	0.82	2.27	13.87	Frances	0.72	2.54	20.01
Kyancutta	1.03	—	—	Naracoorte	0.77	3.24	22.63
Talia	2.03	2.70	14.63	Penola	1.07	3.54	26.05
Port Elliston ...	2.53	3.25	16.50	Lucindale	0.98	3.51	23.29
Yeelanna	0.89	2.58	16.02	Kingston	0.76	3.94	24.37
Cummins	0.82	3.05	17.61	Robe	1.16	4.05	24.56
Port Lincoln	1.10	3.20	19.43	Beachport	1.80	4.67	27.07
Timby	1.15	1.89	14.14	Millicent	1.57	4.65	29.81
Ungarra	1.22	2.43	16.87	Kalangadoo	1.42	4.23	32.38
Port Neill	1.72	1.75	13.16	Mount Gambier..	1.10	4.01	30.55

AGRICULTURAL BUREAU REPORTS.

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Allandale East	†	20	24	Gladstone Women's	†	17	21
Alma	*	—	—	Glencoe	*	10	14
Appila-Yarrowie	1602	6	3	Goode	†	—	—
Arthurton	*	—	—	Goode Women's	*	—	—
Ashbourne	*	25	22	Greenock	1608	2	—
Auburn Women's	1647	R	31	Green Patch	*	26	23
Balaklava	*	23	—	Gumeracha	*	23	27
Balhannah	*	—	—	Hanson	*	24	21
Balumbah	*	—	—	Hartley	*	—	—
Balhannah Women's	*	18	15	Hindmarsh Island	*	—	—
Balumbah Women's	1648	4	1	Hope Forest	†	2	6
Beetaloo Valley	1603	23	20	Hope Forest (Wom's)	†	—	—
Belalie Women's	1648	10	14	Hoyleton	*	16	20
Berri	*	25	22	Inman Valley	1628	19	16
Belvidere	*	—	—	Jamestown	†	18	15
Blackheath	†	26	30	Jervois	†	12	9
Black Rock	*	11	—	Kalangadoo Women's	†	14	11
Black Springs	†	24	21	Kalangadoo	*	14	11
Blackwood	*	9	13	Kalyan	*	18	15
Blyth	1604	27	24	Kangarilla Women's	*	19	16
Booborowie	*	23	20	Kanni	*	—	—
Bouleroo Centre	*	20	24	Kapinnie	*	—	—
Boolgun	*	—	—	Kapunda	*	13	10
Boor's Plains	*	5 & 28	2	Karoonda	*	25	22
Borrika	*	—	—	Keith	*	26	23
Bowhill	*	23	20	Kelly	1616	7	4
Brentwood	*	5	2	Ki Ki	*	—	—
Brinkley	*	25	22	Kilkerran	*	26	23
Brinkworth	*	23	20	Kongorong	*	23	20
Brownlow	1607	—	—	Koolunga	*	—	—
Buchanan	*	—	—	Koonibba	*	19	23
Bute	†	19	16	Koonunga	*	—	—
Butler	*	—	—	Koppio	†	24	21
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Carrow	*	25	22	Kulkawirra	†	10	14
Ceduna	*	—	—	Kyanetta	*	3	7
Charra	*	—	—	Kybybolite	*	26	23
Cherry Gardens	†	21	25	Kybybolite Women's	†	—	—
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Clarendon	1625	23	20	Laura	*	28	25
Cleve	*	7	4	Laura Bay	*	—	—
Collie	*	4	1	Laura Bay Women's	1649	10	—
Coomandook	1618	27	31	Lensw'd & F'st Range	*	—	—
Coonawarra	*	26	23	Light's Pass	1610	—	—
Coonawarra Women's	†	18	15	Lipson	*	21	25
Cummins	1615	13	10	Lone Gum & Monash	*	25	22
Cungena	*	5	2	Lone Pine	*	23	20
Currency Creek	†	23	27	Lowbank	*	25	22
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Millicent	*	27	31	Rudall	*	24	21
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Monarto South	†	—	—	Scott's Bottom	†	21	25
Moorlands	1619	25	22	Shoal Bay	*	24	21
Morchard	1602	20	24	Smoky Bay	*	—	—
Morchard Women's ..	†	25	22	Snowtown	†	13	10
Mount Barker	*	16	20	Snowtown Women's ..	†	5	2
Mount Bryan	*	—	—	South Kilkerran	1615	24	21
Mount Compass	1628	—	—	Springton	*	4	1
Mount Gambier	1600	13	10	Stanley Flat	*	16	20
Mount Hope	†	24	21	Stockport	†	—	—
Mount Pleasant	†	13	10	Strathalbyn	*	11	8
Mudamuckla	*	14	11	Streaky Bay	*	27	24
Mundalla	*	—	—	Sutherlands	1611	5	2
Mundalla Women's ..	†	26	23	Tailem Bend	*	26	30
Murray Bridge	1621	25	22	Talia	*	27	31
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Myppolonga	†	—	—	Tantanoola Women's ..	†	4	1
Mypponga	1620	19	16	Taplan	*	24	21
Myrla	*	25	22	Taplan Women's ..	†	—	—
Nantawarra	†	26	23	Taragoro	*	26	23
Naracoorte	*	14	11	Tarlee	1614	10	14
Narridy	*	—	—	Truro	†	16	20
Narrung	1629	—	—	Tulkinera	*	26	23
Nelshaby	*	—	—	Tweedvale	1630	19	16
Nelshaby Women's ..	*	—	—	Ungarra	*	26	30
Netherton	*	25	22	Upper Wakefield ..	1614	19	23
Nunjikompita	†	26	23	Uraidla & Su'merto'n ..	*	2	6
Nunkeri	†	26	23	Waddikee Rocks ..	*	21	25
O'Loughlin	†	9	13	Waikerie	*	13	10
O'Loughlin Women's ..	*	—	—	Wallala	*	11	8
Overland Corner	†	25	22	Wanbi	*	25	22
Owen	*	9	13	Wandearah	*	24	21
Palabie	*	—	—	Warcoowie	1603	24	21
Parilla	*	17	21	Warcoowie Women's ..	*	—	—
Parilla Women's	*	18	15	Warramboo	1616	24	21
Parilla Well	*	23	27	Warramboo Women's ..	†	6	3 & 31
Parilla Well Women's ..	†	31	28	Wasleys	†	12	9
Parrakie	*	—	—	Wasleys Women's ..	†	5	2
Parrakie Women's ..	1650	24	28	Watervale	*	16	20
Paruna	*	6	3	Wauralte	*	24	21
Paskeville	*	24	21	Weavers	*	9	13
Pata	*	6	3	Wepowie	*	23	20
Penola	†	7	4	Wepowie Women's ..	*	—	—
Penola Women's	†	—	—	Wilkawatt Women's ..	1651	17	21
Penwortham	†	25	22	Williamstown Wm's ..	†	4	1
Petersville	*	24	21	Willowie	*	13	27
Petina	*	28	25	Wilmington	†	10	21
Pinbong	*	—	—	Wilmington Wm's ..	†	—	—
Pinnaroo	†	—	—	Wirrabara	1605	—	—
Pinnaroo Women's ..	*	6	3	Wirrilla	*	21	25
Port Elliot	*	—	—	Wirrilla Women's ..	*	5	2
Pygery	†	24	21	Wirrulla	*	18	15
Pygery Women's ..	1650	—	—	Wolsley	*	9	13
Quorn	*	—	—	Wudinna	*	—	—
Ramoo	†	23	20	Yadnarie	1616	24	21
Redhill	†	—	—	Yandiah	1605	13	10
Rendelham	1600	21	25	Yaninee	*	—	—
Rendelham Women's ..	*	—	—	Yeelanna	*	25	22
Renmark	†	—	—	Yundi	*	18	15
Riverton	*	9	13	Yurgo	*	—	—
Roberts & Verran ..	†	—	—	Yurgo Women's	1651	—	—

* No reports received during the month of June. † Held over. ‡ In recess. § Formal.

AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the Secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the Department for fuller particulars concerning the work of this institution.

[The new Bureau subscription rate of 2s. per annum, which was recommended at the 1933 Congress, applies to all members as from August 1st, 1934, with the following exceptions:—Life Members, Branch Secretaries, and members who reside in the same house as (a) a Life Member, or (b) a Branch Secretary, or (c) a subscribing member. Subject to the foregoing exceptions, new members joining during the months of July to December will pay 2s. per annum, and those joining during the months of January to June 1s. for that period and 2s. for each succeeding year. Subscriptions must accompany the nomination forms unless the nominee is exempt.]

MEN'S BRANCHES.

SUBJECTS DISCUSSED AT BUREAU MEETINGS.

If you have no other subject in mind, here is a list from which you might choose when asked to contribute to your branch programme. The list has been compiled from published branch reports.

Agriculture.	Horticulture.	Livestock.	General.
Barley Growing. Harvest Reports. Pasture Management. Fallowing. Care of Machinery. Control of Drift. Fodder Crops. Haymaking. Crop Rotation. Seeding Operations. Wheat Pickling. Wheat Diseases. Wheat Varieties for the District. Seed Wheat. Value of the Oat Crop. Wheats for Milling. Peas. Wheat v. Sheep. Wheat Varieties for Hay. Crop Competitions. Harvest Operations. Value of Agricultural Experiments. Cultivation. Fertilisers and Manures. Cultivator v. Plough for Fallowing. Tobacco Culture. Meadow Hay. Review of the Past Season.	Cincturing. Spraying. Pruning. Orchard and Garden Pests. Fruit Drying. Drainage. Potatoes. Tomato Culture. Vegetable Growing. Citrus Culture. Packing and Grading Fruit. Budding and Grafting. Orchard Cultivation. Rack Building. Fruit Preserving. Irrigation. Seepage. Care of Orchard Equipment. Farm Garden. Diseases of the Vine. Manures for the Orchard. Fruit Tree Diseases. Planting the Orchard. Frost Prevention. Fumigation for Scale Insects.	Calf Rearing. Care of Farm Livestock. Management of Horses. The Brood Mare. Colt Breaking. Shoeing Horses. Sore Shoulders. Weaning Foals. Lamb Marking. Sheep Management. Wool Classing. Shearing. Sheep Dipping. Fat Lambs. Handfeeding Sheep. Poultry. Shelter for Livestock. Management of the Dairy Cow. Care of the Breeding Ewe. Pigbreeding and Management. Ailments and Diseases of Farm Stock. Sheep v. Wheat. Rearing Turkeys. Horse Breeding. Herd Testing. Rams for Farm Flocks.	Afforestation. Beekeeping. Bird Pests. Blacksmithing. Book-keeping. Preparations for Drought. Ensilage. Labor Saving Hints. Fencing. Fodder Conservation. Vermin Destruction. Care of Hides and Skins. Farm Insurance. Tank Building. Shed Construction. Farm Conveniences. Concrete on the Farm. Dam Sinking. Scrub Farm Operations. Farm Sidelines. Bacon Curing. Value of Native Birds. Noxious Weeds. The Agricultural Bureau. Handling Dairy Produce. Farm Buildings. Layout of the Farm. Firefighting. Lowering Costs of Production. Farm Records. Subdivision of the Farm.

SOUTH-EASTERN DISTRICT.

RENDELSHAM.

May 26th.—Attendance, 14.

QUESTION BOX.—The following questions and answers resulted from the Question Box:—"When is the best time to set eggs of White Leghorns for hatching?"—*Ans.*: August and September. "If a rooster is running with a flock of hens will they lay more or less eggs?"—*Ans.*: Hens will lay as well without as with a rooster. "What is the best method to get ducks to start laying?"—*Ans.*: Feed and treatment will give best results, especially if a good plot of greenfeed is available for the birds. The best feed is a mash of bran and pollard with meal with meatmeal in the morning and grain feed at night. "Do fowls pay with eggs at 6d. per dozen?"—*Ans.*: Yes; a profit can be shown with eggs at 5d. a dozen. "Does top-dressing of pastures pay?"—*Ans.*: Yes; if super is used at about 1cwt. to the acre, especially for the grazing of sheep. "How long after the seeding of rape before it can be fed off?"—*Ans.*: No definite time can be stated, as it depends on the growth of the crop, but as soon as it is well-rooted it can be fed off—usually from about six weeks to two months after seeding. (Secretary, F. White.)

NOXIOUS WEEDS.

(A Paper read by Mr. E. S. Alcock (District Agricultural Instructor) at the June meeting of the Mount Gambier Branch.)

"The need for controlling the spreading of various plants was realised early in the State's history, for we find that legislation was passed by Parliament over 60 years ago to deal with this matter. Reports I have heard from time to time lead me to suspect that this Act was more rigidly enforced than it is to-day. In 1896 Mr. Albert Molineaux, founder of the Agricultural Bureau in South Australia, wrote pointing out the need for more elastic legislation. The various Acts were amended in 1931, and at the same time power was given for any plant to be proclaimed a noxious weed either throughout the whole State or any portion of the State, and to remove any plant from the schedule, provided special circumstances demanded it."

Mr. Alcock then read a list of the Proclaimed Weeds of the State:—

"In the Corporation area the following have been declared noxious:—*Fennell* and *Milk Thistle*.

African Boxthorn is a noxious weed for the whole State, except where grown as a hedge and kept trimmed to a width not exceeding 4ft., and not exceeding 7ft. high. A visitor in this district would hardly think in some years that we had a Noxious Weeds Act. In many places noxious weeds are allowed to grow unchecked. This is largely due to the lack of interest and knowledge by landholders and those who have the handling of the Act. This can be readily proved by anybody visiting the Tatiara District Council area, for they have a very efficient Council inspector in Mr. H. C. Williams, who has created quite a weed sense among the landholders in his district. He is doing a good job, and the same can be done in other centres by the co-operation of both landholders and council inspectors.

WEEDS IN THIS LOCALITY.

The weeds found in and around this locality are Wild Onion, Hemlock or Carrot Fern, Horehound, Boxthorn, Fennell, Milk or Variegated Thistle. Fortunately Wild Onion is not very prevalent; it has been kept well under control. No animal will eat it, although it will take possession if left unchecked.

Hemlock or *Carrot Fern* is a biennial plant, probably introduced by gardeners. It is similar to Fennell, but since it is poisonous, care should be taken to eradicate it as soon as possible. *Horehound*, a perennial plant, is another garden escapee which has recently been declared a noxious weed, since it is spreading on roadsides, gradually taking possession and displacing better type of plants.

Fennell:—A perennial plant which is a very strong grower, usually on roadsides. Along the Penola and other roads this is growing so strongly that it is dangerous to traffic and difficult for stockmen to move their stock in consequence of it. Steps should be taken to have this checked.

Milk Thistle or *Variegated Thistle*.—An annual plant, but an old offender in this district, for it is found growing strongly on roadsides and also in paddocks, displacing better plants.

Boxthorn.—This perennial plant is well known, for it was apparently one of the first plants used for a hedge in many places because of its hardness. In this district many miles have been destroyed from time to time, and there are still many miles which could be destroyed. The plant produces red berries, which are readily eaten by various birds. The seeds are thus distributed, and since it grows

rapidly it soon takes possession of vacant blocks and waste land. This plant can quite easily be replaced by many better plants, which are not so troublesome to keep in check. This is one plant with which more care could be taken to see that land-holders comply with the Act by those whose duty it is to enforce it.

Blueroot is a perennial plant which comes from Europe and Western Asia, probably a garden escapee, or it may have been imported with grass seeds. This plant may be useful to the grazier, but it is not very desirable among cultivated crops.

Bindweed.—This is a perennial deep-rooting plant, and is one of the worst weeds in this State. Sections have been taken from 4ft. below the surface, and these grow as well as those near the surface. It spreads by underground roots and seeds, and the only known means of checking such weeds as these is by the use of sodium chlorate.

Besides these weeds one might include such trees as White Poplars and Cork Elms. Unfortunately these were planted around the Leg of Mutton Lake and Hospital, and to-day they are overrun with their suckers, which present anything but a pleasant sight.

OTHER NOXIOUS WEEDS.

A few brief notes on the other weeds listed as noxious may be of interest here.

Cotton Bushes.—These are importations from South Africa, and grow on fertile soils in tall shrubs. The seed vessels of one are used for table decorations.

Woolly Star or *Star Thistle*.—Rather a tall, slender plant, not readily eaten by stock except when very young. A purple-flowered variety grows around Naracoorte. *Innocent Weed* has only been reported along the River Murray areas, and is not likely to thrive in this district. *Purple Star* or *True Star Thistle* is well-known to those who have travelled the Penola-Naracoorte Road, where it is growing profusely. *Yellow Cockspur* resembles *Saffron Thistle*, but is much stronger in growth and not readily eaten by stock. *Canada Thistle*.—This weed was at one time growing on the Glencoe Road, about 6 miles out, but it has now been destroyed. It spreads by underground stems, and is very difficult to deal with when once established. *Dodder*.—This is a parasitic plant, which lives on lucerne and other plants. To-day most lucerne seed is carefully cleaned so that this bad weed is rarely seen. *Thorn Apple* and *Apple of Sodom* grow with rather long leaves, carrying spines, and the look of them is generally sufficient to destroy them on sight. *False Caper*.—A sturdy annual plant belonging to the Spurge family. Most of these plants are poisonous and emit a milky fluid when broken. This grows well on sandy places, although, not readily eaten by stock, but should be suppressed when noticed.

Cape Tulip.—Two plants are listed under the name, one having one leaf and the other two leaves. This weed can also be seen between Kingston and Robe, and during September, when in flower, it presents a fine sight. Both plants spread rapidly by bulbs and seeds, and since they are poisonous and difficult to eradicate they should be carefully watched. The greatest danger with this, like many others, is that they are planted in gardens from which they escape and soon spoil good grazing areas.

St. John's Wort is another poisonous and dangerous weed, difficult to eradicate when once established. It produces underground stems, with roots as deep as 4ft. If you attempt to pull it up it breaks off, and each small root sends up a fresh stem. A small area appeared near Millicent a few years ago, but they got it under control by attacking it early. Another small patch appeared in the Penola railway yard, but this is also kept under by frequent attention. It has a rather pretty yellow flower and is perennial, growing erect about 2ft. high. *Californian Burr* and *Bathurst Burr* are two weeds which prefer warm districts. *Dyer's Weed*.—This is fairly common between Robe and Naracoorte. It can easily be distinguished, since it belongs to the mignonette family. It was once cultivated for yellow dye; hence the name. Stock will not eat it.

CONTROL OF WEEDS.

The most important point with regard to these seeds is to take care that you do not introduce them into your fields. Care should be exercised in the purchase of seeds, and to see that they are free from foreign weed seeds. Also, when purchasing fruit trees and garden plants examine carefully the earth adhering to their roots and see that they do not contain bulbs or roots of such weeds as sour sobs, hoary cress, etc. Stock can also spread bad weeds if they have been grazing where they are growing.

Once you have noticed a strange plant have it identified, and find out if it is likely to become a weed, because eradication is very often difficult, and may prove expensive if not checked in the early stages. Good cultivation will suppress many of these bad weeds, combined with heavy stocking. Others may be crowded out by sowing various pasture plants, but where these methods fail or are not applicable the use of some weedicide, such as sodium chlorate, may be used.

Care should be exercised to see that your purchase *sodium chlorate*, not *sodium chloride*, which is ordinary common salt. Sodium chlorate can be purchased at about 8d. or 9d. per lb. Used at the rate of 1lb. of sodium chlorate to 1gall. of water,

and sprayed on to the foliage with an ordinary spray pump, care being taken to see that all the foliage is thoroughly wet, this is very effective. This process is best done late in the spring on a dry day. When the vegetation is well established it may be necessary to repeat a number of times, but if persisted with this chemical will destroy any vegetation. Care should also be taken in using sodium chlorate to see that clothes and other vessels, vehicles, &c., which have been used in connection with the spraying of this chemical are carefully washed after. Otherwise, if the solution is allowed to dry on the operator's clothes or other articles they may catch fire at a later date, for it is very inflammable when mixed with organic matter. There is no danger provided these precautions are taken, since sodium chlorate is readily soluble in water."

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Allandale East .	24/5/34	12	Question Box	J. Laslett
Rendelsham ...	3/3/34	10	"Management of Horses," Mr. Andrews	F. White
Rendelsham ...	28/4/34	14	"Poultry Keeping," F. White	F. White
Penola	8/6/34	12	Conference Report	F. Hinze

UPPER NORTH DISTRICT.

(PETERBOROUGH AND NORTHWARD.)

APILLA (Average annual rainfall, 14.6in.).

June 1st.—Attendance, 12.

GREENFEED AND ITS VALUE.—Mr. T. Lange read the following paper:—"Select two five-acre to 10-acre paddocks near the homestead, fallow one paddock in winter, and harrow and cultivate it; have it well prepared so that it can be sown after the first rain after the middle of March. For sowing I prefer Cape barley at the rate of 1½bush. to 2bush. per acre, and not less than 1cwt. of super to the acre. When barley is about 6in. to 9in. long the cows can be let in for a few hours a day, but not in wet weather. Later on when growth is more rapid the cows can be left in longer. It is also very useful for mares, foals, and calves. When cut with a scythe it may also be given to the pigs. Prepare the other paddock with fallow the same way as that which was cropped last year. It is also useful to sow a paddock of stubble land for feed, say about 20 to 50 acres." (Secretary, E. Wurst.)

MORCHARD (Average annual rainfall, 13.59in.).

May 4th.—Attendance, 9.

TRYING TO MAKE FARMING PAY IN THIS DISTRICT AT THE PRESENT HIGH COST OF PRODUCTION AND LOW FARM COMMODITY PRICES.—Paper read by Mr. M. Brown.—"Making farming pay at the present prices is an impossibility. In this district wheat growing over the last 40 years has occupied most of our time with sheep and cows as sidelines. Wheat growing at present prices is a losing proposition, and prospects do not appear to be very bright at present. A man who has plant to work, say 400 acres, if he sows 300 acres will be able to cultivate a little better and devote the other 100 acres to livestock. This practice will give him a better opportunity to wait for rain to sow his crop, for the crop sown just after the first good rain is generally the best. Shallow cultivation and plenty of harrowing should be the rule. Any farmer purchasing a new tillage implement should try to buy the implement that will make a good job at the shallowest possible depth. Growing the wheat is not everything; there is the selling of it, and the man that sells over the tail of the wagon will come out as well as any on the average, and perhaps a little better. Power farming is too expensive at the present price of wheat. During the last three years the horse breeder has had a good harvest, and the good draught horse is still worth breeding for sale. Sheep at present is the brightest spot, but there is no guarantee that this coming wool season will yield such good prices. However, even with a 20 per cent. reduction in price wool is better than wheat at the present price, or even wheat with a 20 per cent. increase in price. Every farm should have a flock of ewes for breeding, and in this district ewes should lamb in August, when there is green feed for them. This will give a better percentage of lambs, and if marketed just after harvest there seems to be a fair local demand for them. This will pay just as well as trying to breed export lambs. At present it would appear that horse breeding

and sheep are the best propositions on the farm to-day. It is very hard to make much profit out of cows at present, and six cows are plenty for the average farmer. The milking Shorthorn is a good breed for this country, and the steers are saleable. The Jersey is a wonderful cream cow, but the steers are generally practically unsaleable unless there is a shortage of beef, and the reverse seems to be the position at present. Every farm has a few fowls which bring in a few shillings to help swell the income. In addition, every farmer should keep a couple of breeding sows of the Large White breed if possible, as there is generally a market for young pigs, and this type of pig seems to be most in demand by the bacon curers. A few pigs fattened for the Abattoirs market would also pay with wheat at such low prices. Sidelines appear to be the only chance of hanging on, and farmers must make a few shillings out of them wherever they can."

Mr. P. C. Schultz read a paper, "Trials and Temptations of the Farmer." (Secretary, E. Tillbrook.)

WARCOWIE (Average annual rainfall, 12.31in.).

May 29th.—Attendance, 14.

THE GROWTH OF PLANTS.—Paper read by Mr. F. Williams:—"Plants, whether they are grasses, herbs, shrubs, or trees, all derive their requirements from two sources—from the atmosphere and the earth. Contrary to popular belief, only a small portion of a plant's constituents is taken from the ground—about 95 per cent. is taken from the air in the form of carbon and water. That portion which is taken from the air returns to the air during the process of burning. That portion of the plant material which is taken from the ground is absorbed in the following manner:—It is assumed that the ground is moist. By this means the various constituents of the plant's nourishment can be in solution, as they—that is, the phosphoric acid, nitrogen, potash, &c.—are not available to the plant otherwise. This solution is "taken in" by the root hairs—the very smallest roots—by the process of osmosis, the process by which two solutions, a strong one and a weak one, change places with each other through a membrane. The weak solution always travels towards the stronger one much more rapidly than the strong moves towards the weak. The root hairs contain a strong solution—an acid solution. A small portion of this moves out of the root into the soil, and a large portion of 'soil solution' moves into the plant. This solution moves up the plant in much the same way as kerosene moves up a lamp wick. The 'drawing' or sucking is caused by transpiration from the leaves. The leaves of a plant serve a double purpose. The sun's rays draw water from them into the atmosphere, and cause the rise of moisture in the plant. They are also the stomach of the plant inasmuch as they prepare the carbon for assimilation by the process of photosynthesis. Photosynthesis is the process by which the chlorophyll (literally leaf-green) in the leaves combines water with the carbon dioxide in the air, and makes carbohydrates or starch for the plant. This starch is thus composed of much carbon from the air, and a portion of water and other foods from the ground. It is circulated all over the plant or tree to build up new tissues." (Secretary, A. Crossman.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Morichard	1/6/34	15	Annual Meeting	E. Tillbrook
Wilmington	12/6/34	25	Address—C. F. Anderson	C. Cole

MIDDLE NORTH DISTRICT.

(PETERBOROUGH TO FARRELL'S FLAT.)

BEETALOO VALLEY (Average annual rainfall, 23.50in.).

April 23rd.—Attendance, 9.

PIG KEEPING.—Paper contributed by the Hon. Secretary (Mr. B. Giddings):—"One of the most essential factors in connection with this sideline is housing. The sties sometimes seen on farms are unfit for rearing or keeping pigs. Usually there is only earth for a floor, which becomes more or less a boghole in winter. A good sty can be built of stone or wood and iron. Not too many should be kept in one sty. That usually means fighting at the trough, and the pigs not getting an even share of the feed. Sties should be well ventilated; it is much easier to keep a pig warm in winter in a well-ventilated sty than cool in summer in a closed one. A good floor can be made of stones which are equally as good as concrete and much cheaper. The habits of the pig are naturally clean, making its bed each night if the bedding is

there for it, and using as a privy the corner of the sty farthest from its resting place. Pigs require plenty of exercise, especially when kept for breeding purposes, so that it is essential to have a yard conveniently adjoining the sty an area of half an acre would be ample, but the size would vary in accordance to the number of pigs kept. This can be erected by using sturdy posts 9ft. to 10ft. apart, and about 4ft. above ground with strong pig netting firmly wired to the inside of posts and four or five barbed wires inside of the netting 6in. apart to prevent the pigs rooting. A stand can be erected in the yard, and if peas were used for feeding can be stacked on it and the pigs fed from there, and no grain would be wasted. Otherwise straw can be stacked there and used for winter bedding; whichever is adopted would provide a cool, shady spot in summer for the pigs. Feeding depends mostly on what is available; not all owners grow special grain for pig feed. Peas make a very good ration if fed in the straw; they not only provide bedding, but make them exercise for the grain, which means that it is chewed more thoroughly than if fed loose and the animal allowed to eat it at will. Another important factor is that the land on which they are grown is enriched. Wheat or barley is considered the usual grain feed for pigs, but whatever grain is fed it should be well crushed or soaked so that it will be thoroughly digested. If milk is available so much the better, especially for young pigs. Any waste from the house, provided no soapy dishwater or bones are in it, can be fed. The trough should be cleaned out before putting in the feed. A forkful of greenfeed daily is very beneficial to sows, and if this is not procurable it will pay the breeder to plant some kind of green fodder. Mating can safely be done at 12 months—a little older all the better—but it does not pay younger. The best time to sell the young is at eight weeks old. If any are required for killing they can usually be bought at a good weight or as stores, and fattened to the desired condition cheaper than they can be reared to that size, unless the feeding is very cheap. The kind to breed usually depends on the breeder's fancy, but if Australia is to depend on her overseas markets—which she is trying to develop at the present time to dispose of her pig products—then the desired type must come from Large White boars crossed with Mid-York, Tamworth, or Berkshire sows. Pigs as a sideline at the present time can hardly be termed a payable proposition, but as the market fluctuates so rapidly it is not to be considered that it will always remain so."

BLYTH (Average annual rainfall, 16.80in.).

May 25th.—Attendance, 24.

CULTI-PACKING.—Mr. W. C. Johnston (District Agricultural Instructor), in the course of an address on this subject, said there were few advantages to be obtained by culti-packing and that the cost of the implement in comparison to the benefits derived did not warrant its purchase. Encouraging results were obtained at Veitch on sandy country, but if a culti-packer was needed in this district it was an indication of poor cultivation methods. Members, in discussing the subject, were of the opinion that culti-packing was not beneficial enough to warrant it being a general farm implement, but in special cases good results may be obtained, especially on sand.

THE IDEAL PIG FOR EXPORT.—Mr. R. H. Eime (Hon. Secretary) read the following paper:—"The pig required for export is also the pig required for local markets. Perhaps the word export has been added because local markets could not absorb the animals, and exports had to be made, but to compete with foreign countries in the British market the necessity of breeding the 'ideal' pig is brought more before our notice, and pig breeders must realise that the short, dumpy, fat pigs are of low value in Britain and are unprofitable for export. The confirmation of what is considered the 'ideal' pig has been brought under the notice of pig raisers by medium of the daily press and Bulletins published by the Department of Agriculture, but it will do no harm to again explain this type of long, lean, rangy animal. The head with jowl and neck should be light, as it consists largely of bone, and is of low value, and should not carry large rolls of fat at the jowl or over the neck. The shoulders and fore end must be light and free from wrinkles and coarseness. The back must be long and level, because the middle of the carcass fetches the highest price per pound. The fat on the back should not exceed 1½in. in thickness in baconers and in porkers considerably less. The sides should be level and moderately deep. The underline must be straight, as it denotes that the 'thin streaky' and 'flank' cuts are not unduly distended and thin. The belly should be thick in the flesh, as the value of the lower cuts is increased by thickness. The flank should be thick, handle firm, and be in line with the sides. The hams must be broad, wide, and deep to the hocks, as these characteristics denote plenty of flesh. There should be no depression at the root of the tail, as this denotes excessive fat. The legs should be set wide apart, and the pig should stand up well on the tips of its toes. The bone must be fine, as it indicates quality and does not detract from weight. The skin should be free from wrinkles and coarseness. The hair should be fine. The colour may be anything, but the trade prefers white pigs. The weights should range between 160lbs. to 225lbs. live weight

(120lbs. to 170lbs. dressed weight) for baconers, and 85lbs. to 120lbs. live weight (60lbs. to 90lbs. dressed weight) for porkers. The same conformation applies to both porkers and baconers; the only difference is in the weights. But the question is how to breed this pig? The trade prefers white pigs, because they have a better appearance than a dark coloured pig when dressed. The only way to get white pigs is to use a white boar, and I recommend a Large White. Suggestions are made to use almost any prolific, roomy sow—a half-bred Tamworth-Mid York cross or half-bred Tamworth-Berkshire cross. Perhaps the ideal pig may be secured in some of these crosses, but once past the first cross there is a danger of the progeny reverting to one of the other breeds. This will not happen in the first cross. Another thing which may happen in cross breeding is the appearance of black blotches on the skin. This can happen when using a Large White boar, but both parents must have some trace of blood of a Black, however far off. It is known that Large Whites may have a trace of 'Black' blood in them. When breeding a Large White this is not so prone to happen. I would breed pure Large Whites. At the 1933 Annual Congress Mr. Barlow had a side of a Large White barrow pig on view as the ideal pig. This pig was 4½ months old and dressed 124lbs. and at that time realised 65s. at the Abattoirs." Members, in discussing this paper, realised the importance of breeding the correct type of pig, irrespective of breed, but considered a Large White quite suitable. The importance of correct feeding was stressed, the addition of a small quantity of lime, and about 3 per cent. of meat meal to the grain ration was advised, especially if there was a shortage of skim milk. Some farmers are still inclined to breed a limited number of the old type pigs for their own consumption. Doubt was expressed as to whether local and export markets required the same type of pig, some holding the opinion that slightly fatter pigs were required for the local market.

WIRBARA (Average annual rainfall, 19.34in.).

April 28th.—Attendance, 14.

SELECTION AND TREATMENT OF SEED WHEAT.—Paper contributed by Mr. W. Stevens:—"It is a good plan to examine crops early in the year if it is intended to obtain a change of seed from any farmer in the district. In a district where there is a good deal of turnip this bad weed can be easily spread over a farm if a few bags of seed are purchased from a farm where the turnip is growing. In most years when there is a dry spell it brings the barley out in ear before the wheat, and it is then possible to see how much barley is in the crop. If wheat true to type is desired, it is necessary to wait until the wheat is out in head to detect heads of other varieties in the crop. When reaping wheat for seed allow the crop to become 'dead' ripe before keeping it for seed. There has not been very much smut in the district this last few years, but when it appears in a crop, the best plan is obtain fresh seed that is free from this disease. Grading is one of the most important jobs of preparing seed. Have a grader that will take out all the cracked and small grains. These latter will make good fowls' feed, or if put through the crusher can be fed to horses. When there is no smut in the seed dry pickle is best. Seed so treated germinates more quickly than that pickled with bluestone. Seed can be treated with any of the wet pickles before seeding, but the bags must not be stacked in the shed until the grain is dry. Formalin is a good pickle, but great care must be taken that it is not used too strong or it will kill the grain. In wet weather the seed must be sown within three days or kept for a week, otherwise it will take a long time to come up, and if the ground is wet, some of the seed is likely to rot. Seed sown in soil that is too wet will often rot before it will germinate." (Secretary, F. Borgas.)

YANDIAH.

April 13th.—Attendance, 25.

CROP ROTATION.—Paper contributed by Mr. C. Jettner:—"With the continued low price for wheat and the rise in wool values, together with the improved outlook in the export meat trade, farmers would probably be well advised to consider curtailing to a certain extent the wheat areas and increasing the number of livestock on the farm. The crop rotation practised in this district is principally wheat—fallow—wheat, which means that practically half the arable land is under fallow each year, leaving only half the land producing anything. By adopting a three-course rotation two-thirds of the land would be producing an income and only one-third lying idle in fallow, and thus the interest charges on working capital, land, and improvements, would be reduced by two-thirds of the land under production instead of half under the two-course rotation. What crop can profitably follow wheat in this district? Several points must be considered—the suitability of various crops for grazing purposes or for grain and their effect on the land for the following wheat crop. In the northern districts choice of crops to follow wheat is unfortunately limited as compared with the higher rainfall districts. Considered from every angle, oats are probably the most suitable crop to follow wheat. A fairly early variety, sown to come away with the first rains,

will provide good grazing much earlier than grass lands, and the stock returning to the soil the growing crop through the droppings will help prepare the land for the succeeding crop. Oats can also be sown for grain, and in fair average seasons the yield on stubble land is just as good as wheat on fallow. The grain is excellent stock feed, and if stored in an airtight bin, can be kept for years, making a splendid reserve in times of shortage of feed. Oats being resistant to many of the diseases which attack the wheat plant, tend to reduce these diseases, many of which are in the soil, and thus greatly increase the chances of growing a disease-free crop of wheat. Cape barley also does well on stubble land, and produces as good a yield as oats, but has the disadvantage of being susceptible to many wheat diseases, and thereby increases those diseases in the land. Wimmera Rye grass will also do well in this district, and 2 or 3 lbs. sown with the crop will produce quite good feed the following year at a small cost. By adopting a three-course rotation instead of wheat—fallow—wheat, cost of production per acre would be reduced, more livestock kept, thereby spreading the income over a larger number of lines, and any rise in values on these lines would be taken advantage of. The cost of producing a stubble crop is not nearly so great as a fallow crop, and by growing a variety of cereals and keeping more stock, the land would be kept in better condition than by growing the same cereal year after year." (Secretary, O. Borgas.)

POWER TRANSMISSION.

[Paper read by P. J. Curnow at the March meeting of the Wirrabara Agricultural Bureau.]

Where stationary machinery is to be installed a little forethought in the laying out of the plant, and later the study of various points in relation to belt drives and other forms of transmitting power, will help to smother working of the plant.

When putting in a power unit, such as an oil or petrol engine, for a specific purpose, as for chaffcutting, the possible future use to which such an engine may be put is worth considering. Later it may be desired to drive a wood-cutting saw, a grindstone, or similar outfit. If the engine is so placed that drives may be taken either right or left, or through overhead shaftings, then future additions to the driven plant may be made without difficulty.

To place an engine in a small shed attached to other buildings often makes it difficult to find space suited to other needs. An overhead shafting under these circumstances is the simplest way out of a difficulty.

All stationary machinery must be firmly based. A good heavy concrete block for a large engine is best, but a small engine may be bolted to a solid gum block sunk at least 3ft. in the ground.

When laying out any plant to be driven, care must be taken to have all pulleys in alignment. Too often in farm plants a little error in this regard means a belt that refuses to stay on the pulley. If correctly adjusted, belts rarely commit this offence.

BELTS AND PULLEYS.

The belt on any unit must be cut the exact length, allowing for a reasonable amount of slackness. Tight belts mean needless friction and worn bearings on the pulley side, in addition to loss of power from the driving unit.

To secure the greatest amount of energy from an engine and the driven machine, belts should drive from the underside of the pulley and not the top. A slack belt transmits all the power developed by the engine pulley, provided a good chemical substance is used to prevent slip. A belt so adjusted makes for easy power transmission. All belts must be cut square at the end, and fastenings adjusted to pull evenly. A belt badly or unevenly laced will often leave the pulley.

Bright pulleys mean slip or loss of power. Care should be taken in selecting a suitable belt dressing. A makeshift will often make a belt cling to the pulleys, but will seriously affect the leather or rubber belting. Castor oil will harden a leather belt and finally ruin it. All kinds of home-made dressings are sometimes used. A good belt with proper care will give many years of first class service and is worth a good standard dressing made expressly for the purpose.

Leather belting is suitable for all classes of power transmission, particularly for small machines and small engines. A good rubber fabric belt, too, give years of useful service.

When purchasing an engine it is wise to ascertain the normal working revolutions per minute, as it is then easy to find the size of pulley needed when putting in other plant.

A large engine pulley means a dangerous speed when power is transmitted to another unit with a small pulley. For instance, a small chaffcutter with a heavy knife wheel would collapse if an unsuitable pulley were used when driven from an engine running too quickly. At least a 20in. pulley on the cutter would be required. There is a safety limit in relation to all driven machinery, beyond which it is risky to go. A heavy

grindstone if over-driven will burst, and so will a heavy circular saw if run above a certain number of revolutions per minute. In these matters the size of the pulley on the driven unit governs the speed.

There are fixed rules used by engineering experts, which cover the whole subject of machinery installation, and any engineering firm supplying new machinery will make recommendations when approached.

Many types of bearings are now available. The newer ring oil form is most suitable for rapidly moving shafting, for lubrication is assured with little attention.

For shafting such as that used in overhead work, special plumber blocks, with correct methods for lubrication, are available. These are easily attached to walls or posts, and must be firmly attached, for vibration means wear and loss of power.

For special work roller bearings, although expensive, are much used in factory layout. Their use means ease of power transmission through loss by friction.

A few further points in connection with leather belting may be mentioned.

Experts agree that a belt driven from the grain or hair side will develop double the pulling power, compared with a similar belt driving from the flesh side.

So long as the original condition of belting is maintained, the best use is being got out of it; but lack of attention means deterioration.

A dirty, greasy belt may be cleaned by scraping with a wooden scraper, followed by a brushing with a stiff brush dipped in kerosene. Or another method is to wash in warm water, then grease and dry thoroughly. When belts are in constant use they should be attended to as soon as a too-dry appearance is noticed. A belt will generally slip more after a lubricant has been applied, but will soon grip as the dressing becomes absorbed. A too-constant application of a dressing will shorten a belt's life. Given reasonable attention a good belt will give years of useful service, especially where the other points mentioned are kept in mind.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Booborowie	9/5/34	9	Annual Meeting	A. Fairchild
Yandiah	10/5/34	15	Address—E. L. Orchard	O. Borgas
Yandiah	8/6/34	18	"Enriching the Soil," H. Meade	O. Borgas
Beetaloo Valley	28/5/34	14	Address—J. O. Hatter ..	B. Giddings
Red Hill	8/6/34	14	Address—C. Goddard	S. Pengilly

LOWER-NORTH DISTRICT. (ADELAIDE TO FARRELL'S FLAT.)

BROWNLOW.

April 25th.—Attendance, 9.

BREEDING AND CARE OF HORSES.—Mr. G. Roocke, in the course of an address on this subject said mares from which it was intended to breed should be of a square build, short ribbed, flat-boned and, if possible, staunch and quiet. Care should also be taken in selecting a sire; bad points should not be overlooked, because the offspring were liable to have the same faults as the parents. It paid to breed good stock; a few of the reasons were:—A ready sale, attractive appearance, good and reliable workers. A mongrel would eat the same amount as a well bred horse, and yet the former would not keep condition like the latter. The Clydesdale was the most popular horse in this district. Care of horses should be practised in every way. Give plenty of good feed, and allow sufficient time for feeding during the busy times. Grooming was worth while. Horses should not be worked longer than from 4 to 5 hours in one run. If possible, accustom horses to watering before feeding. Great care should be taken with the harness; see that it fits well; also, care must be exercised with horses' shoulders; do not work them with sore shoulders, and do not ill-treat a horse. (A. Steinborner, Secretary.)

FRAYVILLE.

May 24th.—Attendance, 18.

Mr. C. B. Shearer gave a travel talk, "A Trip to America and Canada."

HAND FEEDING SHEEP.—The following question was taken from the question box, "Which is the best feed for hand feeding sheep?" Mr. W. Faehrmann recommended "oats straight from the harvester. Mr. V. Dohnt fed hay for a start until the sheep ate the heads off and then fed hay chaff and crushed oats. The result was that he

had 70 per cent. lambs. Mr. L. H. Watchel supported linseed meal and nuts for ewes. Before using this he had kept no lambs, but after feeding meal and nuts ewes had plenty of milk and looked after their lambs. The meal was fed in hay chaff at the rate of 20z. per sheep a day. He also stated that it was inexpensive. Mr. S. A. Bretag found that sheep did fairly well on "heads" left over from harvest.

GREENOCK (Average annual rainfall, 21.57in.).

April 9th.—Attendance, 23.

BLACKSMITH ON THE FARM.—Paper read by Mr. C. M. Roennfeldt:—"Under present conditions it is essential that expenses be kept at a minimum. In this direction the farmer oftentimes has to be his own saddler, bootmaker, carpenter, etc. The greatest time and money saver, however, is a blacksmith's shop on the farm. The initial cost of equipping the shop with the necessary tools, &c., may seem fairly large, but time will prove that money thus spent will be the best investment ever made on the farm. The shop should be fairly roomy—about 15ft. x 16ft. This would enable a fair-sized implement to be put under shelter in winter while it is being repaired. *Site of Shop.*—In choosing the site, care should be taken as regards the danger of fire in summer. An inexpensive shop can be erected as a lean-to against a stone or iron shed already on the farm. The north or north-east side can be left open, thus necessitating only 2 walls and a roof. The equipment should consist of 1½-cwt. anvil, £5; forge, £4 5s.; drilling machine, £3 15s.; stocks and dies, £2; vice and sundry tools, £2. This would consist of several hammers, tongs, hack saw, files, chisels and punches, wrenches, ruler, centre punch and drills for drilling machine, etc. Total £20. Interest on this sum at 5 per cent. equals £1 per annum. These prices are for new tools, but at sales it may be possible to buy the above-mentioned in good order at less than half the price. Punches and chisels can be made out of old rasps or files or pieces of steel. For the forge I favor coke. It makes a cleaner fire, but goes out very easily. A few pieces of charcoal will help to keep the fire going. The amateur blacksmith's motto should be 'Be exact.' All measurements should be taken to an eighth of an inch, and all places for drilling should be marked with a centre punch. When iron is to be bent, mark all corners with a centre punch. When taking anything to pieces care should be taken not to mix the nuts. Each nut fits best on the bolt from which it was removed. Keep all tools in their proper place and put them back after being used. This will save much time and worry in trying to remember where they were last used. The best time to repair machinery is after using, when worn parts are fresh in mind. Be careful to hold the tongs correctly; if not, the hot iron will be frequently dropped instead of hammered. When bending iron, see that the tongs are holding the iron from above, and the cold end of the iron is resting against the bottom of the tongs. Iron must be worked very hot, otherwise the ends are likely to split. If they do, put back in the fire. Heat to welding point, weld the split and continue. When making a fitting or any article that requires a lot of hammering and twisting, do not use iron; get a new piece of mild steel. In most cases the iron cracks or breaks when nearly finished without any apparent reason. When drawing round iron to a point, draw out as if it were a harrow tine. When drawn out sufficiently, break the four corners and it is practically round again. *Welding.*—When welding, most amateurs experience some difficulty. However, with a little care and patience some success should be achieved. Before attempting to weld see that the fire is absolutely clean; all clinker (melted coke or coal) round the blast hole should be removed. This is important. Old iron is easier to weld than mild steel. When welding two bars, first stanch back each end to be welded, then draw the ends to a slanting point or lip. When putting into the fire, see that the lip of both pieces is turned upwards. If the lip is placed downwards the chances are that as the heat comes from the bottom, the thin lip will burn off before the thicker part is hot enough. Make a strong blast up and see that both pieces are heated evenly. When the part to be welded is white, and small white sparks are seen coming out of the fire, the iron is hot enough to weld. The bar which is to be at the bottom must be turned whilst being put on the anvil. The other piece being placed into position and ready for hammering, see that the lips are welded down first; they are the thinnest part of the iron, consequently rapidly cool down. Care should be taken not to hit thin bars too hard because the iron is very soft when at a welding heat. The thinner the iron, the quicker it gets cold, therefore have the anvil close to the forge. Do not use any coal or coke in which any brass or galvanised piping has been heated for welding purposes. When working any iron or mild steel, make it fairly hot; it is easier to work and requires less man-power. The difference between steel and iron can be told by the ring when dropped on the anvil. Iron has a dull ring or sound, whereas steel has a clear ring. *Tempering.*—When tempering picks or chisels, place in the fire, and heat to a bright cherry red. When hot enough, place about 1in. of the point in cold water; take out water and different colours will be noticed working down from the hot end to the point. This actually is the heat working back to the point. When the colours are almost at the point, cool off suddenly. The chisel should

only be hard at the point, otherwise it will snap. If the chisel is too soft, make it a shade hotter before tempering; if too hard, not quite so hot. A little practice and the amateur blacksmith will become efficient. Nuts that refuse to come off old bolts, if placed in the fire until red hot and then plunged into water can be practically unscrewed with the fingers. Iron gates out of old buggy tyres, and iron swings out of old scrap iron, can be made with little expense. It is surprising the hundred and one things that old scrap iron can be transformed into by the handy man. It provides pleasant occupation to the man on the land on rainy days." (Secretary, A. Schubert.)

GREENOCK (Average annual rainfall, 21.57in.).

April 30th.—Attendance, 25.

PIG KILLING AND SAUSAGE MAKING.—Paper read by Mr. Keller:—"Strict cleanliness must be observed in all work connected with small goods. First the weather should be studied carefully before killing; settled, cool weather is essential. Starve the animal for 12 hours before using the knife on it, then bleed the pig well and give the carcass a quick scald. The pig should be killed in the sty by shooting it with a .303 rifle carrying cartridges loaded to half strength. When sticking a pig, turn it on the right side, then insert knife 2in. in front of the breast bone. When the knife is in, press the handle down a little to raise the edge of the blade to cut the jugular vein. For scalding I prefer a roomy trough, 6ft. x 2ft. x 1ft. will answer the purpose up to a pig dressing 400lbs. The carcass should be ready for scalding a few minutes after killing. Keep on turning the pig until the hair and skin come off easily, and then add a little cold water to prevent it from over-scalding. When the carcass is scraped clean, hang it up at a convenient height for disembowelling. First remove the head, then clean it thoroughly, and cut it up to put in the copper to boil. Put the meat in straight away to boil, so that it will be cooked when the carcass is dressed. To do this, make a cut from between the hind legs and continue right down, first cutting off the dummies. Care should be taken not to cut too deep and puncture the intestines. To avoid this, place one hand in front of the intestines and guide the knife between the fingers. After cutting right down, chop the breast bone and the bone between the hams, which will make the dressing more convenient. Then start at the top between the hind legs and remove all intestines and stomach, but just before doing this securely tie the end bowel. Next cut out the lining between the stomach and lungs and remove the heart, lungs, and windpipe. This should leave the carcass clean and unsoiled. The carcass should be left hanging in an airy place

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until next morning to set. Early in the morning cut down the carcass on both sides of the back bone. First cut out the hams, then the shoulders, the sides are then trimmed by cutting off surplus fat on pieces of meat. Then the ribs are taken off, cutting as close to the bone as possible. Keep it smooth in order not to remove too much of the lean flesh of the bacon. After trimming the hams and bacon it is ready for curing. All trimmings can be saved and put in the metwurst. *Curing.*—The pieces of pork should first be well rubbed with a mixture of salt and saltpetre, then place flesh down in a pickling cask and allow them to drain for 3 or 4 days before the brine is put over. This is to remove all the blood from the meat. *Brine.*—Salt, 5lbs., saltpetre 1lb., and 2½galls of water. Then smoke until rich brown.

White Pudding.—Two cheeks, liver, flanks, 2 loaves of bread. Pepper and salt to taste; 1 large onion, a handful majoram. Boil liver 20 minutes, and cut off all the rind of the meat used in the white pudding.

Black Pudding.—Take all the parts of the head that are left, also lungs, heart, and kidneys, all the rind that is cut off the meat used in the white pudding, 3lbs. of boiled rice, and salt, pepper, and allspice to taste, and 2 handfuls of majoram and as much blood as desired.

Metwurst.—To every 8lbs. of meat add 4ozs. salt and ½oz. of saltpetre, about 1 handful of pepper to 10lbs. of meat, 1 wineglass full of brandy, and 1 dessertspoon of sugar. (Secretary, A. Schubert.)

LIGHT'S PASS.

March 26th.—Attendance, 15.

Junior members Ron Hahn and Fred Boehm read papers on "Packing Apples for Export" and "The Codlin Moth." Mr. B. Boehm gave a report of the visit made by Branch members to Mr. N. Wicks' nursery at Highbury. Mr. F. Gunter addressed the meeting on "Manures." Mr. W. Ahrens tabled an excellent sample of locally grown Smyrna figs.

FROST CONTROL.—At the April meeting, which was attended by 25 members and visitors, Mr. L. Plush read the following paper:—"Crops can be definitely saved by artificial means, proved by the test carried out in Mr. Bert Boehm's orchard by Mr. J. B. Harris (Orchard Instructor on behalf of the Department) last year. It does pay to protect apricots, peaches, currants, and vines. There are a number of ways in which frosts have, and are being fought; among the best known are smudging, flooding, covering, circulating the air, and heating. Smudging, by making a smoke screen, has proved unreliable here. It has given definite results one night and may be a failure the next should a black frost occur. Flooding is practised successfully in different parts of the world where ample water is available and the land is suitable for it. Covering.—I only know of one case of this method being done commercially in Australia, at Red Cliffs, Victoria, where an orchardist covers about 15 acres of sultanas with strips of bran bags, cut about 12in. wide, stitched together, wound on to rollers and pulled over the trellis by means of a small windlass. The bagging is kept several inches above the top wire. These are kept on during the danger period. It has worked quite successfully during two white frosts. In Germany vines are taken off the trellis, laid on the ground, and covered with sand, thus delaying the bud burst until the frost menace is over. Circulating the air has proved too expensive, but has been done successfully by the use of explosives, and by the use of fans pumping the warmer upper air downward. Heating with oil will be the universal means of attacking frosts in this State in the near future. It is still in its experimental stage here at present, but will spread rapidly as soon as growers find that it is not so expensive as was at first thought. Oil heating will ultimately be the cheapest and surest means of frost fighting. An acre of apricot trees in full bearing should yield an average crop of 4 tons of fresh fruit annually, valued at, say, £8 per ton equals £32 of fruit for the acre. The cost of oil for that acre (one frost) at 6d. a gallon would be £1 10s., plus interest on capital outlay and depreciation (10 per cent.) on plant would be roughly another £1, making a total of £2 10s., thus showing a profit of £29 10s. over a similar acre that had not been heated. The whole plant sufficient to save an acre would not be much more than £8, plus oil, for at least three burnings. These figures are based on 60 heaters to the acre. Another important point to remember is that one must reckon the gross profit and not the net profit. It is necessary to prune, spray, cultivate, &c., whether a crop is received or not. The equipment needed for a local grower would be about 60 to 75 lard pail heaters (5 quarts) to the acre, costing about 1s. 9d. each for 150 lots; several tested thermometers; an electric alarm thermometer—there will be two of these in the district this year—and lighting torches costing about 15s. each. These prices may be improved on by buying in larger quantities. A storage tank and a tank wagon for distributing the oil would be very useful to larger growers, whereas a few old oil drums would suffice for the small grower or for the man who is starting in a small way. The heaters are usually placed in the centre of each square formed by four trees, with a double row on the windward side of the orchard. When filled the lids are placed on them to

keep out the rain. The temperature as a rule does not fall much below freezing, and equipment to raise the temperature 4° or 5° is all that is necessary. Whenever heaters are started the grower should be able to keep them burning until after sunrise. The lard-pail heater will burn for about 3½ hours. When the temperature falls below 32° only about half are lit, and the temperature is noted. The temperature should never be allowed to rise much above 32°, but as it falls below that mark light more heaters. The reason for not raising the temperature above the 32° mark is for economy. One or two extra degrees of warmth burns up a lot of extra fuel that may be required later on in the night. Spare lighting fuel for the torches should always be kept handy. This is a mixture of equal parts of petrol and kerosene. A few drums of spare oil should also be distributed in the orchard in case of a long frost, when it may be necessary to replenish the heaters during the night or early morning. The Americans have two or three heaters placed together and only one lit, in case of long frosts, to save replenishing during the night. Replenishing can be done with a watering can with the rose off without having to extinguish the heater. Wood fires were tried out last year in braziers and open fires, both being quite satisfactory and cheap so far as fuel is concerned, but the amount of work that has to be put into it and the time it takes to light up as compared with oil rather puts wood out of the question against oil, especially if any large area has to be heated. I have mentioned black and white frosts. The white on the ground or on any object is frozen dew. A black frost freezes before the dew starts to fall. That is, the atmosphere is very dry, and dew point may be as low as 25°, and no white may appear, but every water trough would be frozen. These black or dry frosts are the worst, and frequently occur with a light breeze or drift. In America they call these black frosts "freezes." I am inclined to believe that frosts are becoming more frequent, and the only reason I can offer is the destruction of so much timber, especially in the hills and higher ground. The trees hold the warmth longer than bare ground, and help to stop radiation to a certain extent, whereas now the ground in the high lands cools off more rapidly and drifts down to the low lands, thus causing more frequent and worse frosts than hitherto." (Secretary, C. Verrall.)

SUTHERLANDS (Average annual rainfall, 10.88in.).

May 3rd.—Attendance, 22.

POULTRY AS A SIDELINE ON THE FARM.—Paper read by Mr. E. Twartz:—"At present farmers in this district are in financial difficulties through bad seasons and low prices. It is therefore necessary to turn to sidelines as a means of balancing the budget. The rearing and keeping of poultry is not only a profitable sideline, but an avenue for the disposing of wheat. *Sheds*.—It is advisable to have the sheds fairly close to the house. This saves time and fowls can be kept under observation. It is essential that the sheds should face the north, to shelter the birds from cold east winds. I recommend the semi-intensive system, for by this method the fowls are kept away from the implements and vehicles. *Roosts* should be at least 3ft. high, and care taken to see that they are strong and firm enough to support the birds, especially the heavy breeds. Concrete water troughs are better in the hot weather—the water always keeps cooler. *Making a Start*.—There are several well-recognised methods of making a start. (1) By purchasing day-old chicks and rearing them to maturity. This has its drawbacks, because one does not know whether the chick was hatched from a 2oz. egg or not. (2) By purchasing a pen of breeding hens and hatching their eggs either with an incubator or under broody hens. (3) By purchasing fertile eggs and hatching them. Chickens hatched artificially are, in some ways, superior to those brought out under a hen. Broody hens almost invariably become more or less infested with lice, owing to their prolonged inactivity. Some of the pests transfer their attention to the chickens as soon as they are hatched, with the result that the youngsters start life with a severe handicap. A hen will hatch more chicks in comparison to the number of eggs set. This may be the case occasionally, but far often the hen produces far less when losses from breakages and other accidental causes are taken into account. August and September are the best months for hatching and rearing chickens; the pullets start laying in autumn when there is a shortage of eggs due to the moulting season. It is not advisable to hatch in either February or March. Chickens which are not hatched in the right time are not the best. *Mash*.—For best results the fowls should be fed on a mash—either wet or dry. The wet mash gives a slightly better return than the dry, but it means more work. It is necessary to mix the wet mash and give it to them every morning, whereas with the dry it is only necessary to fill the hoppers when they are empty. This is the more practical, because more fowls can be kept with the minimum of labour. *Greenfeed*.—It is necessary that the fowls be given a plentiful supply of greenfeed. The best plan is to grow a plot of lucerne, which, when watered, grows throughout the summer. It can also be chaffed and fed to fowls when no other greenfeed is available. The following mash is recommended:—Bran 20lbs., pollard 30lbs., meat meal 5lbs. (Secretary, E. Schiller.)

GENERAL MANAGEMENT OF FARM HORSES.

SUTHERLANDS (Average annual rainfall, 10.88in.).

April 5th.—Attendance, 17.

[Paper read by Mr. E. Schaller at the April meeting of the Sutherlands Branch.]

The horse has been described as "man's noblest friend"; he richly merits the designation. He is the chief source of power, and often the only one, on the farm. His peculiarities should be carefully studied, because a personal acquaintance with the peculiarity of temper and constitution of the individual of the team is absolutely necessary in order to become a good horse master, and his management should be on lines calculated to ensure his maintenance in a high state of efficiency.

For general farm work the nuggetty, medium sized, active animal with lightly haired legs has no superior. A big, heavy horse can never keep pace with a fast-moving team of free workers, and it is cruel to try and make him do so. Too much hair on the legs is a great disadvantage where horses have to work on sticky cultivated land. The mud sticks to the hair and forms big lumps, which soon become dry and hard.

Work the fast horses on the rein where you have more control over them; the team will then also go square up to the corners, and if both reins are kept taut the horses turn the corners without treading on each other's hoofs. In the team, care must be taken that all chains are equal and each horse pulls its fair share.

FEEDING.

This is the most important item of horse management, and the horsemaster must use his own discretion to a great extent. The mangers should not be filled and then wait until empty before another refill. The horse should receive at each feed just sufficient fodder as he will reasonably clean up. Under natural conditions the horse is a bulky feeder, and under working conditions bulk is essential to his feed, and even where concentrated feeding is resorted to, the admixture of chaff prevents over hasty feeding, and promotes digestion.

However, the stomach of a horse is small, and it is evident that severe labour cannot be safely carried out on a full stomach, therefore feeds during hard work should be small and concentrated. Breakfast may be bulky, because some time elapses before work is started, and digestion has proceeded to a stage that will prevent an over-gorged stomach. Dinner should be a small and concentrated feed, because time for digestion is short, and weariness of the flesh will interfere with it. The bulk of the feed can be given in the evening, because there is plenty of time for it, and no work to follow.

Oats rank as one of the best grains for horses. They combine all the elements necessary for nutrition in such proportions that the animal is able to consume a large amount without upsetting the digestion, and to extract the greatest possible amount of nourishment from it. Oats have been found to be the finest feed for horses of speed and those in very hard work. Horses are very fond of this feed, and will eat it in preference to all other grain. It probably comes nearer the requirements of a concentrate for horses than any other grain. The kernel is encased in a hull, which adds to its value as a horse feed. Oats may be fed whole or crushed.

WATER.

"Water first, feed afterwards" should be the general rule, because a horse's stomach is small, and water passes directly through the small bowel into the larger one, carrying masses of undigested matter with it. But it is not always possible or convenient to water before feeding, and the horse very often has a mind of his own, therefore, if one to 1½ hours elapse between feeding and drinking, stomach digestion is well advanced. Also arises the question, "Should the horse drink when hot?" It will not hurt him at all if he is used to it, and on the farm the walk in from the paddock will in most cases have cooled him down sufficiently. Should any particular horse be inclined to drink too heavily or be griped in consequence, his trouble will cease if the bit is left in his mouth when drinking, as it prevents him from taking too much. The over-tired horse may gripe with very little, therefore special care should be taken. For over tired, thirsty horses, a handful of oatmeal or pollard stirred in their drink is very beneficial; the main drink can then be postponed until later.

GROOMING AND COLLARS.

The working horse, if in hard condition, cleans himself to a great extent by sweating, and a roll before returning to the stable gets rid of most of the dirt. But in the morning he should be thoroughly groomed. The secret of the art of grooming as an aid to condition is to carry it out with speed and a will.

Care of Shoulders and Fitting Collars.—After a long spell and when work again is resumed the horse's shoulders should be washed with cold water immediately the collar is removed; this will harden the shoulders and prevent sores. For young horses, as an aid to hardening or toughening the skin of the shoulders, these parts can be

swabbed daily with a strong solution of salt or an extract made by the boiling of wattle bark, and if brought to work gradually there should be no trouble with sore shoulders. The shoulders where the collar sits must be kept clean and free from accumulations of dried sweat, grime, &c., that are likely to set up the chafing of the skin. Likewise, the linings and stuffing of the collar should by regular attention be kept clean and soft instead of being allowed to become caked and hard with sweat, grime, &c.

Every horse requires its own collar, which should be properly and carefully fitted to him, and any necessary adjustments made from time to time as the horse gains or loses flesh. Remember that a collar that fits a horse when in good flesh will not fit him when he gets poor, and *vice versa*. The collar should fit sufficiently close to enable it to lie quite flat, and bear evenly on both shoulders. If pressed to one side it should allow the flat of one finger to pass all the way down between it and the shoulder. The collar must be short enough in length to prevent undue rising, but not so short that it will press on the gullet or windpipe. The test is that the hand and wrist must be able to pass easily between the throat of collar and the neck of the horse. New collars are a frequent source of sore shoulders. Be sure they fit, and see that the horse is given easy work until the collar is moulded to the shape of the shoulders.

SHOEING HORSES.

On many farms draught horses are not provided with shoes except, perhaps, in the wheat-carting season, when it is necessary for the teams to travel on the metal roads. When shoeing is properly performed and the farrier has knowledge of the structure of the foot and the correct method of treating it, the results are quite satisfactory. In too many instances, however, there is both a lack of knowledge and a want of care, with the consequence that serious trouble often occurs.

The frog is a most important part of the foot, and has many useful properties. It prevents the heel from becoming contracted. It supports the leg in a valuable manner, whether the animal is at rest or in motion. It prevents undue concussion, and with the heels and bars prevents slipping. Therefore, the frog should never be touched unless, of course, it is necessary to remove a nail or dirt that may have accumulated in the cleft or amongst the flakes. The following rules should be adhered to as nearly as possible in the shoeing process:—(1) Bring the wall down to what it would be if natural friction had existed. (2) Fit the shoe to the outline of the foot; rasping the outside of the wall makes it weak and brittle. (3) Never run the rasp over the outside of the wall, as it has a waterproof coat to keep in necessary, and out, unwanted moisture. (4) The bars should not be cut away, as they are weight carriers, and the shoe should rest on them. (5) The shoe should have a true and level bearing on the walls and bars, and be as simple as possible, only sufficient nails to keep it firm, and only as high as is necessary to hold.

IN THE STABLE.

Horses as a general rule are more comfortable overnight in small yards than they are tied up. If in a mob together, the bullies will keep them on the move, and deprive them of rest and feed, but if the stable is divided into yards to hold several horses they will settle down and are easily handled. Provide proper stabling; see that there is shade in summer, and protection from cold winds in winter.

The stable should be kept as clean as possible, and a bedding of straw put down for the night if the floor of the stable is wet. Should it be possible to keep the floor dry, the need for bedding should not be so great.

THE IN FOAL MARE.

The mare's place in the team should be that which enables her to work without jerks, and avoid squeezing by other members of the team. The swing should keep the chains broad enough to prevent the chains from pressing on the abdomen; this will greatly minimize the risk of accidents whilst working.

CARE OF THE FOAL.

The first fortnight after the birth of the foal is the most critical period in its life. At this tender age, when least capable of offering resistance, he is specially liable to accident or disease. If the bowels are normally active the foal will empty himself in the course of the first two hours after birth. Where this does not take place, an enema of milk-warm water, with a little soap and glycerine dissolved in it, should be given, and if necessary repeated in half an hour. If the mother has to be put to work, care must be taken that the foal does not drink the overheated milk. This can be overcome to a certain extent by slightly milking the mare just as she comes in from work, and so drawing off the heated milk. If this cannot be done, the foal should be kept from the mare until she has cooled down sufficiently. Heated milk will upset the youngster's digestion, and very often result in the death of the foal.

The foal should be weaned at five to six months old, and then reared in such a manner as will avoid any possible check. If stunted during the first year of the foal's growth, it will never fully recover.

TREATMENT OF WOUNDS.

Wounds open to the air or only covered by a light protection heal much more rapidly than those wrapped in filthy bandages, which are supposed to assist because they have been dipped in some irritating antiseptic. Stitching up a wound is the finest way of keeping harmful germs in, and introducing them if not already there, that can be imagined.

In the dressing of ordinary wounds the following will generally suffice:—First: Provide good drainage. Second: Keep up a good blood supply by keeping the horse in a good, healthy condition. Third: Let the air play freely on the wound surface. Fourth: Clean the wound with some weak disinfectant. Fifth: Clear away dead tissue if present. Flies may be kept away by pine tar, eucalyptus, kerosene; if maggots get into the wound, petrol will bring them out, and turpentine will help the tissues to heal; but once maggots get in a wound they must be searched for every day, as they prefer working in rather than out.

TARLEE (Average annual rainfall, 18.09in.).

March 12th.—Attendance, 12.

LESSONS FROM 1933.—Messrs. A. L. Molineux and D. G. Kelly gave papers dealing with this subject. The two main points learnt during the year were:—(1) Avoid poor fallow by ploughing early and working well in the spring. (2) Learn what wheats to sow and when to sow them. Mr. Molineux stressed the folly of sowing shell grit on land in this district. Mr. D. L. Clarke pointed out that while poor fallow would sometimes grow good crops, the best crops were usually grown on the best fallow. Members discussed the question of the quantity of superphosphate to sow, and condemned the practice of cutting down the quantity per acre. (Secretary, N. Clarke.)

UPPER WAKEFIELD.

April 26th.—Attendance, 22.

Mr. W. C. Johnston (Agricultural Instructor) addressed the meeting on "Noxious Weeds and their Eradication." The speaker emphasized the fact that to effectively control noxious weeds it was necessary to pull them up; if hoed they would most likely shoot again. The most serious noxious weeds mentioned were wild garlic, soursob, wild onion, blanket weed, mustard, Jamestown turnip, artichoke, star and saffron thistles, and stinkwort. (Secretary, C. Neumann.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Gawler River ..	28/5/34	27	Address—Mr. Hergstromn	K. Roediger
Black Springs ..	29/5/34	14	Question box	K. Dunn
Penwortham ...	18/4/34	12	"The Currant," W. R. Birks	A. Jenner
Rosedale	28/5/34	38	Addresses—R. Rudall, A. J. Taylor, O. Cundy	S. Sincok
Light's Pass ...	4/6/34	27	Discussion	C. Verrall
Truro.....	18/6/34	60	Addresses—W. C. Johnston and F. C. Richards	L. Davis
Greenock	11/3/34	34	Address—J. B. Harris ...	A. Schubert
Stockport	18/6/34	13	Address—C. Goddard ...	L. Kloffer
Waaleys	7/6/34	16	Address—C. Goddard ...	C. Currie
Sutherlands	4/6/34	26	Address—C. Goddard ...	E. Schiller
Saddleshworth ...	1/3/34	30	Address—S. Shepherd ...	F. W. Coleman
Saddleshworth ...	-4/34	40	"Bulk-Handling," R. Kelly	F. W. Coleman
Saddleshworth ...	4/5/34	50	Address—F. H. Francis .	F. W. Coleman
Saddleshworth ...	29/6/34	50	Address—D. Russell ...	F. W. Coleman

YORKE PENINSULA DISTRICT.**SOUTH KILKERRAN.**

May 9th.—Attendance, 9.

COWS ON THE FARM.—Mr. S. Heinrich read the following paper:—“It is almost impossible to do without at least one cow on a farm, while the keeping of two will ensure a regular supply of milk and its products right through the year. Many will remember the time when a small herd of cows proved a better proposition than pigs, sheep, and wheat, but since the price of butter has fallen, one has to look for another source of income if farm sidelines are to be made a paying proposition. It is a mistake to say that cows do not pay, even if it be only one or two; their real worth is not appreciated until they have been disposed of. To obtain an equal proportion of cream all the year, three cows at least are necessary, and care must be taken to see that all the cows do not go dry at once, and that the majority come into full profit when the price of butter is likely to be at its best—from March or April onwards until about October. Since February 2nd to May 29th my herd of five cows has consumed 14 bags of crushed barley at 6s. a bag, and 10 bags of bran at 7s. 6d. a bag, a total cost of £7 19s., and cream and butter returns amounted to approximately £12, leaving about £4 profit for three months’ work, besides supplying the household with milk, butter, &c. Taking the season into consideration, the money put into cereals for the cows will be well repaid as soon as the feed makes better growth; the cows go right ahead instead of waiting to pick up condition. Most farmers keep cows only because they want the milk and butter and leave the women folk to look after the animals. The farmer thinks they are a nuisance and that either sheep, pigs, or poultry pay better. Nothing goes well if you have no interest in it. Why not select a pedigreed animal of the breed that is fancied. Take the Shorthorn; it is a fairly good producer, and there is a fair market for any bull calves that are not kept for further use. I prefer the Jersey; a nicer and quieter cow no one could wish for. If treated kindly they can be handled better than any other breed, and are not troublesome to fences. It is a wise policy to breed nothing else than pure bred. A crossbred cow is often a good producer, but if one continue such breeding the result will be mongrels. For the 12 months ended March 20th, 1934, my wife milked three cows for 2 months, and one cow for about six months—equal to three cows for 13 months. During that time she made 640lbs. of butter at a net return of £23 7s. 7d., and sent away 90galls. of cream, showing a return of £11 1s. 1d., a total of £34 8s. 8d. The expenses were:—1 bag of linseed meal, 17s. 6d., 5 bags crushed barley £1 10s., 11 bags of bran £4 8s., and 6 bags pollard £2 7s.—a total of £9 2s. 6d. Deducted from £34 8s. 8d. leaves a net profit of £25 6s. 2d.—approximately 10s. a week. These cows are not claimed to be record butterfat producers. Jersey cows are quiet, but the bull is not to be trusted. Keep a bull for breeding purposes, for a good bull is half the herd. All bulls should be locked in a small yard or paddock with plenty to eat or drink, and even the quietest of them should never be trusted.” (Secretary, R. Hasting.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Bute	15/6/34	—	Address—C. Goddard ...	H. Perry
Bute	19/6/34	17	Annual Meeting	H. Perry

WESTERN DISTRICT.

(‘UMMINS (Average annual rainfall, 17.61in.).

April 13th.—Attendance, 7.

SEEDING.—The Hon. Secretary, Mr. K. Trigg, read the following paper:—“In making preparation for seeding it is necessary to start at harvest time—the practical farmer will at this time select seed for the coming season and see that he obtains seed to suit his particular type of land. When the seed is chosen it is in the farmer’s own interest to see that it is properly cleaned in order that it will run through the drill or combine in the desired even manner. I favour dry pickling—not only because tests have proved wheat to germinate better under this treatment, but because it can be cleaned and pickled in one process, thus saving another handling just prior to seeding. I have used dry pickled grain in the same drill for four successive years, and the rollers are running as free as ever. There is one thing that does need cleaning regularly—the super stars. Unless these are running smoothly there is much undue strain on the main driving parts, and on one particular make of drill will

repeatedly break the main casting unless the stars are running freely. Each farmer must use his own discretion about the time to sow each different variety of wheat as a lot depends on this. Just after harvest and before seeding is recognised as the time for the horses' holiday. After running on the stubble and then being put to the preparation of the soil for seeding, sores are likely to show themselves, and it behoves every farmer to pay strict attention to this, his truest dumb friend. Go over chains and swings for they can be the means of causing much delay. When a combine is used on heavy land light harrows should be used to level it off, thus making it much easier on implements that have to cross the working. Keep the drill well covered when it is wet to prevent the super getting wet."

In the discussion that followed it was the general opinion that wheat that had been pickled the previous year need not be pickled again for seed. Messrs. Palm Bros. made it a practice to only pickle where they were going to reap for seed, thus saving much time in pickling which was deemed unnecessary every year. Heating the super stars was a method that was suggested instead of scraping each star.

KELLY (Average annual rainfall, 11.52in.).

April 7th.—Attendance, 19.

TRANSPORT.—In a paper on this subject Mr. J. S. Atkinson outlined the history of transport methods in the district before the erection of the railways and up to the present time. There was always the need of quick transport for primary produce, and transport development must take place just as advances have been made with cultivation methods. The railways catered for heavy traffic, and at present the motor train arrived on Tuesday nights and a goods train on Wednesday afternoons. A few years ago it was pointed out that the district was not advancing in the disposal of primary produce such as cream, butter, and eggs, and the branch secured a permit for freight service. This service had shifted a considerable amount of produce on behalf of farmers and the district as a whole. In the first year the value was £1,800, second year £2,600, and last year £4,000. The value of skins alone during last year was £687. The service commenced with a ton truck, then a 30-cwt., while last year it became necessary to purchase a 2-ton truck. For the future the carriage of livestock would have to be considered. The truck now in use has made 82 trips to Adelaide within 12 months, and the service was the largest in the State. (Secretary, F. Illman.)

June 2nd.—Attendance, 38.

The monthly meeting was held at Mr. J. E. Beinke's residence. The annual report of the activities of the Branch was presented by the Hon. Secretary, Mr. F. R. Illman. An excellent paper, "The Sheep Blowfly," was read by Mr. F. K. Parsons.

WARRAMBOO.

May 11th.—Attendance, 10.

RABBIT DESTRUCTION.—Paper read by Mr. A. Wagner:—"Each landholder should destroy rabbits wherever possible. The quickest method is by poisoning after the first rain with a poison cart, distributing phosphorised pollard and bran baits to which a few drops of aniseed oil have been added. After poisoning, all burrows should be worked in on the cleared land and in the scrub; then all rubbish and trees on and around the burrows should be cut down and thrown on the burrows and burned on a damp day. Dry weather is the best time for any fumigator, as the fumes have much more effect than when the air is damp. Bi-sulphide of carbon is very good for killing rabbits in burrows. The best way to use this is by pumping it into the warrens, or putting a little on a small piece of bag and then pushing it down each hole as far as possible with a stick. Close all holes except one in the centre of the burrow. In this one stand back and drop a match into it, and it will explode through the whole burrow, and will kill most of the rabbits in the burrows. The exhaust gas of an engine is very deadly, and I have had very good results with this method. It is slow but effective." Mr. Crawford found S.A.P. the best for baits, and recommended adding a few drops of aniseed to the pollard. Mr. J. Sampson recommended ploughing in the burrows in summer. One day in summer was worth a week in winter for destroying warrens. (Secretary, F. Chilman.)

YADNABIE (Average annual rainfall, 14.09in.).

May 8th.—Attendance, 12.

FARM ECONOMY.—The following paper was contributed by Mr. C. Spriggs:—"Although the cost of production has been brought down as low as possible in most instances, there are many small avenues where economy can be more rigidly enforced on the farm, and with a little foresight the farmer may save himself many expenses. A very profitable investment on the farm is a blacksmith's shop so that minor repairs can be made to implements, thus saving blacksmith's bills and valuable time. Take

good care of harness, and give it a greasing at least twice a year to protect and preserve it. A good grease for harness is about 50-50 clean unsalted mutton fat and sump oil strained from the crankcase of a car. It can be used in the poultry yard, and if painted on perches will kill lice and tick. Another very important saving is the super bags, which should be washed as soon as emptied. A good place is an old water-hole or disused dam, and left there to soak at least three days. They should then be hung out to dry, and will be strong enough to hold seed wheat the following year. Grow a few vegetables on the farm. Sheds for implements should always be provided; if iron is too expensive a cheap shed can be made of straw. If the implement is left in the weather the woodwork soon deteriorates. A good coat of paint or oil on same is a sound investment. See that reasonable stacks of hay are conserved in years of plenty. At least two years' hay should always be on hand. Another way to protect profits is to cart out manure on to hard red patches of soil—it tends to loosen them. Hoop iron should always be saved; it often becomes useful around the farm. Bagging around bales should be sown together for a tarpaulin to cover benches of the haystacks against fowls. They can also be used as sides for a cocky chaff wagon, as a covering for plants on the hot days, or as a windbreak. Old iron, kerosene tins, boxes, and binder twine should be saved when chaffcutting; it can be used in many different ways, and so help to bring down expenses." Mr. A. Spriggs, in commenting on the paper had found mutton fat and sump oil equal to neatsfoot oil as a harness preservative. Mr. H. Kobelt thought stable manure could be spread on sandy soil to better advantage. Mr. W. Brown pointed out that more care should be taken with sheepskins; they soon deteriorated if left in the weather. A good preparation for sheep skins was Cooper's powder sheep dip dusted finely over the skin before it was dry. Mr. F. Jericho gave a demonstration on setting a rabbit trap that he had made and patented. Members thought it would prove a success. The patent did away with paper, and gave the rabbit more plate space than the ordinary tin patent rabbit trap. (Secretary, E. Spriggs, Cleve.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Taragoro	29/3/34	—	Formal ..	T. Winters
Taragoro	26/4/34	—	Formal ..	T. Winters
Taragoro	24/5/34	—	Formal ..	T. Winters
O'Loughlin	24/5/34	10	Discussion ..	E. Pfeiffer
Mount Hope....	28/5/34	8	Question Box ..	A Myers
Pygery	26/5/34	8	Address—A. Day ..	A. Day
Goode	30/5/34	21	Address—W. H. Brownrigg	B. Linke
Koppio	31/5/34	14	Paper from <i>Journal</i>	M. Gardner

EASTERN DISTRICT.

ALAWOONA (Average annual rainfall, 10.29in.).

April 10th.

FUNGUS DISEASES OF THE WHEAT CROP.—In the course of an address on this subject, Mr. R. L. Griffiths (District Agricultural Instructor) said take-all had been very prevalent throughout the Murray Mallee during the past year, no doubt due to seasonal conditions which were suitable for the spread of the disease. Although rainfall was above average, there had been no heavy rains throughout the year to consolidate the soil, so that conditions were suitable for the spread of the disease. Some farmers thought that every district had to go through a period when take-all would be bad. This was not so, and by employing the proper method of cultivation it could to a large extent be controlled. Mr. W. Paull said in the Lameroo district when take-all was very bad farmers were advised to grow oats, not to cut the crop for hay, but to strip it as the best method of combating take-all. He asked, "Would poverty of soil be a reason for take-all being bad?" Mr. Griffiths said it did not seem to make much difference whether the oats were grazed, cut, or stripped. Oats were almost immune from take-all, and when sown always had a beneficial effect on the soil and a check to take-all. There was no doubt poverty of soil did help. In the north where the ground was stronger there never had been take-all to the same extent as in the Murray Mallee. Mr. B. Flint asked if fallow should be worked dry to destroy weeds. The speaker said it was not advisable to work fallow dry, but if it must be done to kill rubbish work shallow and it would not do a great deal of harm. Mr. B. Flint was also advised that rye grass was practically immune to take-all. Mr. J. Pengilly asked if fallowing with a disc plough disturbed the under layers

of soil and prevented making a good seedbed. Mr. Griffiths said the modern disc plough had very wide wheels, and it was possible to make a good seedbed, but it could not be compared with the mouldboard plough. Replies to the following questions were also given by Mr. Griffiths:—Most combines had narrow shares, was there not a tendency to bring up too much of the underneath soil and spoil the fallow when worked with this implement? *Answer:* The spring-tine cultivator was not entirely satisfactory for fallow working in the Mallee, owing to the tines being strained by stumps causing irregular depth, and if the ground was hard they “cocked up” and ran on the points. In 1916-17 there were small patches of take-all through the crop, and a thistle was nearly always growing in the centre. This was always taken as a sign that there was take-all. If wheat was grown again next year the patch would be bigger, and continue to increase in size until oats were grown or fallowed. *Answer:* Thistles were not a sign of take-all; all sorts of rubbish would be found growing on those bare patches. Is stinkwort likely to become a nuisance in the district? *Answer:* There was no need to fear that stinkwort would become a nuisance as it was in districts of higher rainfall; up to 20in. of rain a year. Would the heavy rainfall of last year have anything to do with take-all? *Answer:* Undoubtedly the frequent light rains of last year encouraged the roots to keep near the surface, and therefore weakened their resistance to disease. Does drake grow in the scrub? *Answer:* It was possible for small plants of drake to grow in the scrub and infest ground when it was cleared. (Secretary, J. Pengilly.)



Competitors in the 1934 River Murray Fencing Championships.

COOMANDOOK (Average annual rainfall, 17.22in.).

April 13th.—Attendance, 8.

A REVIEW OF THE PAST SEASON.—Paper read by the Hon. Secretary, Mr. W. Trestrail:—“The year 1933 will long be remembered by the farmers of this district as one of the worst years in our history of farming. The year opened full of promise and continued so until the middle of September, when hot, dry weather set in and ended all prospects of a good harvest. The season opened early in April, when a big thunderstorm broke over the district, and on many farms over an inch of rain fell in less than an hour. This rain was followed with good rains the following week, and thus enabled the land to be prepared and weeds killed in good weather. April’s rainfall was 188 points. May was also a good month, and 251 points were recorded. June was much drier, with only 58 points. July was fair with 110 points. August was very good, 254 points being recorded. September also promised, well over 2in. were gauged. October only yielded 34 points. November 56 and December 30 points—12.49 for the year. Thus 10in. was the amount of useful rainfall for crop purposes. The weather in October and November was very hot and dry, at times with frosts that spoilt many promising crops. We started working the land about the middle of April, using the sundereut, and turned over 60 acres of grass land that had not been cropped for about five years. This was harrowed later and cleaned up and sown on May 5th with Algerian oats at the rate of approximately 50lbs. seed and 75lbs. 45 per cent. super per acre. From this piece we cut 40 tons of hay and reaped 296 bags oats. For the dry season this yield was a very satisfactory return. We next worked up

with the disc 30 acres and sowed Free Gallipoli wheat, 60lbs. wet pickled seed and 75lbs. super, sowed with combine on June 9th. This was on old ground similar to the land where the oats were sown. This piece yielded about 12bush. an acre. We then proceeded to get to work on our fallow, which, owing to the rough nature of the land with stone and mallee shoots, we had to deal very carefully. A lot of labour was spent in clearing away bush that had grown up. The combine went over the ground twice and made a fairly good job of killing the weeds and grass. Twenty-seven acres of Free Gallipoli were sown with the combine on June 15th to 17th at the same rate as the previous piece, and this lot yielded 10bush. an acre. This wheat seems a good doer, and can stand a long, dry spell fairly well. We next sowed 75 acres of Nabawa, dry pickled, on July 3rd, finishing on the 21st. The piece was divided into two lands, and that which was sown first gave better yields. The rate of sowing was 70lbs. seed and 90lbs. super. The returns were very light. The whole piece yielding an average of 3bush. The frost seemed to be a factor in reducing the yield. The piece sown later never did at all well, owing principally to the dry conditions and heavy stony soil. Eight acres of Sultan were sown last, but the rabbits ate the biggest portion of this plot, and we only reaped about 8 bags from the plot. Our whole wheat yield thus was approximately 6bush. an acre. The lowest for many years. No disease was noticed in the wheat crop. The oats had a little loose smut. Some patches of wheat in the stony soils died right off in November for want of rain. The rain registrations are those recorded in our own gauge on the farm''.

MOORLANDS (Average annual rainfall, 14.76in.).

May 5th.—Attendance, 12.

METHODS OF DESTROYING MALLEE SHOOTS.—Paper read by Mr. R. Wilmshurst (Hon. Secretary):—"One of the first jobs on a mallee block is to destroy the shoots as quickly as possible. *Scrub that has been Rolled.*—Many people are of the opinion that a windy day with a north wind is best, but if the scrub is thick I prefer a slight

1934 CALENDAR 1934																											
MAY							JUNE							JULY							AUGUST						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
6	7	8	9	10	11	12	3	4	5	6	7	8	9	1	2	3	4	5	6	7	5	6	7	8	9	10	11
13	14	15	16	17	18	19	10	11	12	13	14	15	16	8	9	10	11	12	13	14	12	13	14	15	16	17	18
20	21	22	23	24	25	26	17	18	19	20	21	22	23	15	16	17	18	19	20	21	19	20	21	22	23	24	25
27	28	●	30	31	24	25	26	●	28	29	30	22	23	24	25	●	27	28	26	27	28	29	30	31	...
SEPTEMBER							OCTOBER							NOVEMBER							DECEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
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1935 CALENDAR 1935																											
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19	20	21	22	23	24	25	16	●	18	19	20	21	22	21	22	23	24	25	26	27	18	19	20	21	22	23	24
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SEPTEMBER							OCTOBER							NOVEMBER							DECEMBER						
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29	30	27	28	29	30	31	24	25	26	27	28	29	30	29	30	31

● FULL MOON.

breeze, because the slow burn will kill more stumps. Following this is the stubble burn. If the stubble the first year is not thick enough for a running burn I prefer logging it first before fire raking; it makes a far more satisfactory job, and this can be done when it is too cool to burn. By dragging it with a full fire rake it makes a satisfactory job. If there is not much fire raking to do, March is an ideal month to kill shoots, and even if they do shoot again the heavy frosts will give the young, tender shoots a severe shock, killing many of them. The second crop on new land should be oats, and it does not need to be a heavy crop to get a good burn, because oaten stubble burns very readily. Quite frequently in this district when poor crops have resulted the first year or two, the shoots and shrubs make rapid headway. When shoots get to this stage, say, 2 or 3 years old, there is only one remedy for them, and that is a sundercut, being unequalled for rough country. This should be done after seeding, the earlier the better, and what shoots are not dragged off with the discs can be cut with a slasher. The next process is the cleaning up of shoots, spinifex, and other growth. For this a scrub rake makes a clean job, besides pulling out loose stumps, etc., and acts as harrows to the soil. After raking the rubbish into rows it can be raked into heaps and burnt. This makes a reasonably clean job, and then it can be left until autumn rains, when a bridle draught cultivator can be worked with ease, and it will be astounding the amount of stumps that are pulled out which were loosened by the sundercut. Worked over twice with the cultivator it is then ready for drilling, and reasonably good crops can be grown on the poorest land with this method. This may seem quite a lot of bother to farmers with large holdings, but if 200 acres less were sown and the extra time put into cleaning up the other more will be gained. Where the shoots are thin, cut and leave them on the stumps, where they can be burnt. If this is done in February or March quite a number will be killed in this manner. A grass fire is very severe on what shoots are left after previous croppings. Finally, if any stumps are left the grubber is the surest remedy."

MYPOLONGA.

June 21st.—Attendance, 80.

The Annual Pruning and Cow Judging Competitions promoted by the Mypolonga Branch of the Agricultural Bureau were held on Thursday, June 21st, and a large number of visitors presented themselves at the luncheon served in the fine shed lent for the occasion by Mr. J. Victory. The newly-elected President of the Bureau (Mr. E. Llewellyn) occupied the chair, and among the visitors were Messrs. T. Playford, M.P., P. H. Suter



Mr. A. Wedd, of Mypolonga, who won the Fruit Tree Section of the River Murray Pruning Competitions.

(District Government Dairy Instructor), F. J. Cawte, M. O'Grady, F. A. Halliday, and F. C. Richards (Assistant Secretary Agricultural Bureau). There was an excellent entry for the Vine and Fruit Tree Pruning Competitions, the successful competitors being:—Vines: 1st, A. Wedd; 2nd, W. Vogt; 3rd, S. Kuchel. Fruit Trees; 1st, A.



Mr. A. Halliday (Judge) with one of the Competitors in the Cow Judging Competitions at Myppolonga.



Myppolonga Pruning Competitions, Competitors at work on the Apricot Trees.

Wedd; 2nd, W. Vogt; and 3rd, C. Rowley. Mr. E. Leishman, of the Department of Agriculture, and Messrs. W. Noles and B. Edson adjudicated. Mr. J. A. Halliday, of Murray Bridge, made the following awards in the cow judging:—Senior: 1st, L. Llewellyn; Suter Cup: 1st, L. Lodge. School boys: 1st, J. Lodge. (Secretary, R. Llewellyn.)

MURRAY BRIDGE (Average annual rainfall, 13.64in.).

April 18th.—Attendance, 31.

[Papers by Students from the High School.]

SELECTION OF DAIRY CATTLE.

[By E. LEHMANN.]

In the selection of a type and breed of cattle suitable for dairy purposes it is advisable to bear in mind the climatic conditions under which the cows have to live and produce. If the climate is cold and wet and shelter scarce, the light-coated, thin-skinned type cannot be expected to do well unless special provision is made to protect

them against adverse weather. If the cost of providing proper shelter is likely to be expensive, select a type and breed noted for robust constitution. The heavy-coated, thick-skinned, fleshy breeds are better adapted for cold and wet conditions than the lighter-fleshed, thin-coated types. A very strong constitution is required to withstand cold weather, and to combat the many ailments and diseases that high-producing cows are subjected to. Another important factor to be considered in the selection of dairy cattle is fodder supplies. If the natural or prepared pasture is not abundant, and the dairyman has to resort largely to handfeeding, it would not be profitable to select a breed and type requiring large quantities of fodder; present prices of dairy produce will not permit much labour cost in the production of fodder supplies. Profitable results can only be obtained where the supply of fodder exceeds the requirements of the cow's system, thus enabling her to turn the surplus into milk. If the supply of fodder is just sufficient to satisfy the requirements of the body, there cannot be a supply of milk unless produced at the expense of the cow's system, which will, in the course of a short period, ruin the cow and the dairyman also. I have observed throughout our swamp areas and the districts surrounding Murray Bridge, including the Hills district, that quite a number of dairymen have cattle totally unsuitable for the general conditions under which they are living. I have noticed Friesians and Shorthorns in parts of the district where the pasture is suitable only for sheep. Very little additional fodder is supplied, with the result that the milk supply can only be disappointing and unprofitable. Under such conditions the breed would probably be condemned because of the owners' lack of forethought. I have also noticed in places where pasture is plentiful a type of cattle whose lack of capacity for the consumption of fodder is better suited to those districts where the pasture is less plentiful. *Type of Cow Likely to be a Profitable Producer.*—Commencing at the head, the eye should be large and docile, indicating a good, quiet temperament; the forehead broad, the nostrils large—a sign of good lungs; the muzzle broad, as this is the medium through which the fodder has to be gathered; the jaws should be strong and the horns of medium length, neither coarse nor weak; the neck should be of nice length, well set on the shoulders and head, but should not show heaviness in the brisket—a very light, weak neck is generally a sign of lack of constitution. The shoulders should be deep and moderately fine at the top. Looking down over the shoulders they should widen out in the form of a wedge; the girth and foreribs should be nicely sprung to allow plenty of heart and lung room. The back ribs should also be nicely sprung without being barrel-like; the stomach should not be carried high, but should be wide and deep, showing plenty of capacity for the storage of food; the body or middle piece of the cow should be of good length. A cow which has a round barrel-like body has a tendency to bloat, and generally is not a good producer. The back should be level, and gradually widen to the hip bones; the hips wide and level. A nice, even top line is desirable, but is not essential for good production, but adds to the appearance, and denotes excellent formation. The hindquarter should be lengthy from hip to pin bone; this has an influence on the length of the udder attachment; the pelvis wide, and the thurl bones prominent to permit ease in calving, and to give sufficient spread to the hind legs, thus allowing plenty of udder room between the thighs. The tail setting should be high rather than low, and the tail fine and long. The thighs should be lean and uncurving without any indication of beefiness; the hocks should be fine and strong, and not turn inwards, as this is a bad fault which usually accompanies poor udder capacity. Nicely balanced udders are rather rare, but the ideal type looked for commences high between the thighs, gradually curving outwards, and getting broader as it lowers, coming well down between the hocks and then curving and running forward and joining the under line of the body well forward; the teats should be nicely spaced, hang squarely, and be of sufficient size to enable easy milking. Running forward from the front of the udder, large milk veins should be noticed extending well forward, and where entering the body prominent milk wells should be observed. These veins convey the passage of blood from the udder to the heart. Finally, the skin is an indication of the quality of the animal, and should be fine and loose on the fore ribs, which denotes a good circulation of blood. The side view of the cow should be of wedge shape from the forequarters to the rear, and from the top of the back downwards, and from the front to the rear. It is difficult to find cattle embodying all the features sought for in the true dairy type, but it is what each breeder and dairyman should strive hard to obtain, and by careful selection of the dam and sire best results can only be obtained. In conclusion, I wish to emphasise the need for selecting pure-bred stock, giving strict attention to the production performance of the sires' and dams' ancestors, bearing in mind never to purchase stock lacking a good strong constitution. My observations at various cattle shows have given me the impression that many dairy cattle judges and breeders favor too greatly the very fine type of dairy cow, a type too fine to have the necessary constitution to bear the dual strain upon their systems of high butterfat production and the healthy development of their progeny, with the result that both are impoverished, and become the subjects of ailments and diseases.

SHAPING OF FRUIT TREES.

[By L. LUHRS.]

The shape of the tree varies with local practice. In Australia the usual shape is that known as "inverted cone" type. The reason being that the tree must be open, the limbs evenly spaced, and the amount of foliage on them even, and also by doing this the crop produced is spread evenly over the tree, and it simplifies harvesting, spraying, and pruning operations. The type of tree from the nursery is either one straight stick or weak branches on it, or ones with stronger laterals which can be used as the main arms; this tree gains a year by this. On planting, the roots are trimmed of all broken members or any interlacing ones. The single stick is cut back to a suitable wood bud about 15in. to 18in. from the ground. This varies according to the type of tree. Tall growers have a shorter butt, and the shorter growers have a longer butt. During the first summer all unsuitable growths are removed, and then in the next winter the main arms are set in, usually three or five, according to the district. In the following winter the main arms are subdivided and secondary arms set in. This is done each year until the tree is sufficiently strong to bear some fruit. Then leave some fruiting wood on the lower part of the tree, and bring that part into bearing as the top part is still growing. The usual number of secondary arms for good districts

PARAFIELD POULTRY STATION.

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EGGS FOR HATCHING AND DAY OLD CHICKENS**WHITE LEGHORNS.****EGGS.**—7s. 6d. per Setting of 15 Eggs. Incubator Lots, £2 per 100.**DAY OLD CHICKENS.**—15s. per dozen; £4 per 100.**BLACK MINORCAS.****EGGS.**—7s. 6d. per Setting of 15 Eggs. Incubator Lots, £2 per 100.**DAY OLD CHICKENS.**—15s. per dozen; £4 per 100.**Free on Rail,
Salisbury.****DELIVERY.**—CHICKS—July to September.
EGGS—July to September.

Intending breeders should recognise the importance of establishing their flocks with only the very best of stock also, pay particular care to the size of the egg. The future of the poultry industry in South Australia is almost entirely dependent on the export trade; the size of the egg for export is of the greatest importance. The breeding stock at Parafield is carefully selected and every egg set or sold is of a minimum weight of 2ozs., and a large percentage considerably over.

All Eggs and Chickens sold from Parafield Poultry Station are guaranteed to be produced at Parafield.

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C. F. ANDERSON, Poultry Expert.

is about 20, but in poorer districts 12-15. If one arm is much taller than the others nip out the terminal bud; keep doing this until the others have caught up. When pruning make use of the fact that if the cut is made close to the bud the new shoot grows nearly in the same direction as before, but if the cut is well above the bud the shoot grows at right angles to the old stem. If the prevailing winds are always from the same direction, grow the tree in that direction so that it will not lean over with the continual force of the wind.

NATURAL AND SEEDED PASTURES.

[By F. BULLER.]

By a natural pasture is meant one which is composed of native grasses; a native grass being one found naturally in the location. A seeded pasture is one which has been established artificially, and may include either native or introduced grasses or fodder plants. Natural pastures are generally found on rougher and hilly country, and where erosion is serious or in the Northern pastoral areas where great distances and low carrying capacity prohibit cultivation. In the Northern Districts Mitchell Grass and Spear Grass, and Salt Bush, &c., are probably the most important. The practice of seeding a pasture is confined to better rainfall districts, which permit a wider range and better type of grass. Good seed and thorough ground preparation are required for the establishment of seeded pastures. The seed should be of distinctly perennial strain and, if possible, procure "mother seed." A seeded pasture can be one of two types—either temporary or permanent. A temporary pasture is one which is intended to yield green feed at some particular season. It can be used to rest or improve regular cereal or other cropped land, or breaking in new lands such as blackberry or bracken. A temporary pasture's duration is usually a short one, about one to four years. Suitable plants are:—Rye Grass, White Clover, Cocksfoot, Wallaby Grasses, Subterranean and Red Clover in conditions which suit them. The land preparation for temporary pastures is not generally as elaborate as for long rotation pastures. These are grown on land which is fit for cultivation. It is not often that a farmer wants to keep good arable land under pasture all the time, but he may put down grasses for 10-12 years until they deteriorate, then plough them up and sow with cereals for a year or two, when another pasture is put down. This process constitutes long rotation pasture. Permanent pastures are seen chiefly in poor scrub lands which are too rough to cultivate. To grow long rotation pastures the land must be well drained, as inferior plants take control if seeded pastures are slow. The seedbed must be firm and free from weeds. Fallowing is the best method of getting a firm seedbed if the land is not too valuable. A roller should be used to break down clods, and follow with cultivator and harrows. The seeding of permanent pastures must be shallow and even. To accomplish this cross drilling can be used. Sow thinly with drill or broadcast. Cover the seed by using light harrows or roll to consolidate, and loosen surface with harrows after. The land should not be too wet. A clean seedbed will avoid the use of a nurse crop. If a nurse crop is necessary use wheat or barley with thin seeding, and varieties not likely to lodge. Autumn sowing is probably best if it can be done early enough to give plants a fair start before the cold weather. Spring sowing is all right if it is not followed too closely by hot winds. It is probably best to sow heavy land in autumn, as it would take some time to work it into condition for spring sowing. For manuring use not less than 56 lbs. to 84lbs. of super per acre sown with the seed. Five hints dealing with the after treatment of seeded pastures:—(1) Do not allow too much growth to go unchecked in young pasture, as ranker growth shades the smaller. (2) Cut rather than graze in first year. (3) If grazing is necessary, cattle are preferable to sheep (method of eating—sheep tug grasses). (4) Prevent from seeding by grazing or cutting. (5) Top dress annually with super, harrow, and lime. (Secretary, F. Gurr.)

May 24th.—Attendance, 16.

GENERAL FARM MANAGEMENT.—Mr. R. L. Griffiths (District Instructor) in speaking on this subject considered that there was no more important subject than this at the present time. He defined efficient management as the ability of a farmer in each industry to show the maximum credit balance between production and expenditure. In many cases, however, the management was taken out of the hands of the farmer. He thought that that was one of the factors influencing many farmers at the present time. In dealing with wheat growing he found difficulty in giving advice because of the poor prospects of making a success in this direction in the low rainfall areas. He quoted from the costing figures published in recent numbers of the *Journal* and used statistics to illustrate how difficult it was to make a success of wheat farming in the mallee areas with wheat at 2s. per bushel. He showed that 40 per cent. of the cost of production was for interest and depreciation. With improved prices for wool there was added interest in sheep grazing. Mr. Griffiths considered that sheep should be classed as a main industry in the mallee area, and not a side-line. The best managers always realised that and in some cases classed sheep as the more important. Quite a number

attempted to make a success as dealers. There were a few men who were born dealers and to most farmers there was little hope of making success in that direction, mainly because they could not keep in close touch with market conditions. The speaker suggested that a permanent flock should be built up; provision made for hand feeding in dry season and storage of surplus feed when it was plentiful. He gave details of the different breeds and methods of storing ensilage. *Sidelines*.—The lecturer gave details of management in connection with dairy cattle, pigs, and poultry. He showed that it was practically impossible to make cows pay in the low rainfall districts, but was most optimistic when referring to pig raising. His details of the experiments at Parafield in the feeding of poultry proved very interesting. In all cases he stressed the importance of good stock and scientific feeding. (Secretary, F. Burr.

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Coomandook ...	28/5/34	23	Address—C. Goddard ...	W. Trestrail
Overland Corner	30/5/34	10	Paper—F. Sharley	L. Atkinson
Overland Corner	5/6/34	14	Address—C. Goddard ...	L. Atkinson
Nunkeri	28/4/34	13	Address—C. South	E. Peltz
Nunkeri	24/5/34	11	"Pigs for Bacon," S. Yelland	E. Peltz
Kulkawirra.....	12/6/34	7	Discussion	H. Elliot
Pinnaroo	30/5/34	29	Address—C. Goddard ...	H. Badman

SOUTH AND HILLS DISTRICT.

CLARENDON (Average annual rainfall, 32.89in.).

March 26th.—Attendance, 11.

[*Papers contributed by young members of the Branch.*]

POULTRY (Mr. M. Harper):—"Poultry farming in a big way, and worked with system, method, and a scientific knowledge of its requirements, has enabled this industry to become one of our most stable primary products. Knowledge, if only in an elementary form, may spell success to the beginner. He must be a keen listener and also an observer. He may know a book of knowledge, yet lack a few essential points which may mean pounds of loss, or an inferior flock of birds, although he may have started with highly productive ones. If egg production is the object, keep White Leghorns or Black Orpingtons. The Whites are good layers and lay a large egg; the Blacks generally lay when eggs are a good price. Opinion differs widely concerning the best breeds for the table. Orpingtons are much in favour, or a Leghorn-Orpington cross makes a very good table bird. *Housing*.—Have plenty of room. Face the house east or north-east to catch the morning sun. There are too many draughts and too much driving rain from other directions. Avoid low houses—they are a nuisance when working in the shed. I suggest 7ft. high in front and 5ft. 6in. or 6ft. at the back. There should be plenty of chaff and litter on the floor. This provides a good scratching ground. The wheat could be scattered among this. A fowl that will not scratch for her food is not much good. Perches should be of 2in. x 1in. wood, laid on the flat, and should be movable to make cleaning out easier. They should be from 18in. to 2ft. off the ground. Keep all joints of woodwork free from vermin by pouring in a little oil and kerosene occasionally. *Feeding*.—Laying hens should have a warm mash in the morning—50 per cent. bran and pollard (two-thirds pollard and one-third bran), the other 50 per cent. being chaffed greenfeed. They should also have chaffed greenfeed again at noon and wheat at night (about 1½ozs. to 2ozs. per bird). Be sure and keep a good supply of clean drinking water. This should be given at least once a day. Keep it in the shade. Much sickness and loss of birds are due to drinking water which has been heated by the sun. They should also have plenty of shellgrit. This can be placed in the nests—it keeps the eggs cleaner than straw and does not harbour vermin. Nests can be made by cutting kerosene tins on the flat. Culling is necessary. At least once a year go through the flock and get rid of any old birds and any that are inclined to go broody unless you wish to set her. Twelve pullets will lay as many eggs in a year as 17 hens two years old, and as many as 24 three-year-old hens, so that it is necessary to place rings on the birds to distinguish their ages."

THE SHEEP AND ITS PRODUCTS (Mr. J. Langeford).—"Sheep are classed into long-wools and short-wools. The production of clean wool is no greater under a full diet than one which simply maintains the condition of the sheep. Indeed, a sheep may lose somewhat in live weight without much effect on the wool production; but with a starvation diet the yield is seriously diminished. If the wool grows half an inch in the first three months it will grow half an inch in the last three. Poor pasture is shown

by the thickness of the wool. Poor pasture causes the break in the fleece, and affects the price of the clip. Environment, climate, pasturage, and breeding exert considerable influence on the productive powers and consequently on the character and type of wool the sheep produces, and are the chief causes of much variability in wool growth, whose commercial values are so various as to necessitate the classing of wool. The fleeces of a small clip are almost as variable in type and condition as those of large clips, so that to give full value it is essential that small clips be graded for market as well as large ones, but not so extensively. The number of fleece lines will be reduced to suit the clip being classed. Some of the chief factors affecting methods of classification are climate, size of flock, type of wool, conditions. Hence, definite methods for classing of small clips cannot be given. In connection with them it is best that the common sense principle of uniform matching of wool be adopted, as classing cannot be effected with such perfect regularity as large clips. Each of the classes required should be made uniform and the lots as big as the number of sheep will permit. Mixed fleeces must be classed according to breeding and type. Sound back fleece wool is typed higher, sells more readily, and a better average price per pound is obtained. *Classing*.—The following are the lines into which such a clip would probably be divided, with a description of the wools to be found therein:—Fleece wool—AA: sound, good length, light condition, 64's upwards; A: sound, shorter, heavier, 64's upwards; BB: sound, good length, light, medium condition, 60's; B: sound, shorter, heavier, 60's; C: short, fatty or tender. In some seasons the number of tender fleeces may necessitate the making of a separate line branded 'Fle' or even two lines. A Fle.: the finer condition fleeces; B Fle.: the broader tender fleeces. *Skirtings*.—A Pcs.: the longest and lightest pieces; Pcs.: shorter and heavier; Bls.: probably one line of bellies, minus stains; Bks.: the earthy backs; Std. Pcs.: one line minus dags; Lks.: one line minus dags. It is a very bad policy to allow dags and fribby ends to be included in a bale of locks or stained pieces, as the buyers do not pay for these, while the freight must be paid." (Secretary, T. B. Brooks.)

INMAN VALLEY (Average annual rainfall, 26 to 27ins.).

May 17th.—Attendance, 7.

THE FOX.—Paper contributed by Mr. H. Lewis:—"The fox is an inhabitant of the following countries:—North America, Europe, Asia, Africa, and Australia. The red fox was unknown in America previous to 1760 at which time a number of them were imported from England and landed at Long Island for hunting purposes. They were first landed in Australia in the 17th century by direct importation from England by the Melbourne Hunt Club and let loose in Victoria for hunting purposes. They have extended to their present numbers from that time, until they are a menace to all States which are breeding lambs. During the last 30 years they have spread with great rapidity through South Australia. Contrary to popular opinion the Australian fox is no larger than its English forefathers and is considerably smaller than the foxes of Northern Europe. The fox has one litter per year of 5 or 6 up to 10 which is born blind and remain so for 8 days, suckles for about a month, comes to maturity from 18 months to 2 years and lives to an age of 12 to 14 years. *Poisoning of Foxes*.—When laying baits of meat or dosing a carcass it should not be near a roadway where drovers may be travelling. There are many types of baits that can be used. I prefer parrots; most dogs do not like the smell and consequently there is less risk of losing same, if a bait should be moved by a fox. When laying baits use a drag that has a strong smell near any places likely to be frequented by such as a solitary rush or tree in an open flat. Baits are better laid in pairs for a fox when not hungry and unable to carry two parrots is likely to eat one and carry the other away. Strychnine powder and bicarbonate of soda make the best and quickest poison to use. If fat is used a good mixture can be made by using 6lbs. of fat or dripping with a ½oz. of strychnine with sufficient soda. Boil fat and mix in ingredients and cut into blocks before cold. When using parrots, poison the head as well as the body, for a fox will often eat the head and carry the body away, and thus a good skin will be lost. I am not altogether in favour of traps unless they hold their catches. If a fox loses a paw he is not so active and is then very hard to poison. I am in possession of a vixen which I ran down last season and having heard they make good decoys intend to try and trap or lay baits around it. Strychnine crystals do not dissolve when placed in birds or meat and they are not soluble in water; only in vinegar. For this reason I favour the powdered form. Of the fox, Prof. Wood Jones says, "From a zoological point of view the fox probably represents the most baneful disturbing influence brought about by human folly in introducing an animal into a new country." (Secretary, W. Mayfield.)

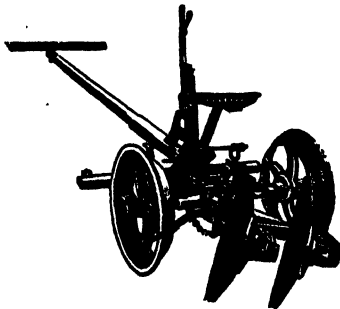
KUITPO.

May 2nd.—Attendance, 9.

CALF REARING.—In the course of an address on this subject Mr. R. Morris said the cow should be dried off six or eight weeks prior to coming in again. That was not always simple, especially in the spring, when feed was good, although, as a rule, it

was more difficult to keep up the supply of milk. In two instances Mr. Morris had experienced trouble in drying off cows and had washed, and after disinfecting the teats, applied Stockholm tar to seal them and prevent the penetration of germs. That was quite effective and could be recommended. When the calf was born it should be left with the cow for 24 hours; at the end of that time the cow should be drenched. Mr. Morris did not recommend drenching prior to calving; it had a tendency to upset the cow. The calf should be put out of sight in good, clean accommodation, with access to sun and light. When the cow was first milked it was easy to tell which quarters the calf had sucked, and if any were weak it was a good plan to put the calf on them again to stimulate the flow of milk. The calves were best kept separate to prevent sucking one another. Mr. Morris attributed one cow he had with "pea teat" to that habit when young. The most important period for feeding a calf was the first six months, and it was during that time that one built up a good or indifferent producer. The first week, as the cow's milk was not of much value, feed 4 pints of fresh milk twice a day. The second week 3 pints of fresh and 2 pints separated twice a day; the third week 2 pints fresh and 3 or 4 pints separated and some hay. The fourth week the same amount fresh and more separated, the fifth and sixth weeks increase the amount of separated milk. After that give separated milk with a little fresh, the fresh milk being a preventive of scouring. A good cure for scours was to feed the calf on fresh milk and add 2 tablespoons of flour with milk. Mr. Morris spoke of the old practice of placing a hot iron in the milk to be fed to calves as being a quick way of heating up the milk to the desired temperature. The calf should never be fed on frothy milk, and at three to six months could be weaned and run in the paddock and watched to see how it developed. It was best to have a good breed of animal, but the most important thing was feeding. Mr. Morris spoke of the teat feeding of calves as being more natural than the bucket, but harder to keep clean and free from germs. He could not recommend a substitute for milk, and the cost of feeding on milk was not very expensive, the first week costing 3s. 6d., the second and third 2s. 7½d. per week, the third, fourth, and fifth at 1s. 9d. per week, and it was worth while, even though all calves do not turn out good. Questions were asked and a discussion held on various points of the talk. (Secretary, J. Pickup.)

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MOUNT COMPASS

ANNUAL MEETING.—There was no exception to the rule of large attendances of the Mount Compass Bureau when the members held their annual meeting and social on June 7th. The committee had prepared a varied programme of musical items and short addresses by visitors and Departmental officers. Mr. A. Kidman presided, and besides representatives of neighbouring Branches, there were present Messrs. Jos. Johnson, H. C. Pritchard (General Secretary), H. H. Orchard (Horticultural Instructor), and members of the Mount Compass Branch and their friends. Mr. Kidman reported that the average attendance of members and visitors for the 12 meetings held during the year was 46. Addresses had been given by Miss Campbell (Education Department), and Messrs. Ford on "Banking," Nottage on "Experiences in Africa," R. Hill (Agricultural Instructor), Muller of Myponga, C. F. Anderson (Poultry Expert), Dr. Callaghan and R. Baker (Roseworthy College), E. Leishman (Horticultural Instructor), and K. Verco. Field days had been held on the farms of Messrs. Dowells, A. Peters, M. Jacobs, and Hunt. Special reference was made to the successes of Mr. C. E. Verco who had beaten his own State record with one of his young cows, and Mr. Howard Peters who was second in the Meadow Hay Competition, Mr. Peters, sen., being a close runner up. Since December sheep and lambs from the district had topped the Adelaide market on six occasions.

The work of the Secretary (Mr. C. E. Verco) had been highly appreciated during the year. After pointing out that all the successful people of the district were members of the Bureau, Mr. Kidman made a special appeal to others to join the Branch as they had "everything to gain and nothing to lose" by becoming active members.

There was increased interest in the Junior Potato Growing Competition, and Mr. Jos. Johnson, of Adelaide, presented a trophy to Don McKinlay who grew 278lbs. of potatoes from 1lb. of seed. The rules of the competition provided that each school boy candidate was required to cut and plant the sets in the presence of not less than two stewards. In all other respects the candidate was allowed to have whatever assistance he desired. The potatoes were dug in the presence of not less than two stewards on the Tuesday preceding the Mount Compass Show, at which all entries were exhibited. Competitors were also divided into two teams (selected before the potatoes were planted) and a prize was given to the team growing the greatest quantity of tubers. Tom Garden's team won this competition by 11lbs. in the weight of tubers dug. As this team was one boy short, it was given an allowance of a pre-arranged weight.

The variety of potato grown was Carmen, and the seed potatoes were donated by Mr. Johnson. The following were the results:—

Team.	Sets Planted.	Crop from 1lb. Seed. Dug. Weight in Lbs.
Tom Garden (captain)	44	41 198½
Linton Jacobs	51	38 268
Noel Jacobs	57	50 230
Arthur Stone	47	40 124½
Kelvin Peters	31	28 151½
Sam Miller	39	37 87
Ray Chigwidden	57	57 181½
Harry Garden	29	14 66½
Ronald Lane	37	19 27
Alex Anderson	50	48 186
Team.		
Don McKinlay (captain)	39	39 278
Norman Anderson	53	53 196
Ben Peters	38	37 166
Ray Richardson	31	31 58
Ross Williamson	59	59 180
Stanley Hales	55	45 78
Ralph Cole	37	37 119
Guiseppe Grotto	45	41 135
Douglas Chigwidden	49	48 192
Laurence Garden	53	50 193
Bob Richardson	22	21 35

The winner (Don McKinlay) first of all dug the plot in which the seed was planted; it was then hoed two or three times and again dug. He applied bone and blood manure and super as well as general farmyard manure. The distance between the sets was 2ft. 6in. x 2ft. 6in. Linton Jacobs dug his plot one month before planting 3ft. between sets and used a bucket of super, sulphate of ammonia, and three bags

of fowl manure. Noel Jacobs ploughed and cultivated the plot several times and applied $\frac{1}{2}$ wt. super, $\frac{1}{2}$ wt. bone and blood manure, and five bags of fowl manure; distance between sets. 3ft. x 5ft.

After congratulating the winners on their success, Mr. Johnson gave a short address on growing potatoes.

In the Flower Competition (for girls), the first prize was won by Miss Ronda Peters, the other competitors being Naomi Dowell, Jeyce Chigwidden, Elizabeth Jacobs, Joan Dowell, Thelma Anderson, Mavis Anderson, Pris. Miller, Emma Haywood, Ruth Dowell, Nellie Peters. Seedlings for this competition were supplied to each competitor and the blooms were judged prior to the show.

Mr. Pritchard presented the trophy to the winner and spoke on the value of competitions in the work of the Agricultural Bureau.

The musical programme was presented by Mrs. Wundersitz, Mrs. Rumbelow, Miss Wundersitz, and Messrs. Rumbelow and Solly.

The Chairman announced the election of officers for the coming year as follows:—Messrs. A. Kidman (President), H. B. Peters (Vice-President), C. E. Verec (Secretary), J. Sneyd, S. Eckers, W. Hunt, B. Proctor, and W. Jacobs (Committee).

NARRUNG.

April 14th.

MANAGEMENT OF LUCERNE AND DAIRY COWS.—Paper read by Mr. E. Wyatt:—"The first essential in sowing lucerne is to have the ground well worked. Harrow the ground down well so that there are no air pockets. The seed can be sown on rolled ground. I prefer broadcasting the seed after the land has been sown with $\frac{1}{2}$ bush. of barley and 60lbs. of super to the acre. Do not be afraid of burying the seed too deeply. I have had better results by harrowing two or three times than by only brushing it in with a bush. If the plants germinate and are too near the surface a dry spell may be experienced, and in this district it may kill the plants. If it is well harrowed in it is able to withstand any dry spells that may come along. My reason for sowing barley is that it comes off much earlier, and gives the plant a better chance to establish itself. The barley should be cut when it comes out in ear, preferably for ensilage; with the lucerne and undergrowth it makes splendid ensilage. If this cannot be done early, then the barley should be stripped and the straw left to protect the young plants, for when they are exposed to the hot sun and hot ground they very often get burned off. The lucerne should be grazed very lightly the first year, this will give it a chance to stool, but it can be cut if it grows well enough.

The year after sowing, topdress with 3wt. of super to the acre, and sow $\frac{1}{2}$ bush. of oats. This should be done with a hoe drill so that the plants will not be unduly injured. The oats should be of an early variety, and should be grazed when 4in. to 6in. high, then left and cut with the lucerne when the oats are coming out in ear, for loose hay. Graze or cut the lucerne the next summer; the following winter the plant should be well established. The following year it is supered again. On 'oily' ground in this district it is difficult to establish lucerne, but the trouble can be overcome by working the ground with as much grass and rubbish in it as possible. Work it with a cultivator or combine, and leave it in rows as left by the machine. When a suitable rain comes—and it must be a good rain—soak the lucerne seed for three or four days, and mix with barley, sowing at the rate of 5lbs. to 6lbs. lucerne to the acre and $\frac{1}{2}$ bush. of barley; this mixture to be broadcasted, then brushed in, but not harrowed. The seed collects in the gutters, the lowest part of which is wet, the seed germinates quickly, and each shower waters it as the water collects where it is most needed around the plant. It should then be handled under ordinary conditions. Fifteen to 20 acres of lucerne should be put down each year so that a fairly young stand is maintained. The young stands grow much better through summer than the old ones, and provide much more feed at a time when it is wanted. The main secret of having lucerne right through summer is not to have 40 cows and 80 acres, it is much better to have 10 cows and 80 acres. There should be six acres of lucerne at various stages of age to every cow kept. Another important point is letting the cows graze it according to the rate it is growing. They should be 'minded' on large paddocks when it is getting scarce, and kept from roaming all over it. An hour a day will give them a good fill of lucerne if it is a good length. To get the most out of cows they need a big variety of feed and plenty of it. This variety of feed should be put aside in times of plenty in the form of ensilage, lucerne hay, mixed hay, that is hay made from lucerne, grasses, and barley or oats, oaten hay, to be cut into chaff. The ensilage and loose hays can be obtained if the paddocks are worked as mentioned. If put in early oats very seldom fail to provide a good hay crop in this district; the chaff keeps the cows in good heart and condition through the slack times and early winter. At present (April 4th) my herd is having a little bran in the bails for the best cows. After milking, ensilage and lucerne hay; after dinner, an hour on good lucerne; after milking at night, more hay. I believe in feeding fresh cows some bran at this time of the year, so that they will hold at their production until the feed

is strong enough to support them. At present there are four cows 'fresh in,' averaging over 60lbs. of butterfat per month, at 9½d. per pound, they are bringing in £2 8s. per week, and they deserve the 4s. to 5s. worth of bran they receive. If it was not for that their production would soon drop back twice what it costs to keep it up. When the lucerne is beginning to go off, the best substitute is ensilage, even with a fair picking of lucerne about the cows have eaten it up splendidly. Try to work the cows so that they are in watered paddocks during the day and in unwatered paddocks at night. Water should be laid on to every paddock so that they can have it at any time day or night.

Do not turn the cows out in the paddock straight after milking; they should be put in a yard alongside those that are not milked; this keeps those that are not milked more contented and not anxious to get out. No stock whips or sticks should be used on the cows; they should be milked and handled in the yard, and moved about as quietly as possible. Milking should be done as quickly as possible, so that the cows are only in the yard a short time, and it gives them more time for feeding or resting. Never miss milking a cow until she has definitely got to go dry. If by going out some of the stale cows have to miss being milked, then do not go out. Since establishing lucerne on the property, culling the cows severely after testing them, and piping water to nearly every paddock, and providing plenty of fodder for the slack time of the year, the average production of my herd has risen from 187lbs. of butterfat to 369lbs.—nearly double their production—which shows that attention and proper food is worth while." (Secretary, W. Laurie.)

TWEEDVALE (Average annual rainfall, 35.97in.).

April 2nd.—Attendance, 15.

TYPE OF PIG FOR EXPORT AND MANAGEMENT OF PIGS.—Points from an address by Mr. Roy Baker. In opening his address he dealt with the best type for export; there were two carcass types, namely, porker and baconer. England required baconers, Australia, he said, had too many different breeds. *Points of a Bacon Pig.*—The baconer should be lean in the jaw, as head meat is cheap. Light in shoulder, thinness of flesh over the shoulder; length of body was important. Levelness of the back, well let down loin. Depth of side and thickness of belly. Level underneath and level along the back. Well-shaped ham, broad, well let down, and a mass of meat. There were four breeds, namely, Large White, Mid York, Berkshire, and Tamworth. The Large White, he said, was not proving the right pig for export, but was a good sire on either the Berkshire or Mid York; it produced a fine carcass. He also favoured the Tamworth-Berkshire cross. *Feeding of Pigs.*—He stated that there was a 7 per cent. gain by feeding meal; labour of cooking was not warranted. Rough foods, such as potatoes, should be cooked; salt should be added to these when cooking, to improve them. Always feed dry, never soak food fed in conjunction with water; food should be damped, but not be sloppy. Water should be handy at all times. *Exercise.*—Pigs remained healthy if allowed plenty of exercise, digestion was also aided, and a better carcass the result. Pasture for pigs was essential. It also lessened the grain to be fed. If skim milk was fed, it should be fed on a scale of 3lbs. to 5lbs. of milk to 1lb. of grain. If self-feeders were used it was a good plan to have the water trough some distance from the feeder, that caused the pigs to travel, thereby giving them the much required exercise. Pigs should have minerals, the following was advised:—20lbs. charcoal, 20lbs. coarse salt, 40lbs. bone meal, super, or rock sulphate, 5lbs. Epsom salt, 5lbs. bi-carbonate, 5lbs. sulphur, 5lbs. sulphate of iron. The mixture should be used at the rate of 1lb. to 2lbs. to every 100lbs. of grain. *Breeding.*—The boar was half the herd; he should be pure bred, active, of medium size, and should come from a 10 or 12 litter. Legs should be straight outside the body, "down" on the pasterns was a bad fault. Examine the rudimentary teats, he should have 12. The sow should have 12 good teats, well forward, the number of teats had no bearing on the number of pigs she would breed. Dummy teats should be well developed and stand out from the belly. Do not breed until 8 months old, she will then have her first litter at 12 months. Feed the sow well. She should have two litters a year for four or five years. Do not discard old sows, use them as long as possible. Breed the type that was wanted overseas, i.e., the long, lean type of pig that has been properly fed and carries a larger percentage of lean meat. (Secretary, B. Schapel.)

McLAREN FLAT PRUNING COMPETITIONS.

The annual Pruning Competitions conducted under the auspices of the McLaren Flat Branch of the Agricultural Bureau were held on June 16th in Mr. T. Ingoldby's vineyard. Under the supervision of Mr. C. Robertson, the energetic secretary, Mr. P. Wait, and a most efficient committee, the competitions proceeded without a hitch.

The cup presented by the R.A. & H. Society for the highest points in the Vine Section was won by Mr. R. J. Deane.

Eighty-six competitors pruned in the Vine Section this year—a record entry since the McLaren Flat Branch has been responsible for the management of the Competitions. To obtain a certificate of efficiency, a pruner must receive 80 out of a maximum of 100 points.

This year, 153 certificates out of a possible 172 were awarded—striking evidence of the high standard of vine pruning that has been reached by pruners in this Competition. The following table sets out the results:—

VINE PRUNING.

Judges—Messrs. J. L. Williams (Viticulural Instructor, R.A.C.), J. B. Harris, E. Leishman, and H. H. Orchard (Horticultural Instructors, Department of Agriculture).

Competitor.	Spur.	Rod.	Total.
R. J. Deane	92	94	186
Ralph Townsend	90	95	185
W. Harris	90	91	181
A. H. King	86	93	179
T. E. Teusner	87	91	178
C. Cassetta	90	88	178
F. Price	91	87	178
H. Eatts	87	91	178
P. Penney	89	88	177
H. Sparrow	89	88	177
H. Cox	91	85	176
J. B. Helbig	89	87	176
A. E. Helbig	89	87	176
Ron. Ward	84	91	175
C. Sigston	88	87	175
G. Baldock	86	89	175
A. W. Osmond	81	94	175
F. H. Grohs	87	88	175
F. Schurgott	87	87	174
B. Sibley	87	87	174
E. G. Helbig	86	87	173
B. Elliott	88	85	173
Reg. Townsend	86	87	173
A. McGaffin	85	88	173
Ron. Elliott	85	88	173
J. Mitchell	85	88	173
A. Baxter	85	88	173
E. R. Grohs	86	86	172
L. Manser	89	83	172
W. Delaney	86	86	172
J. Ordish	89	83	172
W. Harris	87	85	172
C. Air	88	83	171
E. W. Roberts	87	84	171
Reg. Elliott	91	80	171
H. Alexander	85	86	171
R. Low	84	86	170
D. Hunt	82	88	170
K. Whiting	89	81	170
H. Easton	86	84	170
J. Sims	88	81	169
O. Wright	85	84	169
E. Baldock	83	86	169
J. Piercey	85	84	169
L. Ward	81	88	169
K. Broughton	84	85	169
H. O. Helbig	85	84	169
A. H. Turner	81	87	168
F. Cox	82	86	168
J. Keane	86	82	168
F. Turner	80	87	167
G. Wright	86	81	167
C. Sparrow	83	84	167
M. Sparrow	79	88	167

Competitor.	Spur.	Rod.	Total.
C. Wilksch	86	80	166
R. Forrest	79	87	166
F. M. Elliott	79	87	166
L. V. Turner	83	83	166
O. Manser	82	84	166
H. Gunn	79	87	166
E. Waye	83	83	166
L. G. Osmond	80	86	166
N. Sparrow	82	83	165
H. Storer	85	80	165
R. Bilney	85	80	165
T. Burgan	81	84	165
W. Stillwell	78	87	165
B. Powell	91	74	165
P. Roe	78	87	165
L. Rayner	86	79	165
L. Whitehead	85	80	165
Rex. Ward	82	82	164
M. Hailstone	80	84	164
G. C. Cartwright	77	86	163
R. Wickham	79	83	162
R. Gunn	78	84	162
P. Wappler	80	82	162
C. W. Powell	80	81	161
I. Seaman	79	82	161
J. Sigston	79	82	161
A. Cooper	80	80	160
A. Tickle	75	84	159
G. Wright	75	83	158
H. Baldock	80	78	158
R. Rayner	79	79	158
M. Robertson	84	—	84

FRUIT TREES.

Judge—R. Fowler Manager Blackwood Orchard).

Competitor.	Apricot.	Prune.	Total.
A. Trembath	87	84	171
F. M. Elliott	81	88	169
J. B. Helbig	78	89	167
L. Ward	75	85	160
C. Wilksch	78	82	160
R. Townsend	75	82	157
G. Ward	75	79	154
R. Elliott	75	77	152
B. Elliott	77	74	151
W. C. Ledgard	61	76	137
E. G. Helbig	80	—	80
H. Eatts	—	74	74
C. Bruce	68	—	68
R. Nottage	64	—	64
C. Sigston	59	—	59

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Clarendon	5/2/34	14	Address—C. Hill	T. Brooks
Clarendon	23/4/34	60	Address—A. R. Hilton . . .	T. Brooks
Jervois	31/5/34	23	Address—Dr. Davidson . .	F. Bailly
Kuitpo	30/5/34	8 and visitors	Address—Dr. Callaghan . .	J. Pickup
Narrung	9/6/34	19	Conference Report	W. Lawrie
Blackbeath	31/5/34	9	Paper from <i>Journal</i>	E. Paech
Finnis	21/5/34	10	Address—A. Codrington . .	L. Dunn
Currency Creek	28/5/34	6	Discussion	D. Jeff Gordon
Macclesfield	21/6/34	10	Annual Meeting	H. Ross

WOMEN'S BRANCHES.

SUBJECTS FOR BUREAU MEETINGS.

If you have no other subject in mind, here is a list from which you might choose when asked to contribute to your branch programme.

The Farm.	The Home.	General.
Dairying— Care of Milk and Cream Buttermaking Cheesemaking	Home Management — Furniture— Choice Repairing Needlework Knitting Rugmaking	Inter-Branch Visits Competitive Exhibition Flower Show Practical Demonstrations
Pigs— Bacon Curing	Clothing— Choice Repairing	Social Music in the Home
Beekeeping— Honey	Dressmaking	Good Reading Hobbies
Horticulture— Vegetable Growing Flower Growing	Pattern Afternoon	Physical Culture Labor Saving Hints
Poultry— Dressing Incubation Rearing Chicks Turkeys Ducks	Children— Care and Management Cooking— Recipes Recipes for Christmas Lunches Jam Making Fruit Preserving Fruit Drying Fruit, Value of Pickles and Sauces Sweet Making Exhibition of Home Crafts Christmas Gifts Home Nursing	Spring Cleaning Entertainment in the Home.

TRAY-MOBILE SET.

In reply to a question as to the number of pieces of work in a tray-mobile set, which was submitted by the Clare Branch, Miss E. Campbell (Inspector of Domestic Arts, Education Department) says the full set contains the following pieces:—

1. Two tray cloths (one for upper and one for lower shelf).
2. Tea cosy.
3. Teapot holder.
4. D'oyleys, usually four of assorted shapes and sizes.
5. Small serviettes, usually six.
6. If a teapot mat is used there is usually a cover for the mat to match the rest of the set.

In many shops smaller sets, comprising the tray cloths and two or four d'oyleys, may be purchased ready stamped for working.

WARTS ON COWS' TEATS.

Mr. H. B. Barlow (Chief Dairy Instructor) has advised the Secretary of the Gladstone Women's Branch of the Agricultural Bureau that the cause of warts on cows' teats, although not quite understood, is thought to be at least partly caused by leaving the teats wet, friction, &c.

Warts may clear up spontaneously, but any of the following dressings will assist:—

1. Smearing with castor oil after milking.
 2. Painting with glacial acetic acid on dry teats.
 3. Washing in strong soda solution. This may be done in combination with 1.
- Some authorities state that certain types of warts are contagious.

GOOD THINGS FROM THE OVEN.

[By GRACE B. ARMSTRONG, A. MARIE SCHRIEBER, and MARY A. MCPHER,
of the University of Illinois, Urbana, U.S.A.]

(*Continued from page 1496.*)

Part II.—Recipes and Directions.

PUDDINGS.

CUSTARDS.

Custards are products made of milk thickened with eggs. There are many varieties, but the same general principles for making them hold true for all methods of cooking. They may be steamed, baked, or cooked in a double boiler.

BAKED CUSTARD.

Equipment.

1 mixing bowl	1 tablespoon
1 egg beater	1 shallow pan
1 measuring cup	1 baking dish
1 teaspoon	1 strainer
1 double boiler	

Materials.

2 c. milk	$\frac{1}{2}$ t. salt
2 to 3 eggs	$\frac{1}{2}$ t. vanilla
$\frac{1}{2}$ c. sugar	

Amount: 2 or 3 servings.

Method.

How.

Scald milk.

Beat eggs slightly.

Stir in sugar and salt. Pour scalded milk over them gradually. Add flavouring.

Pour through strainer into baking dish.

Set baking dish in a pan of hot water.

Bake in very slow oven (250°F.) until a knife thrust into the custard comes out clean.

Why.

Scalding will hasten the baking. If saving time is no object, milk need not be scalded.

A smoother, firmer custard results when eggs are beaten but slightly.

Eggs are less apt to coagulate if mixed with sugar before hot milk is added.

Straining removes cord and any coagulated bits.

Hot water keeps the cooking temperature around the custard even and low enough to prevent toughening of the protein.

Too long cooking at too high temperature will cause the custard to separate.

PRUNE WHIP.

Equipment.

1 saucepan	1 strainer
1 mixing bowl	1 mixing spoon or spatula
1 measuring cup	1 tablespoon
1 egg whip	1 baking dish

Materials. $\frac{3}{4}$ lb. prunes $\frac{1}{2}$ c. sugar $\frac{1}{2}$ Tb. lemon juice

5 egg whites

Amount: 6 or 8 servings.



Fig. 3.—Cutting edgewise with a spatula into the middle of the mixture.

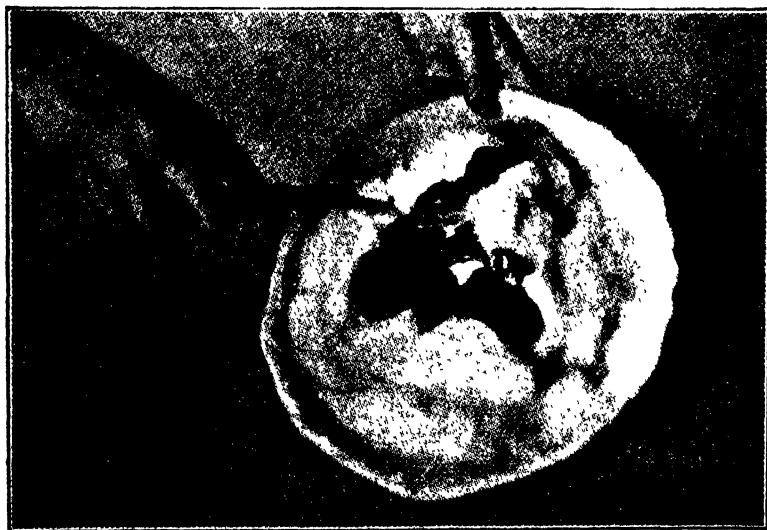


Fig. 4.—Sliding the spatula under part of the mixture. (This part is lifted again and folded over towards the centre.)

The cutting and folding motion illustrated with Prune Whip

*Method.**How.*

Look over prunes carefully and discard any not in good condition. Wash and drain in a strainer.

Cook slowly until tender.

Remove stones and rub prunes through a strainer. Return to saucepan. Add sugar and cook 5 minutes. Add lemon juice.

Cool thoroughly.

Beat whites of eggs until stiff.

Carefully cut and fold prune pulp into egg whites.

Slip mixture out of mixing bowl and pile lightly in a buttered baking dish. Do not stir or mix unnecessarily.

Bake 20 minutes in slow oven (300°F.).

Serve hot or cold with cooked custard or cream.

Why.

By using a strainer it is easier to remove any gritty substances.

Slow cooking permits the absorption of water resulting in a plump, full prune.

Mixture should be smooth and of the consistency of medium-thin marmalade or jam.

A cool product will blend with the egg whites more easily.

Air is incorporated into the mixture in this way.

Folding the prunes into the eggs rather than the eggs into the prunes results in less breaking up of the egg.

Careful handling is necessary to avoid breaking up the air cells.

The large amount of egg requires that the mixture be cooked slowly.

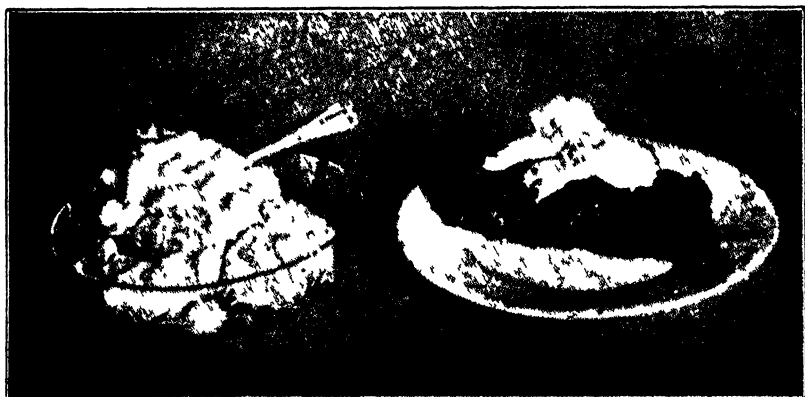


Fig. 5.—Date Pudding.

DATE PUDDING.

Equipment.

1 measuring cup
1 mixing bowl
1 teaspoon
1 flour sifter

1 baking pan
1 knife or food chopper
1 egg whip

Materials.

3 eggs
1 c. sugar
2 c. dates
1 c. pastry flour

1 t. baking powder
 $\frac{1}{2}$ t. salt
1 c. chopped nuts

Amount: 14 servings.

Method.

Wash dates and dry on paper or soft cloth. Chop or cut fine with knife. Chop dates and nuts. Sift dry ingredients. Beat yolks until thick; mix with dry ingredients. If mixture seems too stiff, add 1 tablespoon of milk or water. Beat egg whites until stiff, and fold into above mixture.

Bake in large pan 30 minutes in moderate oven (350°F.). Cut into strips for individual servings. Serve with hard sauce or whipped cream.

(HARD SAUCE.)*Equipment.*

1 mixing bowl
1 measuring cup

1 wooden spoon
1 teaspoon

Materials.

$\frac{1}{3}$ c. butter
1 c. powdered sugar

$\frac{1}{3}$ t. lemon extract
 $\frac{2}{3}$ t. vanilla

Amount: 1 cup.

Method.

Cream the butter (butter must be soft and well-worked before it will absorb and hold sugar). Add sugar gradually, working each addition well into the butter before adding more. Add flavourings. When done, hard sauce should resemble medium-soft white butter.

STARCH PUDDINGS.

The thickening, or basis, of the following group of puddings is starch, though many other ingredients may be added. The main principle to consider in their preparation is that of sufficiently swelling and cooking the starch. Long cooking with moist heat is necessary.

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RICE PUDDING.

Equipment.

1 double boiler or steamer
1 measuring cup
1 fork

1 teaspoon
1 strainer
1 baking dish

Materials.

$\frac{1}{2}$ c. rice
2 c. water
2 c. milk
 $\frac{1}{2}$ t. cinnamon
2 eggs

1 t. salt
 $\frac{1}{2}$ c. sugar
 $\frac{1}{2}$ c. raisins or currants
1 Tb. butter
Grated rind 1 lemon

Amount: Enough to fill a large casserole.

*Method.**How.*

Carefully wash rice by putting it in a strainer and allowing water to run through it.

Put water and salt in top of double boiler and place directly over the heat. Bring water to boiling point. Gradually add washed rice, stirring with a fork.

Boil 3 to 5 minutes. Then place over underpart of double boiler, in which there is boiling water. Cook for 30 minutes.

Add milk and stir slightly with fork. Cook for 20 minutes longer, or until rice is very soft.

Add melted butter. Beat eggs and add with other ingredients, using a fork to stir them into rice. Put in baking dish; cover with cracker or bread crumbs, and bake in moderate oven (350°F.) until custard is done.

Why.

Unless unpolished rice is used, there is always a talcum powder on the rice, which when cooked causes the grains to stick together and results in a gummy product.

This method prevents the rice from sticking to the pan. A fork does not break the rice grains as does a spoon.

Constant watching to prevent the rice from burning will be unnecessary if a double boiler is used after the rice has started to cook.

Milk is not added until the water is absorbed cause salt heated with milk tends to curdle the milk. To have a well-flavoured product, the rice must absorb the salt. When water is absorbed, the milk may be added safely.

COTTAGE PUDDING.

Equipment.

1 mixing bowl
1 measuring cup,
1 egg beater

1 teaspoon
1 mixing spoon
Muffin pans

Materials.

$\frac{1}{2}$ c. butter
 $\frac{3}{4}$ c. sugar
1 egg
1 c. milk

2 $\frac{1}{2}$ c. flour
4 t. baking powder
 $\frac{1}{2}$ t. salt

Amount: 2 dozen small cup puddings.

Method.

Prepare according to the muffin method for plain cake (*details of which will appear in a later issue*). Serve with lemon or chocolate sauce. This pudding should be eaten as soon as baked, since it is not rich enough to keep it from drying out quickly.

(PUDDING SAUCE.)

Equipment.

1 saucepan	1 teaspoon
1 measuring cup,	1 lemon squeezer
1 tablespoon	

Materials.

½ c. sugar	1½ Tb. lemon juice or
1 c. boiling water	½ t. vanilla
1 Tb. cornstarch or	Few gratings of nutmeg
1½ Tb. flour	Few grains of salt
2 Tb. butter	

Amount: 1½ cups.

Method.

Mix together sugar and cornstarch. Gradually add boiling water, stirring constantly. Boil 10 minutes to cook starch thoroughly. Remove from fire. Add butter and flavourings. Serve hot on puddings or on cakes that serve as puddings.

(CHOCOLATE SAUCE.)

Equipment.

1 saucepan	1 teaspoon
1 measuring cup	1 tablespoon

Materials.

1½ c. water	½ c. cold water
½ c. sugar	Few grains of salt
6 Tb. grated chocolate	½ t. vanilla
1 Tb. cornstarch	

Amount: 2 cups.

Method.

How.

Boil water and sugar 5 minutes.

Mix cornstarch with cold water for thickening.

Add grated chocolate to cornstarch and water; then add all to syrup, pouring slowly and stirring constantly.

Why.

Chocolate blends better in hot syrup than in water.

Mixing with cold water separates the starch particles and prevents formation of lumps when added to a hot mixture.

Adding the chocolate to the hot syrup at the same time as the thickening results in a smooth consistency because the starch acts as binder when the chocolate melts. If not held in place by a binder, the fat in the chocolate would cause it to float on the surface of the syrup; then when the thickening was added there would be an uneven composition.

Boil 10 minutes. Flavour with vanilla and serve hot on ice cream or pudding.

FRUIT TAPIOCA.

Equipment.

1 measuring cup
1 saucepan

1 mixing spoon

Materials.

$\frac{1}{3}$ c. minute tapioca

$1\frac{1}{2}$ c. liquid (fruit juice and boiling water)

Amount: 6 servings.

Method.

Boil the tapioca in the liquid until clear, adding more liquid if necessary. Then add sugar and fruit juice as desired. Cool and serve with cream.

TAPIOCA CREAM.

Equipment.

1 double boiler
1 measuring cup
1 strainer
1 mixing bowl

1 teaspoon
1 mixing spoon
1 fork

Materials.

$\frac{1}{2}$ c. pearl or minute tapioca
2 c. scalded milk
1 t. vanilla

2 eggs
 $\frac{1}{3}$ c. sugar
 $\frac{1}{2}$ t. salt

Amount: 4 servings.

Method.

If pearl tapioca is used, soak in cold water for 1 hour, drain, add to milk and cook in a double boiler until tapioca is transparent. Slightly beat egg yolks and salt. Add half the sugar to the milk and the remainder to the egg yolks. Combine by pouring the hot mixture slowly on the egg mixture. Return to double boiler, and cook until it thickens. Remove from fire, cool slightly, and add stiffly beaten egg whites. Flavour and chill.

FIG TAPIOCA.

Equipment.

1 double boiler
1 measuring cup

1 teaspoon
1 mixing spoon

Materials.

$\frac{1}{3}$ c. minute tapioca
 $\frac{1}{2}$ c. light brown sugar
 $\frac{1}{4}$ t. cinnamon or to taste
 $\frac{1}{2}$ c. nuts

$1\frac{1}{2}$ c. water
 $\frac{1}{2}$ lb. dried figs
 $\frac{1}{2}$ t. vanilla

Amount: 4 servings.

Method.

Mix tapioca, sugar, and water. Boil 10 minutes, add figs and cinnamon, then cook in double boiler 1 hour. Add nuts and vanilla. Serve cold with whipped cream.

CARAMEL PUDDING.

Equipment.

1 saucepan
1 measuring cup

1 tablespoon

Materials.

4 Tb. cornstarch
 $1\frac{1}{2}$ c. boiling water

$1\frac{1}{2}$ c. light brown sugar
 $\frac{1}{2}$ c. nuts

Amount: 3 servings.

Method.

Mix the cornstarch and sugar. Add the boiling water, stirring constantly. Boil about 20 minutes, or until there is no taste of raw starch, stirring constantly. Add nuts. Chill and serve.

FARINA CUSTARD.

Equipment.

1 baking dish	1 teaspoon
1 measuring cup	1 mixing spoon
1 fork	

Materials.

1 c. cold farina	$\frac{1}{2}$ c. sugar
2 c. milk	$\frac{1}{4}$ t. nutmeg
2 eggs	

Amount: 5 or 6 servings.

Method.

Stir the farina and milk together until they are perfectly smooth, then add slightly beaten eggs, sugar, and nutmeg. Bake in moderate oven (350°F.) until firm. Serve either hot or cold with any desired sauce.

INDIAN PUDDING.

Equipment.

1 double boiler	1 teaspoon
1 baking dish	1 mixing spoon
1 measuring cup	1 fork

Materials.

1 qt. milk	$\frac{1}{2}$ c. brown sugar
$\frac{1}{3}$ c. corn meal	$\frac{1}{2}$ t. salt
$\frac{1}{2}$ c. dates	$\frac{1}{2}$ t. ginger
$\frac{1}{2}$ t. cinnamon	1 egg

Amount: 6 or 7 servings.

Method.

Place milk in double boiler and when scalded add the meal moistened with cold water, stirring constantly to avoid lumps. Cook 20 minutes. Turn into baking dish and add remaining ingredients except the egg. Stir well and when the mass has cooled somewhat, stir in the beaten egg. Bake 1 hour in slow oven (300°F.). Serve hot with sauce.

FRUIT CEREAL PUDDING.

Equipment.

1 saucepan	1 knife
1 measuring cup	1 mixing spoon
1 fork	1 baking dish
1 teaspoon	

Materials.

1 $\frac{1}{2}$ c. cereal, before cooked	2 eggs
1 t. cinnamon	$\frac{1}{2}$ c. sugar
1 qt. milk	3 large bananas sliced across
1 $\frac{1}{2}$ c. coffee cream	

Amount: 6 or 7 servings.

Method.

The cereal may be any fine wheat preparation, cooked in boiling salted water. While warm, stir in cinnamon. Allow to cool. Add milk. Add slightly beaten eggs to the mixture, stir in sugar, mix well. Pour into greased baking dish; drop in fruit evenly. Bake in moderate oven (350°F.) 25 minutes. Test as for custard. Serve hot or cold.

A further instalment of Part II. will appear in next issue.

(To be continued.)

Papers Read at Eyre's Peninsula (West), Ceduna, July 4th.**JAM MAKING.**

[By MRS. W. PFEIFFER, O'Loughlin Branch.]

Practically all kinds of fruit are suitable for jam. Some may not be quite so useful on their own, but make a good combination with other kinds of fruit. Where the fruit can be picked from the garden it can be used just at the right stage of ripeness, but when the fruit has to be purchased in cases, especially if it has to travel some distance, it has to be carefully picked over. Any soft fruit should be stewed for immediate use. For best results the fruit should be firm, but just ripe. Better results are obtained from slightly under-ripe fruit than from that which is over-ripe.

For the various kinds of fruit there are different methods of preparation. Apricots should be halved and stoned and then weighed; plums likewise, excepting the Damson. Some plums are easy to stone, but some are not, in which case it is perhaps better to allow the fruit to boil without sugar for a while, and try to skim off the stones that come to the surface. But as this method is very tiresome—standing by the fire, especially on a hot day—it is preferable, if at all possible, to store the fruit before it goes on the fire. It may take longer to prepare, but it does not tire so much. A sharp, stiff knife is necessary; cut around the fruit, then put both hands on it, and twist the hands in opposite directions. One half is then free, and the other is cut as close as possible to the stone with the point of the knife. When accustomed to this method there is less waste than by skimming. These fruits do not need peeling, but any blemishes on the skin should be cut off. With the use of sugar, there are exceptions, but, as a general rule, $\frac{1}{2}$ lb. to 1 lb. of fruit is sufficient, but with figs and several of the berry fruits $\frac{1}{2}$ lb. is quite enough. Do not add water to any jam; it usually means longer boiling to make it set, and thus the colour is often spoilt. I usually add half the amount of sugar; mix it lightly with the fruit, and allow it to stand several hours. Warm the remaining amount of sugar by standing it in the oven, and add it after the jam has boiled about 1 hour. Most fruits, with the exception of quinces, apples, and pears, should be boiled quickly; the latter need long, slow boiling to get the right colour.

A reasonably large vessel is more satisfactory than a small one. If the pan is too small the jam cannot be stirred properly, which may cause it to burn. Always stir off the bottom. A board about 3 in. wide, tapered on one end to use as a handle and left wide at the other end and planed to rid it of splinters, and well scrubbed, is more satisfactory than a wooden spoon. A child's wooden spade is quite good. While the jam is boiling see that it does not burn. It needs most watching until it comes to the boil, and more so when nearly done. When the jam has a glassy, transparent appearance and bubbles start to come and break into a number of little ones, which is called "jellying," it is nearly done. Then it is advisable to take out a little and pour it on to a saucer and allow it to stand in a cool place. If thin skin has formed on it when it has cooled, then the jam is ready. If, however, it is watery, it needs a bit longer boiling. When the jam has cooled off a little put it into bottles, either pickle jars or ordinary bottles with the neck cut off. They should be thoroughly clean and dry. If stood in the oven for a while to warm there is less danger of them cracking when the hot jam is poured in. Fill them right to the brim, as it always contracts a little when it cools. When the jam is well cooled, preferably next day, it should have a nice firm skin. It should be sealed, either paper pasted over it and labelled, or melt pure clean tallow and pour it over. It should be stored in a cool, dark, and dry place. Where storing space has to be considered, put into large jars and perhaps tins. Better results can be obtained from a small lot of jam—say, 10 lbs. or 12 lbs. of fruit—than from a much larger quantity. It can be watched more closely, and it does not have to boil so long, thus preserving the colour.



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USES OF COLD MEATS.

[Miss L. KLOEDEN, O'Loughlin Branch.]

It is a problem of most housewives during summer to use up cooked meats, especially when the weather is bad, and all the fresh meat has to be cooked. One soon tires of cold meat for every meal, especially the men on farms. They all look forward to one hot meal a day, so I have chosen some simple ways of making hot dishes from cold cooked meats.

These are some of the different dishes:—Stuffed onions and tomatoes; savoury potatoes; curried mince; potato pie; rissoles; cabbage rolls; hurry scurry; mince omelet.

In stuffed onions and tomatoes, savoury potatoes, the meat has to be minced, adding an onion to taste. Then put mince into a saucepan, adding a little water so that it does not stick to the bottom while cooking. Add seasoning; while this is boiling prepare the tomatoes, onions and potatoes. These should be nice and firm, and the size of a small apple, to get best results. The tops should be cut off and the inside removed with a teaspoon. The inside of the tomato, onion, and potato shells are put into the mince. Arrange the shells in a baking dish, add the mince, and put cap on, then bake slowly until done, which takes from $\frac{1}{2}$ to 1 hour. In savoury potatoes the potatoes must be partly baked before adding the mince. These dishes are served with vegetables and brown gravy, if obtainable.

Mince omelet is a very nice breakfast dish, especially when there is no bacon to serve with the eggs. Mince scraps of meat, onion, and pour into pan, and fry until onion is cooked; then beat up eggs and pour over meat; keep stirring until eggs are cooked. Serve on toast.

Another dish made in a few minutes is called Hurry Scurry. Cut up very fine two big onions, and cut into dice a few slices of bacon. Fry this until lightly browned, then put in the pieces of cut up meat and keep stirring until meat is heated through, then pour off fat and sprinkle enough flour to make a nice gravy. Add enough hot water to the consistency of gravy; this, served with boiled potatoes, is very nice.

Cabbage Rolls.—Take enough outside tender white leaves of the heart as required and boil in a saucepan of water until tender. Boil a little rice, enough as wanted, mince the meat and add onion, salt and pepper to taste, and the boiled rice. Add an egg, then roll in cabbage leaves like sausages, and put into baking dish, and bake in a little butter, basting every little while.

Mashed potatoes served with these dishes are very nice, and it is always wise to keep the gravy from roasting, for gravy served with these dishes improves them immensely.

SOUP MAKING.

[By MRS. D. FAGAN, Assistant Secretary Goode Branch.]

Soup, if made well, can be very wholesome food for adults and children. Most soups are improved by having the stock prepared the day before the soup is required. The fat is more easily removed when the stock is cold. For just ordinary soups, any meat and bones, cooked or uncooked, in fact, any savoury food, if fresh and good, may be used to make stock. Trimmings from joints, remains of cooked meat, vegetables, gravies, bacon rinds, or ham bones can all be used. The water in which the joint has been boiled, can be saved and used to make soup. Save the water from boiled vegetables and mix it with the water in which meat has been boiled, and add either more chopped-up vegetables or split peas. If in a hurry, add a small tin of tomato

soup, or a couple of tablespoons of pea meal, or pea sausage, to the mixed vegetable and meat water. But the mixture must be boiling when the pea meal or pea sausage is added, and brought to the boil again and boiled for ten minutes. The mixture can also be thickened with rice, sago, or corn flour.

Try the following methods:—Usually 1 pint of water is needed for every 1 lb. of meat and bones, and 1 pint over for evaporation during cooking. This extra water may be added by degrees to prevent the stock coming to the boil too quickly. Cut up the meat and chop up the bones small, so that the juices may escape easily. Leave out as much of the fat and skin as possible, put the bones and meat in, and cover with the water in the proper proportion. If you want nice brown soup, the meat may be seared first on a hot pan, and the onions may be well browned also. Add about a cup of water, place on a sharp fire, and stir occasionally till the bottom of the pot is covered with a kind of jelly, then add the rest of the cold water. The meat and bones may be allowed to soak in the cold water for an hour or so to draw the juices, place on the fire, and bring very slowly to the boil. Skim it well before it boils much. A teaspoon of salt added just before it boils makes the scum rise. Take care to remove the scum only, and not the juices, which rise also. Keep the lid off the pot till the stock comes to boiling point, then keep it on all the time afterwards. After it is well skimmed add the vegetables cut in rather large pieces. After the stock has again reached boiling point, let it just simmer slowly for at least 4 hours. Do not let it boil again; add a little cold water if needed to check the boiling. When done enough, strain through a colander; when cold remove the fat from the top. There will be a thick jelly underneath. This jelly may be used as the basis of different kinds of soups. If you want it clear, and the stock is not clear enough by straining, it may be cleared by using $\frac{3}{4}$ lb. lean beef to each quart of stock, together with some cut up vegetables. Or use the white and shell of 1 egg to each quart of stock, whisk all together over a slow fire till boiling, then let it simmer for about half an hour, strain through a fine tea cloth dipped in boiling water. The albumen in the egg, or the meat added, attracts all the impurities in the liquid and clears it. The stock must be good and strong, as in the process of clearing, especially if the egg be used, some of the value of the soup will be removed. So it is better not to have it cleared; it is more nourishing left as it is. Most soups are better if left for the second day, but they must not be cooked too long after they get hot. Do not cover either cold stock or cold soup. If required to keep for any time, boil up stock daily. Many elaborate soups can be made, but if good beef and bones and vegetables are used, and the stock is made well, using split peas, rice, sago, and corn flour for thickenings, we can reduce our meat bill, and still have good wholesome food. A good way to use split peas is to soak them in cold water over night, then add them to cold stock and simmer for 5 or 6 hours, and then serve. If any one would like recipes for Asparagus Soup, Cocoanut Soup, Mushroom Soup, Mock Turtle Soup, Oyster Soup, or Lobster Soup, I will be pleased to give them.

DAIRYING.

[By Miss R. E. BLUMSON, Laura Bay.]

The care of cows is a very important factor in dairying. All milking cows should have as much water as they will drink twice every day. They should be fed according to the amount of feed in the paddock. If there is plenty of green feed in the paddock they will not need so much chaff, &c. Plenty of chaff and oats must be fed to the cows when paddock feed is scarce. Salt or super is very good sprinkled on the feed, especially where cows are lame and miserable, caused generally through mineral deficiency. Cows can be fed before or after milking, whichever is most convenient. The cow yard should be clean, large, and sheltered from cold winds. They can be fed in nose bags or large boxes. Have nose bags $\frac{3}{4}$ parts full, and add a 5 lb. jam tin of oats (more or less, according to the amount of paddock feed).

Cows must not be ill-treated. Breaking in young cows is quite an easy task if one goes about the job gently. In any case, there should be no trouble at all if the young cow has been petted and treated kindly from a calf. Ill-treatment is the source of nearly all the trouble. The cows must be milked regularly, and their teats washed in warm water, and dried with a clean cloth before milking. Every care must be taken when a cow has cow pox or any skin ailment. Massage the cow's udder with Sulphur Ointment, and be very careful not to handle other cows after milking one with any contagious complaint.

Calf feeding is a very important part of the dairyman's work, especially where heifers are concerned. Regularity in the feeding of calves must be practised to make a success of it. Young calves should be fed on fresh milk for at least a week, and at the present price of butter it pays to give them the good milk for three weeks, and then to slowly reduce the quantity of good milk (substituting separated milk) until they are about 6 weeks old. There is not much nourishment in skim milk, therefore a little linseed is sometimes necessary, or two or three eggs beaten up in the milk when eggs are cheap is very good. Calves should be kept on milk until six months old, and, of course, given chaff and hay as soon as they will eat. The calf pens should be sheltered; preferably made with picket fences, and a roof over half of it. Do not let the calf pen get muddy in wet weather. If there is any green feed around, the calves ought to be tied up to a stake, in a different place each day, so they can get fresh grass.

Cleanliness is essential in all stages of butter production. Separator, strainer, buckets, &c., must all be washed thoroughly in lukewarm water, using a clean dish-cloth and a good brush. All the crevices must be thoroughly cleaned with the brush. All utensils must then be scalded with plenty of boiling water, and then dried with a perfectly clean towel, and put in the bright sunshine when the weather is fine. The Separator needs a certain amount of attention, too. It must be oiled well every day, and kept perfectly clean inside and out. Every little while the inside of the machine must be all cleaned out, as the oil gets thick and clogs the works, thus making it hard to turn. A very good cover to keep the dust out of the separator when not in use can be made from a sugar bag.

Never run warm cream from the Separator on to cold cream. Cream must be stirred every day, and will need to stand 24 hours mixed all together before being churned. In the hot weather it is advisable to do the butter early in the morning. Always avoid having the cream in contact with fruit, vegetables, or anything with a strong odour, all of which spoil the flavour of the butter. It is necessary to churn three times a week in summer and twice in winter. Good butter cannot be made from stale cream. Churn the cream till the butter milk starts to come, then add a tablespoonful of salt to every 6 lbs. butter, dissolved in a cupful of cold water. Churn until a solid lump, then drain off butter milk, and wash until water pours off clear. Roll and sift the salt (1 dessertspoonful to each pound of butter) and work in thoroughly. Then wet butter board, pats, scale tray, &c., and rub salt well in. Turn butter on to board, and knead well with a piece of clean linen, kept specially for the purpose. The linen cloth must be scalded, and dipped into cold water before using to absorb the moisture from the butter. When quite free from moisture, form into pounds, which should be a half ounce overweight, to allow for shrinkage, lay on butter paper, and wrap up neatly. The articles used in butter making must be well scalded and kept in a cool place away from dust and flies.

THE DANGER OF FLIES IN THE HOME.

[By Mrs. M. E. BOWELL, Laura Bay.]

That flies are active carriers of diseases is well known; but I am afraid we are not so careful to keep the plague down as we should be. They breed so quickly in hot weather, especially in stables and pigsties, or wherever manure and moisture collect,

that strong measures are necessary to keep them down. They come to the house on people's backs, and stay with us as long as they are allowed to live. Nothing gives the housewife more trouble than flies, for they pollute everything they touch, and one has to be careful to protect food and milk, as a few flies settling on food, even for a moment or two, may cause illness. They carry germs from sick people, such as influenza, fevers, measles, colds, dysentery, and diarrhoea. Many children die of diarrhoea every year, most likely through infection by flies. They also poison uncovered sores, and are very dangerous to babies and small children, and so persistent that it is most difficult to protect them from the fly pest at times.

We should try to eradicate them from our own homes as much as possible. It is rather difficult on farms, but by burning dead animals, and cleaning stables and pigsties, much can be done to lessen breeding grounds. I think everyone should have fly screens and doors, even if they have to do without something else to get them, as it is quite impossible for a woman to combat the fly plague if flies have free access to the house. For the windows, cheese cloth, on light frames, is better than nothing, but screen doors are as great a necessity as a table in the kitchen. There are several good sprays on the market. After using them, sweep up flies and burn them. I use the "fly swat" and find it effective, both inside and out under verandah and outside of screen doors. Flies usually come in for a warm corner towards evening, and are drowsy, so can be easily "swatted," otherwise they are there early next morning, ready to pop in as soon as one opens the doors. The long sticky papers to hang up are useful, but if flies are very numerous the quicker way is to moisten fly paper. Milk, with a little sugar and formalin, in saucers also acts quickly and surely, as flies are thirsty pests. The materials are poisonous, so must be kept out of children's reach. Ducks are good fly eradicators, and our stables were practically free of flies when we had two Muscovy ducks.

AUBURN (Average annual rainfall, 24in.).

May 25th.—Attendance, 14.

BISCUIT RECIPES.—The following recipes were read by members, who also brought samples of the biscuits:—*Biscuits* (Mrs. Glover): 8ozs. flour, 4ozs. each sugar and butter, 1 egg, 1 tablespoon water. Beat butter and sugar, add the yolk of egg beaten with water, add flour. Top—4ozs. icing sugar, white of an egg, and cocoanut. Mix icing sugar with whole of egg, spread over the dough (which has been rolled out $\frac{1}{4}$ in. thick), sprinkle with cocoanut or chopped almonds, cut into lengths 3in. long, $\frac{1}{4}$ in. wide. Bake in moderate oven. *Ujarganappy* (Mrs. Burfield): $\frac{1}{2}$ cup melted butter, $\frac{1}{2}$ cup sugar, 1 egg, 1 cup cocoanut, 5 small cups cornflakes. Method: Beat butter and sugar together, add egg, then cocoanut, and mix well with cornflakes. Use fairly hot oven; bake in cake containers. *Afternoon Tea Biscuits* (Mrs. Kirkbright): 1lb. S.R. flour, $\frac{1}{2}$ lb. sugar, $\frac{1}{2}$ lb. butter, 2 eggs, a little milk if required. Mix butter and sugar to a cream, add eggs beaten well, lastly flour, essence to taste; roll out, cut with a cutter, and bake on a floured tray in rather a quick oven. *Cinna Coa* (Mrs. Morcom): 2 cups S.R. flour, $\frac{1}{2}$ cup sugar, $\frac{1}{2}$ lb. butter, 1 egg, 1 teaspoon each cinnamon and ground ginger, $\frac{1}{2}$ cup desiccated cocoanut, 1 dessertspoon golden syrup. Melt butter and beat all together. Add a little milk if too stiff. *Monte Carlo* (Mrs. Tansell): 4ozs. butter, 3ozs. sugar, 1 egg, pinch of salt, 1 tablespoon coffee essence, $\frac{1}{2}$ teaspoon vanilla essence, $\frac{1}{2}$ lb. self raising wholemeal flour. Cream butter and sugar, add egg, then essence and wholemeal. Put in teaspoonsful on slide, shape with back of fork. When cold, join with filling made of 3ozs. icing sugar beaten with 1 $\frac{1}{2}$ ozs. butter, 1 teaspoon coffee essence, and a few drops vanilla. *Shortbread Creams* (Mrs. Kelly): Cream well together $\frac{1}{2}$ lb. each butter and sugar, 3 eggs well beaten, and mix well with 1lb. S.R. flour and pinch of salt. When cold, join together with butter icing; one half may be coloured with cochineal. *Chocolate Cream Biscuits*: 12ozs. flour, 6ozs. each butter and sugar, 2 eggs, 2 tablespoons cocoa, $\frac{1}{2}$ teaspoon carbonate soda, 1 teaspoon cream of tartar, $\frac{1}{2}$ teaspoon vanilla, 1 tablespoon milk. Method: Cream butter and sugar, add eggs well beaten, then milk and flour, &c., well sifted. When cold, join together with icing made as follows:—1oz. butter, 1 cup icing sugar, 1 tablespoon boiling water flavoured with vanilla. *Ginger Snaps* (Mrs. Kench): 1lb. flour, $\frac{1}{2}$ lb. each treacle and sugar, $\frac{1}{2}$ lb. butter, $\frac{1}{2}$ oz. ginger, 1 teaspoon carbonate soda, a few drops of essence of lemon. *Walnut Wafers* (Miss Dennison): 3ozs. S.R. flour, 2ozs. each butter, sugar, and walnuts, 2 eggs, vanilla essence. Cream butter and sugar together, add eggs

and sifted flour, beating well. Chop walnuts finely and add with a little vanilla. Drop in small spoonful on a greased baking sheet not too near together. Bake in quick oven 10 minutes. (Secretary, Miss L. Dennison.)

BALUMBAH.

May 12th.—Attendance, 12.

RECIPES.—*Orange Marmalade*.—(Mrs. V. van Heythuysen): 3lbs. poorman's oranges, 13 cups water, 10lbs. sugar, 3 lemons, juice and pulp only. Cut oranges in thin slices, then add water and lemon juice and boil until tender. Stand over night, then add sugar and boil 25 minutes. *Almond Slices*.—(Mrs. Murphy): 7ozs. flour, 4ozs. butter, 4ozs. sugar, 1 teaspoon baking powder, 4ozs. almonds, 2 eggs, cream butter and sugar, add eggs, beating each in separately. When mixture is light, add sifted flour and about 3 parts of blanched almonds, finely shredded. When the last two ingredients are thoroughly mixed in, pour into shallow baking tin, spreading it well out. Split remaining almonds and scatter over top of cake, rounded side up. Bake in a moderate oven 15-20 minutes. When cake is coloured nicely turn out on to sugared paper, and cut in fingers when cold. *Nut Rolls*.—(Miss V. Wohling): 2 cups S.R. flour, 2 cups wholemeal, $\frac{1}{2}$ cup sugar, 1 cup sultanas, 1 cup dates, 6ozs. nuts (chopped), 1 teaspoon salt, 2 tablespoons each treacle and butter. Mix thoroughly flour, wholemeal, sugar, sultanas, dates, nuts (walnuts for preference), and salt, then add treacle and butter, which has been well heated and mixed in a saucepan. Mix well into the dry ingredients, and if too stiff add a little milk, but leave mixture as stiff as possible. Fill greased cocoa tins about 3ins. from the top, put on lids and bake in a moderate oven for about 20 minutes, with the tins standing up, then lay them down long ways, and bake 1 hour, turning every $\frac{1}{2}$ hour. When cool, cut in thin slices and butter. *Wheatmeal Scones*.—(Miss H. Jericho): 4 cups S.R. flour, 1 cup wheatmeal, 4 tablespoons cream, a pinch of salt, and enough milk to mix into a nice paste. Roll out lightly, cut in shapes, and bake 20 minutes in a hot oven. *Whole Meal Bread*.—(Mrs. H. Ellis): Take 2 large cups wheat, cover with water and boil well. When cool, put through an ordinary household mincer. Ingredients: 3 cups minced wheat, 4 cups white flour, 1 dessertspoon treacle, 1 teaspoon salt, $\frac{1}{2}$ cup yeast, little water to mix. Make as for ordinary bread, allow to rise, knead, and allow to rise a second time. Knead again and put into tins to rise. When ready, bake for not less than 1 hour. It is essential that the dough be kneaded three times and be sure to include the treacle. *Eccles Cakes*.—(Mrs. J. Swann): $\frac{1}{2}$ lb. flaky pastry, 2ozs. butter, 4ozs. each brown sugar and currants, 1oz. candied peel. Put butter in saucepan and melt, cut peel in fine pieces, then add currants, sugar, peel, and also a little grated nutmeg, and stir all together. Cut pastry into rounds, put some of the mixture, fold edges over, then turn over and roll until currants can be seen. Moisten top and sprinkle with sugar, bake in a hot oven 15 minutes. *Bread, made with Wild Hops*.—(Mrs. J. Franklin): First dry the wild hops, then take twice as much as ordinary hops make yeast in the same way, and also the bread. There is no difference in the bread made this way and with the shop-made hops.

SMOCKING.—Paper read and illustrated by Mrs. Murphy:—"Smocking is a very effective trimming for children's and women's clothes. It is very smart and easy to do. Many dainty and colourful garments can be made at a small cost. The simplest form of smocking is done on flat material. A transfer is obtained and stamped on with a warm iron. It is not strictly necessary to have a transfer, for with the aid of a pencil and ruler a suitable one can be made. It is necessary to make the transfer two-thirds larger than needed, as work usually smocks to about one-third of the original—therefore, if 2ins. of smocking are required it is necessary to have 6ins. of transfer. First begin working with tacking stitches, picking up each dot. When this is finished the work must be drawn together tightly—the tighter the better, because it is much easier to work. The appearance of the work is a series of small pleats with a dot on the top of each pleat. The material is now prepared for working. Thread needle with colour needed and work along each pleat with a stem stitch. This stitch holds the pleats firmly together. Continue working along or between rows with any stitch preferred and finish off work with stem stitch. Circular smocks are very dainty. To do these, have a special transfer, and then it is drawn and worked as desired. Circular smocks, smocked in different colours and stitches with a row of dainty-coloured roses and leaves in between make beautiful frocks for baby girls and smart blouses for girls and women." (Secretary, Miss V. Wohling.)

BELALIE (Average annual rainfall, 17.7in.).

May 8th.—Attendance, 23.

Sister Gurry of the Jamestown Hospital demonstrated an infant's layette showing the advantages of modern garments against old-fashioned baby clothes. From the discussion it was learned that infants' clothing should only be blue once a week and soda must never be used in washing. Vioella wool was recommended as best for knitting infants' garments. (Secretary, Mrs. A. Cummings.)

CLARE (Average annual rainfall, 24.56in.).

May 5th.—Attendance, 29.

ENTERTAINING YOUNG AND OLD.—Mrs. H. Bowley in the course of an address on this subject said entertaining meant to engage the attention agreeably, to amuse with that which makes the time pass pleasantly, or to divert or to receive into one's home. Entertainment was provided even for baby age, rattles, toys, &c., then to the kindergarten stage and from there to school days. After school hours childrens' playgrounds were the source of entertainment to most children. Libraries were another form for the older child. Picnics were a healthy source of entertainment. Then in high school life there were sports clubs as well as the scholastic side. After school life there were sports to entertain, community singing, music, bridge, knitting, and if older, conversation. Mrs. Deland also spoke. She said at one time sport was only considered for the young but now-a-days quite elderly folk took part in croquet, bowls, and bridge. One had only to go to the beaches during summer to see people of all ages getting entertainment and variety out of mixed bathing. When summed up "We are only as old as we feel." The shingled head as well as modern fashions were also adopted by many elderly folk. There were compensations for the really elderly folk, they had store houses of reminiscences which were the resting places of many recollections. The best and kindest way to entertain the old was to allow them to do the entertaining. Listen to them patiently and intelligently, thus they will be pleased and the listener will find that his time has not been spent in vain. (Secretary, Mrs. A. Pollock.)

LAURA BAY.

May 8th.—Attendance, 13.

PASTRY.—Paper read by Miss T. Barnett:—"There are three kinds of pastry:—Short crust, so-called because short and crumbly when cooked, used for Cornish pasties and all fruit pies, except apple pie; flaky pastry, so-called because in flakes or layers when cooked, used for apple pie and all meat pies, except Cornish pasties; suet crust, made with suet as shortening, used for boiled pudding, boiled dumplings, &c. Pastry should be made in a cool, airy place, put on a clean, cold oven slide, and baked in a hot oven. See that the oven is hot for flaky pastry or short crust, and the saucepan of water boiling for suet crust. Sift flour, salt and baking powder to remove lumps, mix thoroughly, and enclose air. Rub fat into flour with tips of fingers, raising fingers out of flour so that the air may mix with the flour as it falls. Handle pastry as little as possible, but lightly and quickly. Do not knead short or suet crust; use as little water as possible; the dough must be stiff and in one lump. Make dough for puff pastry fairly moist, and knead it well before adding fat. Roll pastry with a firm even pressure away from you—never sideways. Pastry should not be put over the contents of a pie whilst hot; the steam will make the underlayers of the pastry sodden. While pastry is in the oven, open the door of oven very seldom—never within

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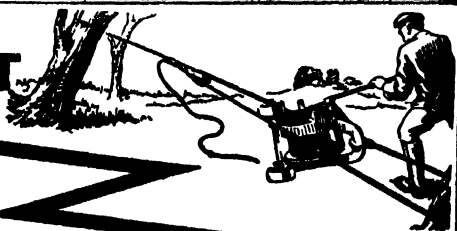
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the first five minutes. Small holes should be made in pastry that is covering meat pies to allow the gases from the meat to escape. When pastry is cooked in an open tart tin it should be well pricked to prevent it from rising too high in the centre. *Ingredients for Pastry.*— $\frac{1}{2}$ lb. flour, 1 gill water (cold), $\frac{1}{2}$ lb. fat or suet, $\frac{1}{2}$ teaspoon baking powder, pinch salt. To test oven heat sprinkle a little flour on cold oven slide and place in oven. The flour should become dark brown in 30 seconds, or a piece of paper should turn dark brown in the same time.

RECIPES FOR BISCUITS GIVEN BY MRS. F. EDSON.—*Plain Biscuits.*—Melt $\frac{1}{2}$ lb. butter in $\frac{1}{2}$ pint warm milk, 2 eggs, beat 1 minute. Stir these into $\frac{1}{2}$ lb. flour, make a stiff paste, roll it thin, cut into plain circles the size of the top of a tumbler, and bake 10 to 12 minutes. *Ginger Nuts.*—Rub 6ozs. of butter or good dripping into $1\frac{1}{2}$ lbs. of flour, add 1 teaspoon soda, 2 ozs. powdered ginger, $\frac{1}{2}$ lb. treacle. Make into nuts, bake on greased tins in a moderate oven 15 minutes. Dripping can be used instead of butter. (Secretary, Mrs. Morrison.)

PARRAKIE (Average annual rainfall, 14.64in.).

May 22nd.—Attendance, 10.

FARM LIFE EXPERIENCES.—Paper read by Mrs. Hamilton:—"Most of my life has been spent on a farm, and I have had the usual experience of most rural women. Looking back I am struck with the many changes and different methods of doing things. We feed the cows, milk them, and treat them much the same as 40 years ago, but we deal with the milk and cream in quite a different way. Instead of the old-fashioned, roomy dairy with the milk pans set around for cream we have the separator. Again, we sell the cream, not the butter, and send it to market at once. Years ago we made it into butter with the wooden churn, and sold it where we could. It generally went to the nearest store. Butter prices rose and fell in those times much the same as they do to-day. Poultry were handled much the same as to-day, except that now we hatch with an incubator and keep the chicks warm in a brooder. We buy day-old chicks of high laying strains, and have a much more prolific hen; also different and better ways of disposing of them. We obtain better prices for eggs and poultry than we did 30 years ago, but I have more trouble with tick and foxes to-day. Pigs are very unruly. I like them best in a good sty or on the table. My experience on a farm has been that one can have a garden. One should try and grow most vegetables, kill your own meat, and grind your own porridge meal. Many people think farm life is monotonous, but I have not found it so. We can interest ourselves in many things apart from household duties. At present we have better roads, and with motors more comfort, and are safer when out at night. We trust that the farmer will receive better prices, experience better seasons, and hope always for the best."

Mrs. Temby also read a paper on the above subject. She said her earliest recollections were of happenings and experiences on a farm, and had lived on one for over 50 years. Farm life for some people was much harder than for others. Sidelines she thought the most interesting. At present there was little profit in anything, and it was wonderful that as much interest was shown as when times were prosperous. All realised that farming must continue or everything else would fail. (Secretary, Miss Halliday).

PYGERY.

April 3rd.—Attendance, 9.

THREE COURSE DINNER MENUS AND RECIPES.—Mrs. M. E. Heath: *Chicken Broth*.—Take a small chicken, remove all fat, and cut into small pieces. Put into a saucepan with a quart of warm water and a little salt. Simmer over fire for 2 hours slowly, then strain. Serve with small squares of dry toast and add a little parsley before serving. *Poor Man's Duck*.—Remove bone from shoulder of mutton. Make stuffing of bread crumbs and onions, and seasoning to taste. Fill the hole and tie, and bake 2 hours. Serve with cauliflower and white sauce, and brown gravy. *Queen of Puddings*.—1 pint of bread crumbs, 1 quart of milk, 4 eggs (the yolk), a piece of butter the size of an egg, sugar to sweeten, flavour with lemon. When baked spread with jelly or jam and the white of the eggs beaten to a stiff froth. Mrs. A. R. Kammermann: *Tomato Soup*.—Boil several tomatoes and 1 onion finely cut. Strain, and add to the juice 1 cup hot new milk and 1 cup of stock; salt and pepper to taste, and thicken with a little flour. *Mock Fowl*.—Take a loin of mutton with sufficient chops to allow one for each person. Make a basin of seasoning, lay it on the chop side, turn the flap over and sew around the edge. Roast and serve cold with salad. *Stewed Pears with Blanc Mange*.—Let the sugar and water boil for 20 minutes before putting in the fruit. For blanc mange, allow to each pint of new milk 1 tablespoon each of sugar and corn flour, beat these in a basin with a little cold milk. Bring the rest of the milk to boil, pour it on the mixture in the basin, and beat until smooth. Serve quite cold. Miss G. Haylen: *Cauliflower Soup*.—1 cauliflower, 1 table-

spoon flour, 1 pint stock, 1 tablespoon margarine, $\frac{1}{2}$ cup of milk. Wash the cauliflower and break into small pieces, and boil in stock until quite soft. Follow by melting margarine and working the flour into it. Then mix the cauliflower, stock, the floured margarine, and the milk. Heat for 30 minutes, and add salt and pepper to taste.

Roast Pigeons.—Plunge pigeons in a saucepanful of hot fat, let them cook slowly for $\frac{1}{2}$ hour, then take out and brown in the oven for 10 minutes, or more if necessary.

Chip Potatoes.—Cut raw potatoes into slices, the thickness should be $\frac{1}{4}$ in. Melt some well clarified beef dripping in the frying pan, when very hot put in potatoes and fry for about 5 minutes, turning them as they brown. When cooked drain well and sprinkle with salt and pepper.

French Beans.—Use the old fashioned beans. Take off the outer rind, but do not cut up, tie in a bundle like asparagus and boil, serve with melted butter.

Apple Charlotte Russe.—Melt 2ozs. gelatine in $\frac{1}{2}$ cup of water, add a little sugar, lemon juice, and carmine. Put a layer of this in a plain mould and let it set, then line the sides of mould with finger biscuits and pile with following mixture:—1 cup of apple pulp flavoured with lemon juice and a little grated rind. Put in 4 sheets of gelatine (which has been melted in a very little water and allowed to cool slightly) the whites of 2 eggs stiffly beaten, and enough castor sugar to sweeten the mixture. Colour half with pink and put in mould, then colour the other with green and pile up rest of mould and put aside to get thoroughly cold. Turn out and decorate with whipped cream. (Secretary, Mrs. E. I. Heylen.)

May 1st.—Attendance, 16.

RECIPES FOR SWEETS.—The programme consisted of a display of sweets and recipes.

Snow Balls (Miss R. V. Foster): Soak 1oz. of gelatine in 1 $\frac{1}{2}$ gills water 20 minutes. Boil together 1lb. sugar, 1 $\frac{1}{2}$ gill of water, boil until sugar has dissolved; add gelatine and water, boil 10 minutes longer. Pour mixture into a bowl to cool, cut or roll in cocoanut.

Caramels: 1 large breakfast cup sugar, 1 level tablespoon flour, stir well together, then add a piece of butter the size of an egg, 2 tablespoons golden syrup, $\frac{1}{2}$ cup milk. Boiling quickly, this takes $\frac{1}{2}$ hour to cook, stirring all the time.

Toffee: 1 large breakfast cup sugar, 2 tablespoons honey, $\frac{1}{2}$ cup milk, boil 20 minutes quickly.

Cocoanut Ice (Miss M. C. Kammermann): 2 breakfast cups sugar, $\frac{1}{2}$ cup milk, 1 cup desiccated cocoanut. Boil sugar and milk in an enamelled saucepan slowly for 5 minutes, stirring all the time, then add desiccated cocoanut and boil for 1 minute. Take off saucepan and set it in a dish of cold water and stir until thick. Put half in a wet soup plate, colour the other half and spread on top.

Toffee (Mrs. W. H. Douglass and Miss O. Ingram): 2 cups sugar, $\frac{1}{2}$ cup water, boil until it sets in a little cold water.

Chocolate Ruffs: 1 cup each icing sugar and scorched cocoanut, 2 tablespoons cocoa. Mix with enough cream to make firm.

Almond Toffee (Mrs. M. E. Heath): 2lbs. sugar, 2 cups water. When boiling add $\frac{1}{2}$ saltspoon cream tartar dissolved in 1 tablespoon water. Let boil hard without the lid, to cracking degree, or when it begins to change colour. Sprinkle with blanched almonds and pour into a greased dish.

Turkish Delight (Mrs. G. Duggin): 1lb. granulated sugar, 1 lemon, 1oz. gelatine, water, icing sugar (cochineal to colour half). Soften the gelatine in a little cold water, then stir over gentle heat until dissolved. Boil sugar with 1 gill cold water, stirring until dissolved, strain in dissolved gelatine, and boil gently for 15 minutes, stirring frequently; draw to the side of the fire and add strained juice of lemon. After 15 minutes, strain and pour half into moistened tin to cool. Colour the remainder and turn into another moistened dish. When cold turn each on to a board dusted with icing sugar, cut into shapes, and roll in the sugar.

Vanilla Cream Caramels: 1lb. sugar, $\frac{1}{2}$ lb. butter, 1 cup each milk and cream, vanilla essence, and 1 tablespoon glucose. Stir sugar, milk, cream, and glucose over the fire until boiling, add butter, and stir; boil to the "hard ball." Flavour with vanilla essence, pour on to a buttered tin and when cool cut into squares. (Secretary, Mrs. E. I. Heylen.)

WILKAWATT (Average annual rainfall, 16 to 17ins.)

May 8th.—Attendance, 14.

HOMESTEAD MEETING.—The monthly meeting took the form of a social afternoon at the home of Mrs. F. R. Koch. Songs were rendered by Mesdames Bowman, Neville jnr., and Mrs. Koch. Mrs. Koch read several useful hints and recipes. (Secretary, Mrs. A. Oram.)

YURGO, May 25th.

WINTER PUDDINGS.—Paper read by Mrs. Rogers:—"As the various fruits and their accompaniments are mostly favoured for summer sweets, one looks forward to something more substantial for winter fare, such as steamed or boiled puddings which contain suet, butter, or dripping are usually boiled in a cloth or steamed in a greased basin, and are both wholesome and appetising. If I have a roast dinner I usually

have a boiled or steamed pudding, such as some of the following:—*Mother's Currant Pudding*.—1 cup sugar, 1 tablespoon dripping, pinch salt, $\frac{1}{2}$ cup milk, 1 cup each bread-crumbs and plain flour, $\frac{1}{2}$ teaspoon carb. soda, few currants or sultanas and little lemon peel. Mix all dry ingredients except soda, bind with milk, add soda dissolved in little boiling water, put in cloth already scalded and well floured, place in saucepan of boiling water, into which a saucer has been dropped. Boil $2\frac{1}{2}$ hours. I usually double this quantity, and what is left from dinner I fry for tea; cut in slices and fried in hot butter (or dripping), well drained and sprinkled with sugar, it is delicious.

Jam Roly Poly.—I used to have trouble with this sticking to the cloth, but have overcome that difficulty by first wrapping in greased butterpaper before tying in scalded cloth, and it turns out as desired. I put breadcrumbs in my mixture; it adds to the lightness of the pudding. Recipe is as follows:— $\frac{1}{2}$ lb. each breadcrumbs, flour, and suet, $\frac{1}{2}$ teaspoon salt, 1 teaspoon baking powder, water to mix. Mix dry ingredients, add shredded suet, rub well, mix to stiff paste, roll out in long strip, spread with jam, keeping it away from the edges of pastry; roll up and seal ends, roll in greased butterpaper, then in scalded cloth. Cook in boiling water two hours or more. Serve with boiled custard or cream.

Sago Fruit Pudding.—The sago fruit pudding is a general favourite, preferably for Sundays; on account of it being so rich one only needs a small serve. 1 cup breadcrumbs, 2 large tablespoons sago (soaked in enough milk to cover, soak over night), $\frac{1}{2}$ cup sugar, 1 cup seeded raisins, 2 tablespoons butter, 1 teaspoon soda dissolved in boiling water. Mix with enough milk to make rather slack; boil three hours or more. For steamed puddings, the college pudding and the 30 minutes pudding is my standby for washing days. It is easily and quickly made, and takes only 30 minutes to cook. I cook it in the same basin in which it is mixed. Scrape the mixture tidily from the sides of the basin and place in saucepan quarter full of boiling water and cook 30 minutes.

Thirty Minute Pudding.—1 cup S.R. flour, 1 pinch salt, 1 dessertspoon each butter and sugar, 1 egg, about $\frac{1}{2}$ cup milk. Beat butter and sugar, add egg, then milk and flour to make stiff batter. Serve with golden syrup and cream or sweet white sauce. I never cover the steamed puddings with greased paper or such like, and never have trouble with water getting into them if careful how I lift the saucepan lid. I try to find a convenient spot on my stove for the pudding saucepan, where it will keep simmering, and avoid shifting it if possible. If I have a boiled dinner then I arrange a baked pudding—either mill puddings, baked jam roll, or cottage pudding.

Baked Jam Roll.—2 cups S.R. flour 2 tablespoons dripping, pinch salt, water to mix; rub dripping well into flour and salt; mix to stiff paste with water, roll out, spread with jam. Roll up, place in greased piedish. Into a basin put a tablespoon butter, $\frac{1}{2}$ cup sugar, dissolve with 1 cup boiling water, pour over jam roll, bake in moderate oven $\frac{1}{2}$ hour, basting with the syrup occasionally." (Secretary, Mrs. R. Sanders.)

Other Reports Received.

Branch.	Date of Meeting.	Attendance.	Subject.	Secretary.
Mundalla	26/4/34	18	Address—Mrs. Cook	Miss M. Scown
Mundalla	1/6/34	8	Papers—Mrs. Golding and Miss Scown	Miss M. Scown
Rendelsham ...	2/5/34	14	Formal	Mrs. E. Andrews
Rendelsham ...	9/5/34	—	First Aid Demonstration—Mr. Nulty of the S.A.R.	Mrs. E. Andrews
Pinnaroo	4/5/34	16	"Dahlias," Mrs. F. Atze	Mrs. F. Atze
Morchard	30/5/34	17	Discussion	Mrs. Schultz
Snowtown	7/5/34	40	Question Box	Mrs. A. Hooking
Tantanoola ...	6/6/34	12	Annual Meeting	Mrs. E. Telfer
Wilmington ...	11/5/34	17	Address—F. C. Richards	Mrs. L. Cole
Wilmington ...	14/6/34	28	Question Box	Mrs. L. Cole
Kangarilla ...	21/6/34	8	Question Box	Mrs. M. Steer
Parilla Well ...	19/4/34	—	Formal	Mrs. J. Johnston
Parilla Well ...	26/4/34	—	Discussion	Mrs. J. Johnston
Parilla Well ...	19/6/34	16	Demonstrations by Mrs. Venning and Mrs. Johnston	Mrs. J. Johnston
Kybybolite ...	5/6/34	—	Address—Dr. H. Paver	Mrs. W. Schwick

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